UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Jakarta, Indonesia

PROJECT PAPER

Secondary Food Crops Development

Project No. 497-0304

April 1983

UNITED STATES GOVERNMENT

memorandum

DATE: 05/04/83

REPLY TO ATTN OF: Dennis C. Zvinakis, PRO

SUBJECT: Project Authorization

TO: William P. Fuller, DIR

THRU: Jonathan L. Sperling, PRO

Your approval is requested for a loan of $6,400,000 from Section 103 of the Foreign Assistance Act of 1961 as amended, appropriation to Indonesia for the Secondary Food Crops Development Project, Project Number 497-0304.

Discussion: At a meeting at BAPPENAS on 28 April a number of clarifications were made to the project which are now incorporated in the Amplified Project Description attached to the Project Loan Agreement. They include a limited budget revision, a wider participation to the Project Coordinating Committee and a number of editorial changes which clarified the responsibilities of the Indonesian participating agencies.

Waivers: None.

Justification to the Congress:

FY 83 Congressional Notification (see JAKARTA 15463 and STATE 080058 for CN and notification of expiration of CN).

Clearances Obtained:

The Project Identification Document was approved in AID/W on September 14, 1981. Mission Director has the authority to approve this project. The Project Paper has been reviewed and cleared by AGR, RLA, PRO, and FIN. The supporting Loan Agreement has been drafted by RLA and cleared by PRO, FIN, AGR and DD.

Action Requested: That you sign the attached Project Authorization and the Project Data Sheet indicating your approval of the Project Paper.

DCZ/cb

PROJECT AUTHORIZATION

INDONESIA

Secondary Food Crops Development Project

Project No.: 497-0304
Loan No.: 497-T-075

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Secondary Food Crops Development Project for Indonesia involving planned obligations of not to exceed $6,400,000 in loan funds over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

2. The project will assist the Director General of Food Crops, Department of Agriculture, to increase the production and improve the marketing of corn, cassava, soybean and peanut also known in Indonesia as secondary crops or "palawija".

3. The Project Agreement which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

4. a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within forty (40) years from the date of first disbursement of the loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10 years), and (b) three percent (3%) per annum thereafter, on the outstanding balance of the loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag registry of the United States, or Indonesia; or Code 941 countries as long as chartered or operated by Indonesian shipping companies.

b. Conditions Precedent to Disbursement

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D., evidence that:

1. a mutually agreed upon plan for the allocation, schedule and method of disbursement of funds to participating agencies namely, the National Logistics Agency (BULOG), Department of Cooperatives, the Agency for Agricultural Extension, Training and Education (AAETE), and Bank Rakyat Indonesia (BRI).

2. evidence that creation of a Steering Committee consisting of the Director, Bureau of Production, DGFC (Chairman); Director, Research and Development, BULOG; and Secretary to the Ministry of Cooperatives has been created to oversee the project.

5. I hereby authorize the use of loan funds provided by A.I.D. under the Project Agreement for international travel of participants.

William P. Fuller
Director

14/4/83
Date

Drafted:RLA:LChiles:04/13/83, mai

Clearances: AGR:ELucas:
FIN:RClark:
PRO:JSperling:
DD:RSimpson:

Distribution: DD-1, RLA-1, AGR-1, FIN-1, PRO-1, C&R-3

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: _____ — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: INDONESIA

3. PROJECT NUMBER: 497-0304

4. BUREAU/OFFICE: ASIA 04

5. PROJECT TITLE (maximum 40 characters): Secondary Food Crops Development

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 04 DD 15 YY 88

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4): A. Initial FY 83 B. Quarter 3 C. Final FY 83

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 83 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	3,643	2,757	6,400	3,643	2,757	6,400
(Grant)	(-)	(-)	(-)	(-)	(-)	(-)
(Loan)	(3,643)	(2,757)	(6,400)	(3,643)	(2,757)	(6,400)
Other U.S. 1.						
Other U.S. 2.						
Host Country	-	6,291	6,291	-	6,291	6,291
Other Donor(s)						
TOTALS	3,643	9,048	12,691	3,643	9,048	12,691

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	130B		140				6,400		6,400
(2)									
(3)									
(4)									
TOTALS							6,400		6,400

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 019 | 029 | 031 | | | |

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BR	BF	XII				
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

To increase production and consumption and to improve the marketing system of secondary crops in Indonesia.

14. SCHEDULED EVALUATIONS: Interim MM 06 YY 85 | Final MM 06 YY 88

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [X] 941 [X] Local [ ] Other (Specify) _____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment)

17. APPROVED BY — Signature: William P. Fuller — Title: Director, USAID/Indonesia — Date Signed: MM 04 DD 14 YY 83

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (8-79)

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PART I: SUMMARY AND RECOMMENDATIONS

A. Recommendations

A loan of US$6,400,000 from the USG to the GOI is recommended to support the Secondary Food Crops Development Project. The total project cost is estimated at US$12,691,000 of which the GOI will contribute US$6,291,000 in rupiah equivalent. Life of project is five years, beginning in January 1983 to January 1988.

The above recommendation is contingent upon the availability of USAID loan funds in US FY 1983. The loan will be fully funded at the beginning of the project.

B. Summary, Description and Findings

This project will assist the Directorate General of Food Crops, Department of Agriculture, to increase production and improve the marketing system of "secondary crops" known in Indonesia as "palawija". For purposes of this project, the secondary crops will be limited to peanut, soybean, corn, and cassava.

This project is fundamentally an experimental, trial, demonstration and intensification project --- experimenting and testing new cropping systems, demonstrating the superiority of improved cropping systems over the traditional, improving post harvest operations, and developing the market for secondary crops. The project will be concentrated on three project sites representing various agronomic conditions under which secondary crops are grown in Indonesia. Greatest attention will be at the local levels but other studies will also address regional and national policy issues relating to domestic and foreign demand for secondary crops.

The objectives of the project are:

(1) To bring about rapid adoption of recommended production technology using improved varieties, commercial inputs (e.g. fertilizers, lime, seeds, inoculum, pesticides) improved agronomic practices, and appropriate cropping systems.

(2) To improve the quality, storeability, and market acceptance of secondary crops by adoption of recommended pre and post harvest technology that includes harvesting, threshing, drying, storing and processing at the farm level and at various stages of the marketing chain.

(3) To evaluate results of experiments, trials, demonstrations and related studies as bases for planning expansion of the project or as a bases for the formulation of appropriate policies regarding prices, subsidies, production, consumption and market development.

(4) To identify possible extension, marketing and behavioral change models for maximizing the contribution of secondary food crops to improved nutrition.

This project is original in that for the first time, most of the agronomic, economic and social constraints will be addressed simultaneously. In addition, the impact to highly vulnerable target groups of changes in staple food consumption patterns in project areas will receive major emphasis. Current or traditional technology will be compared with improved technology that has been developed through cropping systems research. Trials will be conducted as a means of developing site and climate specific technology in areas of potential expansion. Also, the impact of changes in staple food consumption resulting from increased production and improved marketing will be evaluated. This is an intermediate step necessary for the planning of a regional and national program of secondary crops development in Indonesia.

Bone, South Sulawesi; North Lampung, Lampung; and Ponorogo, East Java have been selected as pilot sites because (1) they are predominantly secondary crops producing areas with tremendous potential for expansion and increased production, (2) they represent different agro-climatic conditions, (3) their population eat secondary crops as supplement or substitute to rice, and (4) improved cropping systems have already been tested with some degree of success in these areas.

All together, the project will directly affect 144,000 hectares operated by 72,000 farm families supporting approximately 360,000 people. It is anticipated that the introduction of the new cropping system will increase cropping intensity by 60% for peanut and soybean and 30% for corn and cassava thus bringing into effective production an incremental area of 54,000 hectares. Moreover, it is anticipated that productivity in the incremental areas will increase by at least 50% through improved agronomic practices and judicious use of commercial inputs.

There are five components of the projects, namely, (a) provision of production and marketing inputs, (b) extension, (c) demonstration, (d) field trials, (e) training and (f) nutritional considerations, (g) credit.

Timely and adequate supply of production and marketing inputs is critical to the success of the project. These production inputs include fertilizer, lime, seeds, insecticides, weedicides, herbicides, rhyzobium inoculum, small tillage equipment and draft animals for Lampung and Bone. Marketing inputs include drying sheds, simple mechanical dryers, storage facilities, simple harvesting and processing facilities, and quality control equipment.

The use and proper application of the above inputs will be accompanied by field level instruction and demonstration to be conducted by six Field Teams, each one consisting of Cropping Systems Agronomist, Marketing and Post Harvest Specialist and Agricultural Economist working with the regular extension workers (PPS, PPM, PPL) in the project sites. They will encourage the farmers to adopt cropping systems appropriate to the area, assist procure the inputs, and teach farmers the recommended agronomic and post harvest management practices (harvesting, milling, processing, storing, grading warehouse management). Also, they will

encourage public marketing agencies (KUD/DOLOG/BULOG) and private dealers to procure secondary crops on a regular and contractual basis and offer premium prices for products of superior quality.

As a companion measure to the above extension work, the Field Teams will also supervise farmers groups manage one one hundred eighty trials and demonstration farms where the new cropping systems, improved agronomic practices, proper use of inputs and equipment will be demonstrated. The project will provide for the commercial inputs, the farmers will provide the land and labor and the Field Teams will provide the management and technical know-how.

The Field Teams will also work in areas outside of the demonstration farms. These are called intensification areas. The field teams and cooperating farmer groups, will develop an annual farm plan that specifies the cropping systems to be followed, the types and amounts of inputs to be used and the agronomic practices to be followed. The farm plan, approved by the Field Team and certified by the Head of the Kabupaten Extension Office will be the basis for approval of non-secured production loan from BRI. The terms of the loan will follow present BRI requirement.

Similar procedure will be used to obtain credit for participating KUDs and private dealers in intensification areas. The Field Teams and BRI staff will assist the KUD or private dealers develop an investment plan for physical facilities improvement or expansion. This plan will specify tbe kind and amount of investment needed, economic feasibility analysis of investment, and repayment schedule. The investment plan, approved by the BRI staff, Field Teams, and certified by the Kabupaten Chief, Ministry of Cooperatives or other cooperative officials acting in similar capacity will be the basis for applying unsecured business loan from BRI.

There will be several types of experiments and trials in this project. Data for agro-economic research on cropping systems, costs and returns, production functions, fertilizer-yield response, and variety trials will be obtained from the demonstration farms and intensification farms. Trials on post harvest operation will be done at the BULOG Research and Training Center and at cooperating KUD/DOLOG/BULOG facilities. Trials on cropping systems will be done in potential areas of expansion outside of project sites. Special studies on national policy issues relating to pricing, subsidies, import and export, market development, baseline evaluation and monitoring surveys will be done by selected Indonesian or U.S. institutions. Technical workshops and coordinating meetings will be organized as necessary.

All of the training under this project are short term, designed to provide specific management and technical skills to GOI officials, extension workers, public and private marketing agents and farmers. Training given to GOI officials will consist of visitation travels or attendance to professional conferences related to upland agriculture. Three months training on production and marketing of secondary crops will

be given to the Field Teams in Jakarta organized by BPLPP assisted by the technical agencies such as CRIFC, DGFC, BULOG and AARD before they are posted in the project sites. On-site two weeks training on production and post harvest management organized by the Field Teams will be given to contact farmers, extension workers, public marketing agents as well as private dealers.

The Secondary Food Crops Development Project provides an excellent vehicle for integration of food production, consumption and nutrition activities. Specifically, the concern here is for the identification of beneficiaries and formulation of production and marketting activities that provide maximum nutritional impact on the target population. As an initial step towards this end, a market basket type study will be included in the baseline survey. This study will establish the present consumption and nutritional status of the beneficiaries. It will also establish a basis from which nutritional interventions will be formulated as the need arises.

All of the above activities will be under the overall administration of the Directorate General of Food Crops. Under it is the Directorate of Production where an office called the Palawija Project Office (PPO) will be created to administer the project. The PPO will be staffed by technical advisers consisting of an Agricultural Economist, a Cropping Systems Agronomist, a Marketing and Post Harvest Specialist, Food Policy Library Development Specialist. These technical advisers will be counterparted by similar experts from the Directorate General of Food Crops and BULOG and together they will provide the managerial, administrative, supervisory and technical backstop to the Field Teams.

There will be six Field Teams (FT), two in each project site. Like the PPO, each FT will consist of an Agricultural Economist, a Cropping Systems Specialist and a Marketing Specialist. They will be drawn from existing DGFC staff or recruited from outside. They will serve as the main extension arm of the project, working directly with the extension staff at the kabupaten level. They will be responsible for procurement of inputs, organize on site training for extension worker (PPL), contact farmers, and marketing agents. With the help of the PPS and PPM, they will organize and supervise farmer groups working on demonstration and intensification farms. They will assist farmers groups and KUD develop farm plans and investment plans as basis for obtaining unsecured production and investment loans. They will also assist researchers collect farm level data and assist them conduct baseline and evaluation surveys in their respective areas. They will report to the PPO in Jakarta, through the Kabupaten and provincial extension service.

Operational support services will be provided by various agencies of the government. For example, BPLPP will conduct training to the Tield Teams in cooperation with the DGFC, CRIFC and BULOG. CRIFC will be contracted to conduct Cropping Systems Research in areas of potential expansion. Regional universities will be contracted to conduct baseline, monitoring

and evaluation studies and other special studies as required. Gadjah Mada University will be contracted to provide rhyzobium inoculum. P.T. PEKTANI and P.T. PUSRI will be contracted to provide agricultural inputs while the Provincial Seed Centers will be contracted to provide the seeds for the demonstration farms.

This project will use the existing BIMAS coordinating committee as a vehicle for coordination with other agencies involved in food crops production. The Project Director will become a member of the national BIMAS Coordinating Council while the Team Leaders of the Field Teams will become members of the provincial BIMAS Coordinating Committee.

To ensure closer coordination among the participating agencies, a Palawija Project Coordinating Committee will be formed consisting of (1) the Director, Bureau of Production, DGFC, (2) Director, Research and Development, BULOG, (3) Secretary to the Minister, Department of Cooperatives, (4) Project Director, Secondary Food Crops Development Project and (5) USAID Project Officer. The Project Director will serve as Secretary to the Committee, prepares the agenda, and keeps records of all actions and decisions taken by the Coordinating Committee. The Committee will meet at least ones a month but special meetings can be arranged by the Chairman as the need arises. Chairmanship of the Committee will be rotated among the members. These members of the Steering Committee may be changed any time at the request of their respective Director General.

The Project Design Team has analyzed the technical, economic, social, financial and administrative feasibility of the project. The members of the Team unanimously recommend approval of this project. The Team has identified features of the project which are critical to its success. First is the choice of qualified technical advisors. Second is the administrative arrangements among participating agencies. The Team is convinced that this project comes at a time when the policy environment is favorable, when serious commitment towards food crops self-sufficiency is a matter of national goal.

C. Policy Issues

The principal policy issues are (1) subsidies to producers and consumers of secondary crops and (2) role of private vs public sectors in the marketing of secondary crops.

1. Subsidies and Pricing Policies

Altough there is a considerable volume of private trade, the economy operates within a system of government managed prices for a broad range of commodities. The principal tools of price management include subsidies on inputs, establishment of floor and ceiling prices, control of imports and exports and open market operation.

For example, the support prices for peanut and soybean are slightly above the CIF price of importing these commodities but less than the actual price in Indonesia. For corn, the CIF and actual prices are slightly less than the support price, which imply that if Indonesia is to become a surplus producer rather than a net importer, it would find it difficult to compete in the world market. In the case of cassava, as long as the feed market for gaplek in the EEC holds, this market appears assured in the foreseable future.

The key question is what the government plans to do about subsidies. The Economic Analysis shows that peanut and soybean will continue to be sound development prospects even in competition with imports. Corn and cassava have favorable benefit/cost ratios overall. For corn this statement is true if some improvement in post-harvest handling will improve the quality and prices in the domestic market. Increased export of cassava will require some improvements in post harvest operations and continued concessional access to the EEC.

The subsidized prices of rice and wheat to the consumers have stimulated demand for these crops and depressed the demand for secondary crops. If plans to reduce these subsidies materialize there is, within the lower income groups, substitution of rice/flour diet to secondary crops, thus stimulating the demand for and prices of the secondary crops.

2. Public vs Private Marketing

Indonesia has developed an efficient buffer stock operation for rice designed to contain price fluctuations in the market. This is supported by establishment of a floor price that assures reasonable profit to producers and a ceiling that is affordable by consumers. Because the difference between the ceiling price and the floor price is narrow and because spatial and temporal price fluctuations are minimized by periodic market operation, there is no incentive for private dealers to participate in the marketing of rice.

There is a similar support price for selected secondary crops. However, the actual market prices for peanut, soybean and mungbean exceeds the support price by 46%, 97% and 125% respectively indicating profitability of private dealership to get involved in the marketing of these commodities. This also explains why government procurement of these crops has not been successful since the market prices have always been higher than government support prices.

While this project will address marketing improvements in both private and public (BULOG-supported) operations, it can be expected that private traders will continue to be the principal marketing outlet for secondary crops. It is unclear as to what degree BULOG desires or is prepared to undertake public procurement for secondary crops. A key premise of this project which has been verified at the local and regional levels is that private marketing exists and can be developed and improved to handle secondary crops production if a sufficient supply at acceptable standards

is available with certain assurance of regularity. Quality improvement and more reliable supply appear to be the necessary pre-requisites for private market participation, along with continuation of the present price structure that allows investment in drying, storing and processing facilities.

PART II: PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Background

1. Agricultural Development in Indonesia

Indonesia is a country over 3,000 miles long, located between South Asia and Australia. It consists of 13,600 islands located on both sides of the equator along the Java, Molucca and Banda seas. Forests and swamps cover 60% of the total land area of 191 million hectares, of which approximately 75 million hectares are potential agricultural lands. About 18 million hectares are presently cultivated, one-fourth of which is irrigated. Some 15.6 million subsistence farmers produce food and cash crops on 15.8 million hectares of land, while 1,800 large estates occupy 2.2 million hectares for tree crop production.

Although Indonesia is rich in natural resources, it is a developing country in many respects. With per capita GNP of $520 in 1981, Indonesia remains the least developed among the ASEAN countries. Recent estimates and other data indicate that perhaps 76 million or 52% of its 153 million people live at or below poverty levels, with some 50 million people having per capita incomes of less than $90 a year.

Poverty in Indonesia is predominantly rural. The lack of employment is a major contributing factor. Under-employment is becoming the leading manifestation of poverty. Given an under-employment rate of 30-40%, the creation of productive employment and improvement in agricultural productivity are the main avenues to eradicate wide-spread rural poverty and to bring about more equity in income distribution.

a. Role and Performance of Agriculture in the Economy

Indonesia's agriculture is characterized by a large proportion of subsistence farming. About six million farmers own less than a quarter of a hectare of land and another five million own between a quarter to half a hectare of land. The average farm size in Indonesia is about 1.0 hectare.

Although the contribution of agriculture to GDP and exports has declined during the last decade, the agricultural sector remains the principal source of employment and income. Agriculture accounted for 26% of the GDP in 1980 and provided 60% of employment. Agricultural output has increased during the past decade at an annual average growth rate of 4% per year, making Indonesia among the developing worlds better performers in this area.

b. Trends in Agricultural Production

Of the total value of agricultural production, food crops constitute 58%; tree crops, 18%; fisheries, 9%; forestry, 5%; and livestock 10%.

Rice which represents 47% of all the value of agricultural products is the preferred staple in most of Indonesia. Production during the first two Five-Year Development Plans (Repelita I and II) has made impressive gains. Annual rice production for the period 1976-81 increased by about 48%, from 15.8 million tons to 22.2 million tons. This increase was due to the introduction of high-yielding, pest and disease resistant varieties; increased use of fertilizer; an expanded program of irrigation construction and rehabilitation; and short-term production credit to farmers accompanied by intensive extension work. For the first time, in 1982, Indonesia has attained its long sought goal of rice self-sufficiency. Consequently, the Government has announced that it does not intend to import rice in 1982.

The major secondary food crops are soybean, peanut, corn, casava, sweet potatoes and mungbean. Overall, the annual production of secondary crops either stagnated or decreased during the period 1974-1977, and it was only recently that an upward trend has been observed. Secondary food crops production as a group experienced a composite growth rate of only 1.6% from 1968 to 1977, compared to an aggregate agricultural production rate of 4%. Results of cropping systems research suggests that these crops offer promising prospects for substantial increases in production and farmers income particularly in the upland rainfed areas.

The main tree crops are coconut, rubber, coffee, cloves, pepper, tea, oil palm and cacao. Tree crops occupy about a third of total arable land and are Indonesia's second largest source of foreign exchange. There are some five million smallholders, many of whom are in the poverty group, who depend partially or entirely on perennial crops for their livelihood.

The annual value of livestock output increased from $833 million in 1976 to only $881 million in 1980. An important exception to this trend with implications to this project is poultry. Poultry production has expanded rapidly in recent years and is expected to continue in the future as income increases. Continued expansion will sustain a strong demand for production of soybean and corn for feed purposes.

Although fisheries account for only 9% of the total value of agricultural production it constitutes one of the more important agricultural exports. Fish production increased during the past ten years at an annual average growth rate of 4.5%. Indonesia's forest resources are the largest in Asia. About 120 million hectares are classified as forest lands of which 45 million hectares are presently in production. This subsector accounts for about 5% of total agricultural production.

2. Secondary Food Crops Development Strategies and Policy Options

a. Rationale for a National Program of Secondary Food Crops Development

Indonesia has been a major food deficit country. In 1981 Indonesia imported 1.5 million tons of rice, 1.6 million tons of wheat, 100,000 tons of corn and 250,000 tons of soybean. Previous to 1982 the rice import in any one year constituted about 20-23% of the supply in the domestic market or about 10% of supply in the world market. A major drought, pest or disease infestation or natural calamity in major rice exporting countries has serious consequences for Indonesia.

Dramatic increases in rice production similar to the "Green Revolution" in the 1970s are not likely to be repeated in the 1980s. By 1990 an additional 9 million tons of basic staple food will be required to feed a population increasing by about 3 million persons per year. Recognizing these facts, the GOI departed from its Repelita I and II policy of rice self-sufficiency to one of food crops self-sufficiency in Repelita III. This policy supports diversification of food crops production and consumption to include not only rice but also secondary crops.

Secondary crops have potential for improving the diet of the poor at a relatively low cost. These crops can be used directly as substitutes for rice, or in processed forms as bakery products. It is recognized that the best way to improve the diet of the poor is to grow those crops that are labor intensive, relatively cheap but rich in nutrients, easy to grow and eaten by the poor.

As shown in the Technical Analysis, increased production of secondary food crops is feasible within rice-based cropping systems. Through cropping systems employment can be expanded, productivity improved, and farm incomes increased. It was demonstrated in some upland areas that farm income from secondary food crops exceeds income from rice. Moreover, secondary food crops can be grown in soils and climates where rice cannot grow. They are adaptable to a greater variety of soil and climate and their growing requirements are less technologically demanding than that of rice.

The domestic and export markets for secondary crops are more diverse than those for rice. Aside from direct human consumption, secondary food crops can be processed for animal feeds, manufactured into alcohol, oils and syrups or made into noodle and bakery products. Food technology research and market promotion should enchance long-term demand and acceptance of a wide range of new products.

In summary, development of secondary food crops is seen not only in the context of increasing food production but also of diversifying food consumption and production with the goal towards relief from rice dependency, improvement in nutrition, conservation of soil and water, generation of employment opportunities, increase in farm income and more even distribution of income to the farmers, all of which are guiding principles stated in Repelita III.

b. Potentials for Development

There is room for improvement in yield through research, adoption of improved technology and increased support services. Similarly, there is a tremendous scope for area expansion in the outer islands. Some of the more important factors needed to realize these potential are already in place.

There is sufficient land area, particularly in the outer islands, for extensive cultivation of secondary food crops. The World Bank estimated potential lands of 22.7 million hectares that could be utilized for food crops cultivation in the outer islands.

Secondary crops grow well under different agro-climatic conditions throughout most of Indonesia. Yields of these crops on experimental and demonstration trials conducted by FAO, IRRI and CRIFC have exceeded substantially the yields attained generally by farmers.

c. Constraints and Strategy

Several constraints must be simultanously addressed if secondary crops are to assume a more significant place in Indonesia. Research must receive continued support. Research results already showing promise for adoption need to be extended through trial and demonstration in different agro-climatic zones of the country. Effective and cost-efficient models for improving research and extension linkage need to be explored.

Marketing constraints and related supply and demand issues require closer examination. Marketing concerns include problems of low, fluctuating and uncertain prices; the seasonal nature of harvests and the requirements by processors of a more reliable supply of good quality; limited services for processing, drying, and storing, and the strong preference for rice among Indonesian consumers.

The approach chosen in this project is both cautious and ambitious. Caution argues for a narrowing of focus to limited project areas where lessons can be learned and digested before possible expansion on a larger scale. In this way the project should serve the GOI and cooperating donor organizations in determining more precisely the conditions for successful promotion of secondary crops.

B. Detailed Project Description

1. The Project Area

The project will focus initially on six agricultural extension zones (WKBPP or Wilayah Kerja Balai Penyuluhan Pertanian) located at the

district (kabupaten) levels in three provinces. These are as follows:

WKBPP	Kabupaten	Province
Abung Timur	North Lampung	Lampung
Banjid	North Lampung	Lampung
Selli	Bone	South Sulawesi
Palattae	Bone	South Sulawesi
Sokorojo	Ponorogo	East Java
Pulung	Ponorogo	East Java

Together, the six WKBPPs include an agricultural land area of 410,500 hectares cultivated by about 168,000 families with a total population of 897,000. These sites were selected because (a) they represent different agro-climatic zones and ethnic characteristics, (b) secondary crops are eaten as regular staples of the population, (c) there is potential for increased production, and (d) preliminary research has been completed on improved production technology and cropping systems which are ready for demonstration and dissemination to farmers.

The average farm sizes differ from one area to another, ranging from less than 0.50 hectares in Sokorejo, East Java to more than 2.50 hectares in Bone, South Sulawesi. Details on the agronomic, economic, institutional and social profiles of each project site are found in Annex A.

The project is designed for intensive trial and demonstration of production and marketing systems. However, expansion to an additional six WKBPPs is planned at the end of the third year, contingent upon results of comprehensive evaluation of the six original sites. Choice of the second set of WKBPPs will be based on the same criteria followed in this project.

2. The Project

a. Goals

The goals of the project are (a) to increase the production of secondary crops by about 15%-30%, (b) to improve the marketing system of secondary crops, (c) to increase household consumption by 10%-15%, and improve nutritional status of target groups, (d) to increase employment by 20%-30%, (e) to increase farm income by 20%.

The goal of increased production will be attained through a cropping systems approach where technologically and economically appropriate food crops are grown in sequence or in combination, supported by adequate amounts of input and intensive extension. This cropping systems approach may alter the existing sequence and combination of crops presently grown in the project sites, revise the cropping calendar, require additional investment in inputs and more intensive use of labor, land, and capital.

The increase in production assumes that recommended cropping systems for each site will be adopted by the farmers and that inputs and technical assistance are available whenever needed and that incentive procurement

or market prices continue to prevail. Achievement of this goal will be verified by an impact evaluation study at the third and fifth year of the project.

The second goal is improvement in the marketing system. This will be attained through improved methods of harvesting, threshing, milling, storage and grading. To attain this goal, farmers will be trained by extension workers in the latest techniques of post harvest management; storage and warehouse operation and post harvest losses will be minimized through fumigation and insect control procedures. Quality control in accordance with standards of procurement established by BULOG will be followed. Indicators of goal achievement will be through impact evaluation study showing increased volume of marketed crops of higher quality. This will be reflected by higher prices, reduced spoilage and generally increased demand for household consumption and market demand for industrial and commercial uses. This goal assumes that there is a latent demand for secondary crops if there is adequate and regular supply of high quality.

The third goal is to increase household consumption of secondary crops. This will come about through income and substitution effects. As income increases consumption of fresh cassava, peanut, and soybean will increase while consumption of corn will decrease. As production of secondary crops increase causing secondary crops prices to decline relative to the price of rice, there will be a substitution of rice for secondary crops in the diet. Achievement of this goal will be indicated through baseline survey and impact evaluation studies. This goal of increased consumption assumes that rice is substitutable for secondary crops and that income continues to increase during the life of the project.

The fourth goal is to increase employment. Achievement of this goal will come about through increased cropping intensity, resulting from fuller utilization of land, labor and capital throughout the year. The effect will probably be more in the reduction of under-employment rather than in creating additional jobs. Achievement of this goal will be indicated in the impact evaluation survey showing increased labor use, increases in capital investment and fuller utilization of land and other farm resources. This goal assumes that there is substantial under-employment on the farm due to the seasonal nature of production inherent in the traditional cropping patterns.

The fifth goal of the project is to increase farm income. This is of course a result of increased production and higher prices. This goal assumes that the production technology will be adopted by the farmers and procurement and market prices continue to increase at a level that provides profit to secondary crops enterprises.

High-income households generally tend to consume more food and show less under-nutrition than poor ones. When diets are inadequate in quantity or quality because of lack of income, increased incomes should have beneficial nutritional effects by shifting these households to a higher consumption group. However, it cannot be assumed that improved nutrition will automatically follow from production increases or income increases.

b. Purposes

The purposes of the project are (a) to introduce improved cropping systems consistent with the agronomic and market conditions of the project sites, (b) to increase the use of commercial inputs, (c) to improve the system of post harvest management, and (d) to maximize the contribution of secondary food crops to improved nutrition.

In the first purpose, it is expected that about 50% of farmers in the six WKBPPs and about 30% of farmers in kabupaten Bone, Ponorogo, and North Lampung will adopt the improved cropping systems. To achieve this purpose, 54 demonstration farms will be located at each project site. These demonstration farms will be used as models. Experiments will also be conducted in areas of potential expansion. The demonstration farms, experiments trained PPLs, use of commercial inputs and the adoption of improved agronomic practices will be the principal components of an effective extension system. Indicators of achievement of this purpose will be the rate at which improved agronomic practices have been adopted and the magnitude of increased use of commercial inputs.

For the second purpose, it is expected that 50-75% of farmers in the project will increase their use of commercial inputs. This increase in the use of fertilizer, insecticide, pesticide and rhyzobium inoculum is inherent in the adoption of new cropping systems and improved agronomic practices. An efficient input distribution system is already in place through the BIMAS Palawija program. Farm records and accounts will show the magnitude of increase in the use of inputs.

The third purpose is to improve the system of post harvest management. To achieve this purpose training in post-harvest operations will be given to KUD and BULOG staff, private dealers and contact farmers. Also, post harvest facilities such as small scale dryers, and storage facilities will be provided. Harvest and threshing equipment will be provided and quality standards will be adhered to in procurement centers.

The fourth purpose is to maximize the contribution of secondary food crops to improved nutrition. To achieve this, emphasis will be given to beneficiaries of the extension services and related assistance, how families use the increased production, and to whom the crops are sold. A simple baseline nutrition status survey and regular monitoring of nutrition consequences will allow for appropriate interventions as needed.

Achievement of the above purpose will be indicated by improved quality of products, reduced spoilage, increased consumer and market acceptance and increased prices and improved nutritional status..

c. Outputs

There are six outputs of the project. They are (a) the Palawija Project Office, (b) six Field Teams, (c) trials demonstration farms and intensification farms, (d) trained extension and KUD staff, private dealers and contact farmers, (e) special studies, (f) commodities, and (g) experiments and trials.

- The Palawija Project Office (PPO) is the implementing office of the project. It will be staffed by three technical advisors with specialties in cropping systems, agronomy, agricultural economics, post harvest management and marketing. GOI counterpart personnel with similar specialties will complement the three technical advisers and together they will provide technical and management advisory services to the DGFC, the executing agency for this project.

- The six Field Teams to be located in Bone, Ponorogo and North Lampung are the field implementing units of the project. Each Team will consist of one cropping systems agronomist, one agricultural economist and one marketing and post harvest specialist. Together they will work with the PPS, PPM, PPLs and farmers at the provincial, kabupaten and WKBPP levels. They will also assist research workers collect data for special studies, facilitate the provision of inputs, plan for design and construction of trials and demonstration farms, and assist farmers, KUD and private dealers develop farm plans, and investment plans for credit purposes.

- There will be 162 demonstration farms of 5 hectares each and 18 experiments of one hectare each. The demonstration farms will be used to demonstrate the improved cropping systems and the trials will be used to try new cropping systems in areas of potential expansion. All commercial inputs will be given free to the experiments, demonstration farms with close supervision on their use by the Field Teams and extension workers. Land and labor will be provided by the farmers.

- Similarly there will be intensification farms who will receive the services of the Field Teams but will procure their inputs through BRI loans.

- A cadre of trained PPL, PPM, PPS, KUD managers, contact farmers and private dealers will complement the Palawija Project Office and the Field Teams. Together, they will teach the farmers recommended cropping systems and appropriate post harvest management practices.

- Special studies on agronomic, economic, social and policy aspects of food crops in Indonesia will be conducted. The Project Director will establish an ad hoc panel of experts to establish areas of researchable topics, establish criteria for determining priorities, and guideline for proposal selection. Research proposals will be solicited from local or foreign universities, private individuals and institutions or from government agencies. These special studies will include baseline and evaluation surveys and feasibility studies. These special studies will be complemented by technical workshops conducted to support the various activities of the project.

- Various types of commodities needed in the project will be delivered in each project site. These include operational support facilities such as motor vehicles, office equipment, production facilities such as seeds, draft animals, fertilizers, insecticides and rhyzobium inoculum; and post harvest facilities such as sprayers, dryers, and on farm storage. These commodities will be provided by the project. Production, marketing and post-harvest facilities and inputs in the intensification areas will be provided through loans from BRI.

- Increased number of acquisition and improved library and information services at the BULOG Food Policy Library and the Research and Training Library at Tambun.

d. Inputs

There are five categories of inputs in this project. These are (a) technical assistance, (b) training, (c) personnel, (d) other operational support, and (e) commodities.

- The technical assistance will consist of 171 men-months of management and technical advisory services of which 156 men-months will be for long-term advisors and 15 men-months for short term consultants to work on specific components of the project.

- There will be 678 men-months of training consisting of 98 man-months of overseas training and 580 man-months of in-country training for Field Teams, extension workers, private dealers, contact farmers, and KUD officials.

- Personnel will consist of 1200 men-months of (a) three senior GOI officials that will counterpart the technical advisors in the Palawija Project Office, (b) eighteen GOI officials to staff the Field Teams, and (c) eight support personnel.

- Inputs in the form of operational support will be given by cooperating agencies through contractual arrangement with the PPO/DGFC. For example, Cropping Systems Research will be conducted by CRIFC. Special studies, baseline and evaluation surveys and monitoring will be conducted by the universities. Credit will be administered by BRI, and inputs will be provided by Gadjah Mada University for rhyzobium inoculum, P.T. PUSRI for fertilizer, P.T. PERTANI for other agricultural inputs and Sang Hyang Seri for seeds.

3. Project Related Activities

This project complements existing projects of USAID and other donor agencies. For example, results of research on secondary crops under the AID funded Sumatra Agricultural Research and Applied Agricultural Research and the World Bank's National Agricultural Research Projects will be the bases for developing on farm trials and demonstrations. Demonstration farms on cropping systems and fertilizer yield response funded by FAO will also complement the project.

The World Bank's National Food Crops Extension II Project in so far as it addresses secondary crops will also be complementary to the project. The seed development component of this project will also use the institutions established under the World Banks Seeds II project.

Agricultural education projects supported by USAID will indirectly affect this project as the expertise developed under these projects will be called upon occasionally to conduct baseline, evaluation and various socio-economic studies.

PART III: PROJECT ANALYSIS

A. Technical Analysis

1. Institutional Structure

a. Directorate General for Food Crops

The Directorate General for Food Crops (DGFC) in the Department of Agriculture will have primary responsibility for managing the project. The DGFC is one of five commodity oriented line agencies within the DOA. It is represented at the provincial level by the Chief of the Food Crops Agriculture Extension Service, who reports directly to the Governor of the province for administrative matters relating to agriculture, and to the Director General, DGFC for technical matters relating to the implementation of national food crops programs.

The DGFC, through its Directorate of Food Crops Production Development, operates the national agricultural extension system for rice and secondary food crops and horticultural crops. Provincial DGFC branches have offices at the district (Kabupaten) levels through which they operate a network of Rural Extension Centers (WKBPPs). On the average, there are 4-6 WKBPPs per Kabupaten. Each Rural Extension Center serves approximately 10 extension areas (WKPPs), each assigned to a one field extension worker (PPL). The PPL works indirectly with 1600 farmers through farmer groups (Kelompok Tanis) of 15-25 progressive farmers. One PPL handles approximately 16 farmer groups, each farmer group is headed by a Contact Farmer (Kontak Tani) serving as the principal contact with the PPL. Each Kontak Tani supervises 20 progressive farmers (Tani Maju) who are responsible for extending advice to about five additional farmers. Thus each PPL reaches about 1600 (16x20x5) farmers in each WKPP.

The field extension workers (PPL) are managed by an extension supervisor (PPM) at the Rural Extension Center and supported by a staff of subject matter specialists (PPS) at the provincial and district levels. This extension network is now well established and staffed with trained personnel in most of the provinces. It has adopted the "Training and Visit" method of extension and achieved impressive success in carrying out the government's programs for intensification of rice production.

b. Supporting Institutions

While the DGFC will be the lead agency for the project, success demands participation of other agencies involved in research, training, credit, marketing, post harvest operations and the provision of inputs. These include other agencies within the Department of Agriculture, especially the Central Research Institute for Food Crops (CRIFC) of the Agency for Agricultural Research and Development (AARD) and the Agency for Agricultural Education, Training and Extension (AAETE). Other participating agencies will be the National Logistics Agency (BULOC), the Directorate General of Cooperatives (DGC), the rural banks, and the regional universities, all of which have coordinated successfully with the DGFC in the BIMAS, INMAS and INSUS rice intensification programs. Expansion to secondary crops will require no important change in that relationship.

Research - Extension Linkages

The AARD is responsible for implementing the national agricultural research program. It consists of six commodity oriented central research institutes and six supporting research centers. The CRIFC, the main center for food crops research manages eight regional Food Crops Research Institutes, each with its network of experiment stations, serving location-specific needs for food crops research in their regions.

The need for close linkage between research and extension is recognized---research subject matter specialists (RSMS) assigned to AARD are responsible for compiling and interpreting research results for use by the extension subject matter specialists (PPS) of the DGFC departments at provincial and district levels and are expected to interact directly with research teams at research institutes and stations. To further strengthen the linkages, regional technical committees, with representatives from AARD, AAETE, the regional universities and the DGFC have already been formed to coordinate support programs and training activities for extension workers.

Regional Agricultural Universities

Indonesia has established forty public universities throughout the country under the Directorate General for Higher Education in the Ministry of Education. Twenty seven of these have faculties of agricultural sciences.

In addition to their role in training personnel for staffing the DOA, these regional universities constitute another network of agricultural research institutions. While the universities are not formally linked to the research system of AARD, faculty members sit on the advisory boards of provincial research stations where facilities are made available to university students and faculty to conduct research trials. Cooperation among CRIFC, research stations and the regional universities is generally very good.

Participation of the regional agricultural universities in this project will include assistance on socio-economic research, marketing assessments, baseline and evaluations surveys, monitoring, and training activities.

The National Logistics Agency (BULOG)

BULOG is a government agency established in 1967 to ensure that consumers are provided an adequate food supply at reasonable prices and that farmers receive stable prices offering adequate production incentives. Basic policies of pricing and procurement are determined by a technical group with representation from the National Development Planning Agency (BAPPENAS), the Department of Agriculture, the Department of Finance, the Directorate General for Cooperatives and BULOG.

Initially BULOG was concerned only with stabilizing rice supplies and prices. Later it was given responsibility for other commodities, including sugar, wheat and cotton. It is the sole importer of rice, corn and sugar and administers all food aid programs in the country. Since 1978 it has been charged with maintaining floor prices for corn and more recently peanut, soybean and mungbean have been added to the list.

BULOG also operates a Food Technology Research and Training Center at Tambun near Jakarta, which provides technical support on post harvest drying, milling and storage of food crops. Much of the program at Tambun benefits from a long-term agreement with the Tropical Products Institute, a branch of the United Kingdom's Overseas Development Assistance program. Other international agencies involved in post-harvest research are the International Development Research Center (Canada) and the South East Asia Research Center for Agriculture (SEARCA).

BULOG's participation in the project will be primarily in activities related to drying and storage technology for food crops and in training of project personnel including DGFC extension agents on post harvest operations such as harvesting, drying, milling, processing and storage. In this connection, BULOG's Food Policy Library in Jakarta and the Research and Training Library at Tambum through assistance from this project will become the repository and sources of information pertaining to post harvest operation and management, and agricultural commodity procurement and marketing.

Cooperatives

The village unit cooperatives (KUD) are responsible to the Department of Cooperatives. The KUDs numbered about 600 in 1972 and are expected to increase to about 5,000 by the end of the Third Development Plan in 1984. A goal announced by government decree in 1978 is to eventually establish one KUD in each village throughout the country. This underscores the official commitment to cooperatives.

The KUDs are expected to function as channels for distribution of production inputs to farmers and to participate in BULOG's food procurement program. The government has provided substantial technical support and financial subsidies to the KUDs to enable them to carry out these activities.

In this project the KUDs will be an important source of production inputs, such as fertilizer and pesticides, provided through supply channels operated by P.T. Pertani. The KUDs are not now significantly involved in purchase, processing or storage of any of the secondary crops. These crops now move almost entirely through private market channels. However, when and if market prices fall below support prices for these crops the KUDs could be involved in procurement, assuming they are able to purchase or process commodities meeting BULOG's quality standards.

Wherever KUDs are functioning and have potential for providing input supply and/or marketing services the project will involve and assist them in improving their capability. The project will also examine and assist other cooperatives or farmer group associations.

Credit

The Government has tried to meet credit needs at interest rates generally lower than those obtainable from private sector sources. The Bank Rakyat Indonesia (BRI) began setting up branch banks at the village unit level (BRI Unit Desa) in 1969 to handle the large volume of BIMAS production loans. These banking units are now dispersed throughout Indonesia.

In addition to the need for credit to finance production inputs many farmers need to borrow for consumption purposes. The BIMAS program loans include from Rp.5,000 to Rp.16,000 per hectare to cover consumption needs. Another formal source of consumption loans is the Lumbung Desa located in many villages which supply rice for consumption and seed. Their loans are for up to 6 months at interest rates of 30 per cent or more per annum. Other sources of consumption loans are pawn shops and village banks (Bank Desa). Of the informal sources, the high interest ijon system is considered very important. Other important sources are neighbors, friends, traders and landlords.

For medium and long-term credit needs of farmers the KIK (small investment credit) program is available to finance such capital items as tractors, irrigation pumps and buffaloes.

Short-term financing is required for marketing crops as stocks pass along distribution channels from farm to consumers. This includes financing for off-farm storage between harvests and for processing at various points in the marketing chain. Large wholesale traders in major centers may provide credit for each trader in the supply chain. For stocks that move through government channels each party in the distribution chain may

have to negotiate separately for credit. Credit for financing government stocks held by BULOG and for procurement is provided by the Bank of Indonesia. The BRI finances the credit needs of the KUDs for stock handling.

There are several formal sources of credit for private sector traders. The KCK (Small Traders Credit) is available for very small traders. Loans are for a maximum of Rp.10,000 for up to 3 months at 12 per cent interest per annum. The BRI Kredit Mini loan is available for up to 36 months for up to Rp. 200,000. Medium and long-term credit is available to KUDs from BULOG and BRI for rice mills, drying equipment, storage facilities and miscellaneous equipment.

In this project, unsecured credit will be available in intensification areas through village brances of BRI at prevailing terms of interest. Instead of collateral, a duly approved and certified farm plan will be required for production inputs, and a duly approved and certified investment plan for post-harvest facilities and equipment. An approved and certified farm plan includes specification of the cropping pattern to be followed, the amount of production inputs needed, the agronomic practices required and expected production and revenue. The farm plan will be developed jointly by the Field Teams and farmers group, certified by the Chief of the Kabupaten Office of Agricultural Extension and approved by the BRI Manager of the village.

The investment plan for cooperatives will be developed jointly by the Field Teams, KUD Manager and BRI staff. This plan specifies the purpose of the loan, the amount of the loan, the repayment schedule. An economic feasibility analysis is needed to assure that the proposed investment is economically viable and that the repayment schedule is met on time. The investment plan must be certified by the KUD Manager and approved by the Manager of the BRI Unit Desa.

The Private Sector

Despite the important role of BULOG and KUDs in marketing rice, most of the rice marketed and virtually all of the other food crops move through private commercial channels. Since most crops are consumed within a short distance of where they are produced much of the marketing involves petty traders and collectors at the village level buying directly from the farmer and small "cottage industry" processors preparing a variety of products for sale and consumption in the local community. The relatively small portion of secondary crops that move to larger markets go through a network of private firms from the village collectors to sub-district wholesalers to large wholesalers, processors or exporters at major provincial centers.

Private dealers are also active in the distribution of production inputs. While public agencies such as P.T. PUSRI and P.T. Pertani have a monopoly in distribution of fertilizers and pesticides down to the kabupaten level, private sub-distributors and retailers are still the major suppliers of these materials from kabupaten-level warehouses to the farmers.

A few large private firms have made investments for processing and/or exporting some of the secondary crops. In Lampung several large-scale modern factories are now in operation making starch. Other firms have made large investments in chipping and pelletizing facilities for processing dried cassava (gaplek) for export as cattle feed.

As production of secondary crops expands beyond the needs for local consumption, the private sector is expected to have major responsibility for processing and marketing the extra output.

2. Production Feasibility

Cropping Systems

In the lowland, padi is transplanted to puddled soil soon after the soil is prepared at the beginning of the rainy season. If rainfall or irrigation water is sufficient padi will follow padi. If moisture is insufficient for two crops of rice, then soybean, peanut or corn will follow padi.

In the uplands, rice is planted at least once a year. Corn may be planted two weeks after the rice. Cassava may also be planted in the rice-corn intercrop. A legume often follows the corn crop. In South Sulawesi and East Java, soybean is often planted in monoculture. A generalized cropping pattern beginning with the rainy season is rice/corn/cassava/legume

Sequential cropping is urged. Part of the farm could be dry seeded (gogoranca) and part transplanted in order to spread the work load at planting time. An early maturing rice will leave sufficient moisture for the following legume. The legume can be planted before the preceding rice crop is harvested.

In the uplands, intercropping is urged. Planting dates can often be adjusted to fit the desired moisture pattern. Some combination and sequence of rice, corn, cassava and legume is recommended for maximum calorie and protein yield per acre. Fertilizers are economic on some red, yellow podzolic soils even with the low yielding varieties. Minimum tillage planting for legumes is recommended.

Several cropping system designs have been tested based on rainfall patterns, soil types, response to fertilizers and lime, and crop varieties for the regions in Lampung and South Sulawesi.

3. Supply and Distribution of Inputs

a. Fertilizer

Prior to 1957, practically all fertilizers were used on plantation crops. Fertilizer distribution system for food crops was not established. Later, when fertilizer use was expanded to

include food crops, P.N. Pertani, the supply agency for the Department of Agriculture used the cooperatives and extension networks for distribution. It soon found that it could not efficiently distribute fertilizer to all the food crops producing areas. Therefore, in 1967/1968 P.T. PUSRI the first and now the largest government fertilizer producing company was given the responsibility for distribution. The distribution system that has developed combines both government agencies and private dealers to distribute fertilizer down to the village level.

P.T. PUSRI's expanded role has tended to coincide with expansion in domestic production capacity. In 1980 it was assigned essentially monopoly control from port or plant to Level III (Kabupaten). This came after domestic production of urea had exceeded consumption during the period 1977 to 1980.

The margins allowed private retailers have been insufficient to encourage carrying of local level stocks. In 1981 the price to farmers was fixed at Rp. 70,000/MT and to the Level IV at Rp. 66,000/MT for both urea and TSP. Thus the total retail margin was about Rp 4,000 or $6.50/MT. The port or factory price was fixed at Rp. 41,000/MT and the margin for import and distribution to the village level averaged about Rp. 25,000/MT (about $40). At that time the CIF price of urea was estimated to be about Rp. 130.000/MT ($210). The difference of Rp. 89.000/MT ($144) was made up by a government subsidy payment. Table 1 shows World Bank estimates of costs and margins.

In February 1982 the Project design team was told that urea at the factory was billed at Rp. 170,000/M.T. ($265 at an exchange rate of Rp.640 to the US dollar).

Table 1

Price Structure For Urea and Triple Superphosphate

Fertilizers Price	1981 (US$/ton)	IBRD Rp/Kg
Urea		
World export price, f.o.b. Europe	239	149
Ex-factory price, Palembang /1	254	159
Handling and distribution to retail level	+ 35	22
Transport to farm	+ 4	-
Farm-gate price (economic price)	293	183
(Financial farm-gate price)	(112)	(70)
Triple Super Phosphate (TSP)		
World Export price, f.o.b. Florida	208	130
Ocean freight and insurance	+ 56	35
Handling and distribution to retail level	+ 35	
Transport to farm	+ 4	
Farm-gate price (economic price)	303	189
(Financial farm-gate price)	(112)	(70)

/1 Urea is valued at ex PUSRI factory, Palembang; IBRD world market price projections for bagged urea, f.o.b. Europe have been adjusted for S.E. Asia markets with a US$15 transport premium.

b. Pesticides

P.T. Pertani, a government corporation is the major pesticide and insecticide distributor in Indonesia. It has branches in every major city with private dealer and cooperative distributionship in smaller towns. Assurance has been made by DGFC that direct delivery of fertilizer, insecticides, and pesticides will be made to the project sites on cash and delivery basis.

c. Seeds

The Department of Agriculture proposes to follow the same organizational scheme for secondary crops seed as has been used for production and distribution of improved varieties of rice. Commercial seed is marketed through private dealers, village cooperatives or directly by the growers. Certification and grading programs are controlled by the government according to published standards.

In this project, it was determined that minimum funds to support specific seed processing and storage centers at Kabupaten levels in the three project areas would be needed to supplement other funds potentially available through the World Bank Seeds II. It will be incumbent on the DGFC to insure that secondary crop seed passes through the phases from foundation seed to extension and other regulated seed grades down to the farmers involved in field demonstrations.

The system of seed multiplication and distribution in Indonesia has moved toward private enterprise within the last five years. Seed production costs were about 20% higher on state operated farms than on contract grower seed farms. Traders sell an appreciable portion of planting seed in the nation. Indication are that private industry will continue to enter every role in the seed system that is profitable. However, the experiences of the U.S. and other nations indicate that the Indonesian government will need to occupy a vital role in seed development.

d. Rhyzobium Inoculum

This project proposes support for a development and production program for rhizobia inoculum in Indonesia. In order to guarantee an adequate supply of inoculum for the project, support to Gajah Mada University is needed to ensure adequate supply and continued research on promising rhyzobium strains of soybean and peanuts.

4. Marketing

a. Supply and Demand

The marketing problems which the project addresses must be considered in the context of an available supply of rice. Rice accounts for the largest part of total resources devoted for food production. During the period 1968-1977, rice accounted for 65 to 74% of total starchy calories and about 53% of total calories. Maize and cassava have each contributed about 10% of starchy calories, sweet potatoes about 3% and wheat 2-3%. Cassava and corn have tended to vary considerably from year to year. Among the other important food staples soybean consumption increased from about 3.1. to 6.2 kg per capita and peanuts from 2.3 to 3.3 kg during the same period (see Table 2).

Where secondary crops production goes from here will depend heavily on price incentives, available technology and market acceptance. An important aspect in reducing costs and increasing productivity will be development of integrated cropping systems particularly for corn and cassava within the dominant rice economy. Improvement in quality also will be very important for these new commodities if they are to compete with other foods.

Peanut and soybean face favorable propects with respect to growth in demand and the prices consumers are willing to pay. They both face formidable technical production problems in competing with foreign

imports. Until now no meaningful effort has been made to capitalize on the ability of soybean and peanuts to fix nitrogen as a means of reducing their costs of production, and greatly increasing yields.

Currently Indonesia is importing about 40% of its soybean. Given the rise in incomes and the strong demand for peanut and soybean, it is likely that substantial increase in the current production levels could be absorbed in the next few years with little reduction in price. Peanut prices have been particularly strong relative to other food crops including soybean.

The increase in soybean imports has affected peanut prices less than soybean prices. Soybean evidently is not considered an adequate substitute for peanut. In 1969 when the peanut supply was 75% of soybean supply, soybean prices were about 75% of the peanut price. However, by late 1979 and 1980-81 when peanut supply had fallen to about 50% of soybean supply per capita, soybean prices were well under 50% of the price of peanut. During the 1969-1980 period per capita supply of peanut increased by about 30% and soybean by about 100%.

Table 2 shows recent World Bank estimates of supply and demand for major food crops. Though these data do not reflect the latest of the recent rice production, they are indications of the likely balance for other crops, that is, a surplus of cassava and potatoes and deficit for corn. See Table 2.

b. Market Structure for Secondary Crops

Indonesia was once an exporter of corn but now it is a net importer. As corn exports shifted to imports in 1976, Indonesia started to export large quantities of cassava mainly to the EEC where price policies favored cassava over corn for feed use. In general, exports of cassava are handled by private traders. Also, private traders have been allowed to import soybean, corn and other feed ingredients under government controls.

Domestically, private trading is permitted in all food commodities. In its food procurement and distribution operations BULOG depends heavily on private traders and cooperatives to provide the lowest level link between it and producers and consumers. Beginning in 1978, price supports were extended to secondary crops including soybean, peanut, corn and mungbean. However, BULOG's ability and willingness to provide support prices has not yet been tested since market prices of these crops have generally been above the support level.

Corn is an exception. Market prices at the farm level have from time to time fallen below the announced support levels. More importantly, BULOG has set standards for each of the crops in the price support program based on moisture content, insect infestation and per cent of broken kernels - qualities which greatly affect their storability. Surveys by BULOG and the Department of Agriculture indicate that for all of these

crops except rice, much of what moves through market channels, fail to meet BULOG's minimum standards. BULOG has assisted the KUDs to improve the quality of rice by providing dryers and drying floors. They have up to now provided no similar assistance for the other supported crops.

Table 2

Summary of Projected Supply and Demand for Food Crops in 1985 and 1990 (MMT a/)

Crop	1985			1990		
	Supply	Demand	Surplus deficit	Supply	Demand	Surplus/ deficit
Rice	21.5	23.8	-2.3	26.1	28.1	-2.0
Corn	3.9	4.2	-0.3	4.7	4.4	0.3
Cassava	17.7	16.4/a	1.3	21.3	19.4	1.9
Sweet Potatoes	3.5	2.4	1.1	4.2	2.7	1.5
Peanuts	0.5	n.a	n.a	0.7	n.a	n.a
Soybeans	0.9	n.a	n.a	1.1	n.a	n.a

/a. Includes 0.6 million ton for used, losses and feed
/b. Includes 0.4 million ton for losses and feed.

Source: World Bank, Indonesia Policy Options and Strategies for major Food Crops, November, 1981.

For corn, cassava, soybean, peanut, marketing is almost exclusively private. The cooperatives (KUDs) operate largely as an arm of the government and have been most active with rice. Private collectors or traders buy crops either directly at the farm or at local markets. For some crops and areas the practice of buying in the field is followed. The collector or processor buys the entire crop, e.g. peanuts or cassava, and does the harvesting, hauling, drying, etc.

Small local collectors sell directly to consumers or small local retailers or they may sell to processors or to large collectors. The latter may sell locally but more likely will move the commodity to larger consumption or processing centers after which it goes through a distribution system to reach small retailers and then consumers. Obviously the margins between farmer and consumer vary greatly depending on the intermediaries and distance involved.

c. Post Harvest Technology

Any generalization about harvest and post-harvest technology is likely to apply only in very limited situations. Traditional methods are typical but vary greatly from place to place and of course from product to product. The major problem for the crops with which the project deals - cassava, corn, peanut, soybean - is bringing moisture levels down quickly enough to prevent serious product deterioration. In general fumigation is non-existent and storage is very inadequate in terms of sanitation, aeration and moisture, insect and rodent protection. Drying is almost totally dependent on the sun with little protection from the rain except incomplete coverage or movement indoors. Good cleaning, important to control of insects, is difficult with available technology - mostly done by winnowing and possibly coarse screening. Humidity, and continuous warm weather contribute to the build-up of insects and other pests of various types with pose serious problems.

d. Recommended Actions

The above analysis indicates several actions needed under the project to increase the probability of marketing success. The following activities will be undertaken directly or provided with financial support under the project:

1. Support for analysis along with periodic high-level review of the local and world supply, demand and price situation for crops included under this project. This should provide a basis for decisions on relative intensity of promotion of the various crops.

2. Study of different low-cost methods of harvesting, processing and storing crops in Indonesia and in other countries where similar crops are important and conditions similar.

3. Systematic introduction and testing of facilities, equipment and methods which appear to offer promise for reducing harvest and post-harvest losses or provide a more acceptable product form. This will be followed by demonstrations of systems and equipment where prospects appear favorable.

4. Systematic study of costs and returns to alternative methods for carrying out various harvest and post-harvest functions.

5. Surveys of marketing channels and their costs and benefits to identify points where well-designed technological interventions would yield high returns.

6. Analysis of alternative cropping systems as they affect harvest and post-harvest processing (especially drying), storage and marketing problems.

7. Cooperation with and support of private industry and financial institutions to introduce and support manufacture, promotion and financing of improved equipment and methods for harvest and post-harvest operations.

8. Study of the system for distribution of inputs to identify constraints to achievement of project objectives.

9. Training both in-country and abroad of marketing technicians and economists at various levels and of extension personnel who will work directly with local traders and processors and with farm families and farm groups.

10. Technical assistance, including the kabupaten-level Field Teams and long and short-term expatriate specialists.

11. Holding of technical and coordinating workshops as appropriate.

5. Nutritional Concerns

For nutritional purposes, the project will include the following components:

1. Collection of baseline data on nutrition in all project areas.

2. Assessment of food and nutrition problems of the areas, and how they are related to social and economic structures and problems.

3. Inclusion of nutrition criteria in the selection of beneficiaries to assure that production increases or income changes benefit those malnourished housholds or food deficit communities.

4. Conduct of in-depth consumption studies of individual commodities.

5. Training of secondary food crops agriculture extension workers to nutritional objectives and concerns.

B. Economic Analysis

The procedure used in this section is known as incremental benefit cost analysis. This is a method used in evaluating the economic viability of a newly introduced technology package such as the one proposed in this project. This method has been used in evaluating the successful BIMAS/INMAS rice intensification program of the government.

This analysis proceeds on two levels: (a) using subsidized and unsubsidized input prices and (b) using domestic and world prices of outputs.

1. Estimate of Production

In 1980/1981, the area, yield and production of selected secondary crops within the project sites are shown below:

Table 3

Estimate of Present Area, Yield and Production of Selected Secondary Crops in Project Area.

Crops	Area in Ha	Yield in Tons/Ha	Production in Tons
Peanut	15,000	.53	7950
Soybean	23,000	.56	12880
Cassava	32,000	11.12	355840
Corn	74,000	.77	56980

As a result of the project, it is expected that the above cropped area for peanut and soybean will increase by 60% and cassava and corn by 30%. These increases are due primarily to increased cropping intensity, areal expansion and changes in land use brought about by the new technology. Moreover, it is anticipated that productivity will increase by 50% as a result of improved cropping systems, use of better varieties, improved agronomic practices and increased use of commercial inputs. Given the above, and anticipated spread effects of rhyzobium inoculum outside of the project site, the incremental area, yield potential and production potential are estimated as follows:

Table 4

Incremenetal Area, Yield and Production in Project Area

Crop	Incremental Area in Ha	Yield Potential in Tons/Ha	Production Potential in Tons
Peanut	9000	.795	
	120000 a/	.200 b/	31,155
Soybean	13800	.840	
	120000 a/	.200 b/	35,592
Cassava	9600	16.680	160,128
Corn	22000	1.155	25,641

a/ Spread effect of inoculum outside project site
b/ Incremental yield

2. Estimate of Benefits

The revenues derived from the above production are based on current domestic prices and world market prices. The use of world market prices is necessary to determine the viability of the project if in the future Indonesia will enter the export market. Table 5 shows the revenues derived from each crop based on the above production potential and world and market prices.

Table 5

Projected Revenue at Domestic and World Market Prices for Secondary Crops

Crops	Prod'n Potential	Prices Per Ton in $		Value in $1000	
		Domestic	World	Domestic	World
Peanut	31,155	$.1,015	$500	$. 31,622	$15,577
Soybean	35,592	$. 508	$295	$. 18,080	$10,500
Cassava	160,128	$. 50	$ 50	$. 8,006	$ 8,006
Corn	25,641	$. 156	$150	$. 4,006	$ 3,846
Total				$. 61,714	$37,928

3. Estimate of Costs

The internal project cost is $12,691,000 shared by USAID and GOI on approximately 50:50 basis. However, total program cost which is the basis for estimating the benefit/cost ratios must include farmers' cost for investing on additional inputs and the GOI cost for subsizided inputs. See Table 6.

Table 6

Estimated Cost Components by Crops in $1000

Crops	Project Cost	Farmers Cost	Subsidy	Total Cost w/o subsidy	Total Cost w/subsidy
Peanut	5,537	1,602	1,495	8,634	7,139
Soybean	5,764	1,955	2,061	9,780	7,719
Cassava	412	210	174	796	622
Corn	957	350	618	1,925	1,307
Total	$ 12,691	$ 4,117	$ 4,348	$ 21,156	$.16,808

4. Cost Benefit Analysis

Based on the estimated benefits and cost presented above, the benefit/cost ratios can be computed for each crop and for the project as a whole. These are shown in Table 7.

Table 7

Benefit Cost Ratios by Commodities

Crop		World Market Prices	Domestic Market Prices
Peanut:	Without Subsidy	1.80	3.66
	With Subsidy	2.19	4.43
Soybean:	Without Subsidy	1.07	1.85
	With Subsidy	1.36	2.34
Cassava:	Without Subsidy	10.05	10.05
	With Subsidy	12.87	12.87
Corn:	Without Subsidy	2.00	2.08
	With Subsidy	2.94	3.06
Project:	Without Subsidy	1.79	2.92
	With Subsidy	2.26	3.67

On the basis of the above results, the project appears economically viable. The B/C ratio for the project in both the world and domestic markets with or without subsidy are favorable.

Cassava has the highest B/C ratio because it takes very little input to increase production. Moreover, the price of cassava used in this analysis reflects historical prices over the last few years when the EEC export market was wide open. It is possible for the B/C ratio to decrease with reduction in domestic and world market prices resulting from the EEC established import quota.

Peanut and soybean have high B/C ratios in the export market but relatively low in the world market. The reason is that peanut and soybean prices are higher in Indonesia than in the world market. In turn, this implies that Indonesia will have difficulty competing in the world market if and when it will produce sufficient quantity for export.

Corn is also an economically viable enterprise. Although it shows a favorable B/C ratio, a substantial increase in production can very well decrease the price particularly because of its inelastic demand characteristics and negative income elasticity. To overcome this situation, ways should be explored to develop the various and diverse

industrial and commercial uses of corn. The potential for the development of corn rests primarily on uses other than for direct human consumption.

C. Social Soundness Analysis

The social soundness analysis for this project requires an assessment of the socio-cultural feasibility of the proposed project activities on each site, the social factors affecting potential spread of the new technology beyond the project sites, and the probable social consequences to the direct and indirect beneficiaries of the project.

1. Socio-cultural Feasibility

This section examines the appropriateness of the major components of the project with respect to social characteristics, attitudes, organizations and institutions of the expected beneficiaries. The beneficiaries are the Buginese in Bone, South Sulawesi, Javanese in Ponorogo, East Java, and the Javanese, Bataks and Balinese in North Lampung, Lampung province. The following discussions will attempt to answer such questions as: Is the proposed technology package appropriate to the educational level of the expected beneficiaries? Is this proposed technological package suitable to existing organizations, institutions, attitudes and culture, and is the technology package technically appropriate to the agro-climatic and economic conditions of the project sites.

The cropping systems approach to upland agriculture is not new to the Buginese in Bone nor to the Bataks of North Lampung, but perhaps new to Balinese and Javanese transmigrants in North Lampung. The Buginese in the interior of Bone and the Bataks in the upland regions of North Lampung have for years been growing secondary crops by necessity. Because of the upland conditions of their farms and the difficulty of impounding run-off water from the mountains, they have developed a system of agriculture where rice is planted during the rainy season and other foodcrops during the dry season. Because they could not produce sufficient rice for themselves they have had to supplement their rice diet with other staples such as cassava and corn. As observed in the course of interviews, they are familiar with the production and utilization of secondary crops.

Although the Javanese and the Balinese transmigrants in Lampung do not have similar upland agricultural experience and background, having been raised in lowland agriculture, they have adjusted over the years by necessity to upland farming in transmigration sites. Following the examples set by the Buginese and the Bataks, the Javanese and the Balinese plant only those crops that are suitable to upland conditions and those that command high prices in the market. Rice, corn, and cassava are grown primarily for home consumption, and peanut, soybean and mungbean are grown for market.

It is clear therefore that the expected beneficiaries are familiar with the production and use of secondary crops. Whether they would accept a new package of technology that would increase production is another question. Examination of their attitudes and ability to change suggests that they will. The Javanese, Buginese, Bataks and Balinese, like most farmers, are known to respond to economic incentives. On the other hand, being subsistence farmers, they are also known to avoid risks preferring the traditional methods to newly introduced technology unless they are convinced through demonstration that the technology works. In this project, the new package of technology to be introduced should offer the potential beneficiaries sufficient economic incentives and security to induce rapid adoption. The economic incentives come in the form of increased production of corn and cassava for home consumption and higher market prices for soybean, peanut and mungbean. Trend analysis of prices for the latter commodities show that their prices have increased faster than the rate of inflation. As for corn and cassava, analysis demonstrates that these products are typically consumed in combination with rice in an effort to minimize risk of hunger, with the proportion of each depending upon the relative prices of these commodities. Moreover the combination of crops to be grown under the proposed cropping systems minimizes risk in that it allows for spreading both the biological and economic risk over several crops and over two to three cropping seasons of the year.

Examination of the beneficiaries' age structure, education, pattern of land ownership and sharing arrangements also suggests a motivation and ability for rapid adoption of technology. First, a majority of the younger farmers have completed at least primary education. This indicates that they are less tradition-bound and more likely to accept improved methods of farming especially when endorsed by community leadership and extension workers. Second, a very high percentage of the farmers own their land which implies that the increased benefits from the new technology will accrue to them as owners of land, labor and capital. This should motivate them to take r sks and invest in production-increasing inputs. Similarly current share-holding arrangements suggest that the gains will be shared equitably by the landlord who owns the land and the laborer who supplies the manpower.

Two common characteristics among the different ethnic groups are (a) respect for leadership and authority and (b) deference to civil servants. New technology will be adopted only if community leadership understands and endorses the project. This requires educating contact farmers, progressive farmers, village chiefs, the Camats and the Bupatis. As soon as they are convinced of the benefits and advantages of the new technology, there is a high degree of assurance that farmers generally will adopt the new technology. This is further re-inforced by the loyalty of farmers to government extension agents already known to them. In the preparation and design of this project, cooperation and assistance of kabupaten and local officials as well as selected farmers in all project locations was excellent. There is already an expectation that the project will bring potential benefits.

A final indication suggesting feasibility for rapid adoption of improved technology are the results of two earlier efforts carried out in the project areas. One was the LAPO-ASI in Kabupaten Bone, South Sulawesi, and the other the Makmur Tani program in Kabupaten Lampung Utara. Both were intensification programs using upland areas to increase rice production. These intensification programs succeeded in demonstrating that rice production in rainfed areas can equal that in sawah if proper management practices and recommended fertilizer levels are followed. The success of these projects were due primarily to intensified extension work, delivery of inputs at the proper time and, of course, good weather.

2. Beneficiaries and Spread Effects

It is intended that new technology introduced through the project will spread (a) within the target groups in the project areas, (b) outside of the project sites within the kabupaten or within the province, and (c) within Indonesia generally.

The most direct beneficiaries of the project will be some 500 farmer cooperators cultivating approximately 900 hectares of trial, and demonstration areas. These will vary from very small (less than one hectare) plots to units as large as $\pm$ 5 hectares. Through the demonstrations the field extension agents will instruct farmers in the use of improved technology, cropping systems and post-harvest operations.

The next immediate spread effect will be to farmers in the intensification areas. This is expected to affect approximately 69,300 total hectares in Year 5. If average farm size in the project is calculated at 2.0 hectares, this implies a direct beneficiary population of about 72,000 farm families and about 360,000 people (5 individuals per farm family).

Spread to other intensification and demonstration areas will depend on a thorough evaluation of results during Year 3. If this expansion occurs as planned, a possible 25% increase in area affected would bring additional direct beneficiaries of about 26,000 farm families and 130,000 people by Year 5.

The mechanism built into the project to stimulate spread effect is the placement of the Field Teams at the kabupaten level. There will be a constant interaction among the Field Teams and the PPS and PIMs working at this level. In this way, the project will attract attention among staff and extension workers responsible for areas throughout the kabupaten and not limited to the specific WKBPP project sites.

Lastly, indirect spread throughout Indonesia will depend largely on (a) successful introduction of rhyzobium inoculum technology for use on soybean and peanut which is estimated conservatively to benefit 10% of total area planted to these crops and (b) DOA/GOI decisions on replication and expansion of the project after Year 5.

3. Social Consequences and Benefit Incidence

The direct beneficiaries of the project will be the farmers cultivating principally upland areas where production, income and employment will increase with the adoption of the new technology. Other indirect beneficiaries will be consumers who will obtain a more regular supply of good quality food, processors and traders providing various services (e.g. grading, transporting, packaging) as the products move from farm to consumer. At the national level and over the long term, foreign exchange costs should be reduced as the country reduces its imports of corn, soybean and peanut.

Total employment in project areas should increase as year-round cropping systems lead to more intensive land use. Moreover, a more even distribution of demand for labor is anticipated with increased adoption of the new cropping systems.

Employment in agro-processing industries is also likely to increase. In East Java and Lampung, for example, there is potential for increased processing of corn and cassava for feeds and for alcohol. There will also be increases in home processing industries such as manufacture of soybean cakes, peanut sauce, catsup and other forms of confectionery.

Employment may also be generated from the manufacture of simple farm machines such corn shellers, dryers, grinders and farm level storage bins. Because of the simple nature of this farm equipment, labor displacement is not anticipated; rather, these implements will increase the productivity of farm labor. The nature of these implements and the size of the average farms suggest that they will be labor enhancing rather than labor saving. Clearly, increase in labor demand and employment will be a potentially major indirect benefit of the project.

It is generally claimed that there is little market for secondary crops outside of home consumption at the present time, despite the fact that marketed surplus of corn and cassava is about 1/2 - 2/3 of total production, and for peanut, soybean and mungbean about 3/4 - 4/5 of total production. Private traders and members of KUDs claim that there is a potential market for local and regional trade, for processing and for export if a sufficient and regular supply of acceptable quality is assured.

This project takes the position that there exists a latent market and that middlemen, such as local traders and KUDs, and institutional processors such as tapioca factories, gaplek factories, and corn processing mills will develop with the assurance of sufficient supply of acceptable quality. Even if government policy mandates BULOG to procure these commodities through KUDs given certain standards of moisture content and purity, this project will depend more on private trade than on government procurement operations.

A desireable consequence of the project is therefore to stimulate the conditions for a more active private market in secondary crops and their related products.

The project, if successful, will likely cause some positive redistribution of income. Most upland farmers have incomes lower than those of lowland farmers mainly because of higher production and prices of rice compared to cassava or corn. However, with appropriate cropping patterns of corn or cassava intercropped with soybean, peanut, mungbean or cowpea, revenue from these crops are comparable to revenues derived from lowland rice. Perhaps as cropping patterns become more firmly established, and as markets for secondary crops are developed, the differences in the values of lowland and upland areas and the revenues derived from them will be narrowed.

New cropping systems when introduced into the project sites may, over the long run, cause greater concentration of land held by relatively well-off farmers. Small farmers who cannot buy the necessary inputs will not be able to realize the potential of the new technology packages as much as the relatively richer farmers. As the income differentials between rich and poor continue, the smaller farmers tend to sell off their lands. Marginal farmers who will sell off their lands will become tenants or farm laborers. If agricultural wages are high and if the landowner wishes to share the risk of farming, he will opt for a share- cropping arrangement. If the agricultural wages are low and the farmer wishes to assume all the risks he will manage his farm himself and hire farm laborers on daily or seasonal basis.

One trend is clear: as new technology is adopted and farming becomes commercialized, the age-old tradition of "gotong-royong" will decline. Hired laborers will take the place of community planting and harvesting and monetized wages will replace the practice of exchanging labors among farmers in the community.

PART IV: FINANCIAL PLAN

A. Project Cost Summary

Total project cost is estimated at $12.691 million. The USAID contribution is $6.4 million in loan funds, GOI counterpart funds is $6.291 million, or a USAID/GOI ratio of 50.4% to 49.6%.

Summaries of foreign exchange (dollar) and local currency (rupiah) cost estimates are shown in Table 8. Details for each category are provided in Annex B. Table 9 is a projection of expenditures during the life of the project, 1983-1987.

The Secondary Food Crops Development Project is a five year project, starting at the beginning of IFY 1983/1984 and terminating at the end of IFY 1987/1988. The total cost is $12,691,000 of which $6,400,000 is AID Loan and $6,291,000 is in the form of GOI counterpart fund. Of this amount, $3,643,000 or 29% is for foreign exchange cost and the remaining 71% or $9,048,000 is for local cost.

The loan fund will pay for technical assistance and operational support estimated respectively as $1756 (13.8%) and $2772 (21.8%). GOI counterpart fund will pay for personnel estimated at $582 (.46%) and commodities (except vehicles) estimated at $4036 (31.8%). In-country training will be paid from GOI funds estimated at $641 (5%) and overseas training estimated at $742 (5.8%) will be paid from loan fund. Contingency and inflation estimated at $2092 represents 16.4% of the total project cost.

The loan fund will be allocated to participating agencies as follows: the Directorate General of Food Crops will get $3099 or 48.4% of the loan fund. This amount include among others, contractual cost to CRIFC, and universities for experiments, trials and special studies. BULOG and the Department of Cooperatives will get $3301 or 51.6% for marketing and post-harvest activities. The GOI fund amounting to $6291 will be distributed as follows: DGFC will get $2151 or 16.9% for personnel and cost of production inputs for the demonstration farm. AAETE will get $767 or 6% for organizing in-country training for Field Teams and other extension workers. The BRI will get $3373 or 26.6% use for credit to farmers, KUD and private dealers in intensification areas.

B. Recurrent Cost Implications

This project is designed to demonstrate a model for increased production and improved marketing of basic food crops in Indonesia. If the model or adaptations thereof proves viable, the GOI will decide at what rate and with what resources to replicate the model to other parts of Indonesia. While this project calls for only limited additional personnel, a decision to expand the program on a large scale could require substantial new staff commitments, plus continued support for seed development, agronomic research, equipment for demonstration purposes, socio-economic surveys, project operational support and evaluation. Such a decision would in fact be one of the primary indicators of success of the project. Given the GOI's commitment to promotion of secondary crops, there should be no difficulty in allocating the necessary resources at the time they are required.

Table 8:

Summary of Cost Estimates by Allocation of Funds
in $000

Inputs	AID			GOI	TOTAL COST
	FX	LC	TOTAL		
Tech. Assistance	1756	-	1756	-	1756
Training	343	399	742	641	1383
Personnel	-	-	-	582	582
Operational Support	864	1908	2772	-	2772
Commodities	-	-	-	4036	4036
Contingency & Inflation	680	450	1130	1032	2162
TOTAL	3643	2757	6400	6291	12691

Table 9:
PROJECT FINANCIAL PLAN, 1983-1987
IN $ 000

Allocation of Funds	1983 AID FX	1983 AID LC	1983 GOI LC	1984 AID FX	1984 AID LC	1984 GOI LC	1985 AID FX	1985 AID LC	1985 GOI LC	1986 AID FX	1986 AID LC	1986 GOI LC	1987 AID FX	1987 AID LC	1987 GOI LC	Total AID FX	Total AID LC	Total GOI LC
Technical Assistance	241	-	-	362	-	-	424	-	-	425	-	-	304	-	-	1756	-	-
Training	117	60	405	117	120	236	109	219	-	-	-	-	-	-	-	343	399	641
Personnel	-	-	116	-	-	116	-	-	117	-	-	117	-	-	116	-	-	582
Operational Support	205	148	-	122	297	-	206	445	-	123	700	-	208	318	-	864	1908	-
Commodities	-	-	111	-	-	432	-	-	794	-	-	1161	-	-	1538	-	-	4036
Infl. and Cont.	172	41	124	125	83	154	160	124	179	115	139	251	108	63	324	680	450	1032
Total	735	249	756	726	500	938	899	788	1090	663	839	1529	620	381	1978	3643	2757	6291

PART V: IMPLEMENTATION PLAN

A Administrative Arrangements

1. The GOI

The Directorate General for Food Crops in the Department of Agriculture will be the implementing agency. The DGFC has had considerable experience in the implementation of development projects with AID, IBRD and other donors. It has had major responsibility for implementing Indonesia's successful "intensification" programs for rice (BIMAS and INMAS). It has in place an extension system that is well suited for implementation of this project.

The present organizational structure of the Department of Agriculture and, within it, the Directorate General of Foodcrops are shown in Annex H, Figures 1 and 2. Figure 2 also shows how the project will fit into the present organizational structure. No basic changes in structure or extension methodology are needed except for some training and strengthening of existing staff with the project Field Team to cope with the added emphasis on secondary crops. Maintaining the present structure and operational procedures is necessary for DGFC to carry on or expand the project after its termination in 1988.

In general, extension personnel are better prepared to provide assistance in rice production than in secondary crops. The infrastructure needed to provide extension services on secondary crops is the same as for rice.

Lack of information on agronomic practices for secondary crops is the biggest weakness in the extension service. The site specific field trials on varieties, fertilizers, rhizobium inoculum and cropping systems should generate the needed technology for all extension agents such as PPS, PPM and PPL. By these educational means, the extension capability should improve at the same rate as the project demonstrations move from one WKBPP to the next.

2. Palawija Project Office and Field Teams

At the national level Palawija Project Office will be established in Jakarta within the Directorate of Production in the DGFC. This will be staffed by a Cropping Systems Specialist who will also serve as the Project Director and Secretary of the National Steering Committee. As a Project Director, he will approve all project expenditures allocated for other participating agencies. Other members of the PPO are an Agricultural Economist, a Marketing and Post Harvest Specialist plus clerical personnel that will be assigned to the project.

The Palawija Project Office will provide technical and administrative supervision and support to all project staff including the Field Teams. It will determine what demonstrations will be carried out at each project site, establish priorities among various socio-economic studies, specify equipment needs, and trials to be undertaken. The office will also plan

The Palawija Project Office in cooperation with the Steering Committee will be responsible for arranging the roles and the partipation of other agencies including AARD, CRIFC, AAETE and regional universities, including formulating of contractual arrangements and allocation of project funds.

Two Field Teams will be assigned in each of the project site in North Lampung in Lampung province, Ponorogo in East Java and Bone in South Sulawesi.

Each Field Team will consist of three members: one agronomist/cropping systems specialist with expertise in palawija crops, one specialist in marketing and post harvest management and one agricultural economist. Other personnel may be recruited from within or outside the DGFC and assigned to work on various project activities.

The Field Team members in each project site will work with and assist the PPS at the kabupaten level in training and supporting the PPLs in the two WKBPPs (Rural Extension Centers) selected as project areas in each kabupaten. A partial list of job functions follows:

The agronomist/cropping systems specialist will work with regional research stations in arranging for approved agronomic field trials and experiments and assist research staff in monitoring field trials and demonstration farms. He will work with the PPS in selecting appropriate locations for trials and in arranging for PPL and farmer participation. He will also assist the PPS in planning programs for training PPLs in the package of technology to be demonstrated in the project areas. He will assist the farmers groups in intensification areas develop farm plan required for obtaining unsecured supervised credit from the BRI Unit Desa. The farm plan will be developed with the assistance of the agricultural economist. The agricultural economist will also work with the agronomist cropping systems specialist and the marketing post harvest specialist members of the Field Teams to develop farm plan and investment plan for farmer groups and KUDs in the intensification areas.

The specialist in marketing/post harvest management will assist the PPS in the development of procedures on harvesting and post harvest handling of secondary crops at the farm level. He will arrange with the Directorate General of Cooperatives at the kabupaten level in cooperation with local KUDs, trials and demonstrations of various methods and equipment for drying, processing and storage of secondary crops. He will assist in the development of training materials and programs for training of KUD management and technical staff. He will also help identify specific local marketing constraints which will be considered for special study or analysis in the project. He will assist, in cooperation of the agricultural economist, and BRI staff develop an investment plan for the KUD as a basis for obtaining unsecured supervised credit for facilities, supply and equipment.

The agricultural economist will be responsible for (a) recording and analyzing costs and returns of the various activities carried out under the project, (b) identifying socio-economic factor relevant to the project, and (c) designing appropriate studies for addressing issues in the economics of food crops production and marketing. He will work with the PPS and the other two field teams members, for coordination of all baseline studies, progress reports and evaluations in the project area.

Communications among the Field Teams and the Project Office will be assured by establishing a system of periodic reporting of implementation progress and problems to the Project Office through the offices of the kabupaten and provincial extension services. and frequent visits to the Field Teams by project office staff. It is also planned for all Field Teams to meet regularly at one of the project locations to exchange information and discuss progress once every six months.

2. USAID

The USAID Project Officer will assist the PPO in project implementation, participate in baseline and evaluation studies and perform functions generally associated with USAID's monitoring role. He will also serve as a member of the Steering Committee. USAID will also provide four long term technical advisors. Proposed terms of reference for the long term advisors are presented in Annex B. The Senior Technical Advisors will work directly with their counterparts at the PPO and with the provincial and kabupaten staffs of the DGFC and provide direct technical support to the Field Teams. One of these advisors will be located in Surabaya. The others will be located in Jakarta and Teluk Betung in Lampung province, or Ujung Pandang in South Sulawesi.

3. Coordination

Participation of other agencies is crucial to the success of the project. Various mechanisms already exist for coordination between the DFGC AARD, BULOG, DGC, BRI, IPB and the regional universities. The BIMAS program, for instance, which is operative in all of the project areas, provides for coordination of all above agencies through the BIMAS Coordination Committees at the national, provincial, district (kabupaten) and sub-district (kecamatan) levels. The same mechanism will serve to coordinate participants for the secondary crops.

Another coordination mechanism already in place is the National Committee on Post Harvest Activities, chaired by the DOA. This committee will facilitate participation of BULOG in training programs on harvesting, handling, drying and storage of secondary crops. There are precedents for contractual arrangements between DGFC and BULOG, AARD, IPB, etc. which indicate no serious problems in cooperation.

To ensure closer coordination among the participating agencies, a Palawija Project Coordinating Committee will be formed consisting of (1) the Director, Bureau of Production, DGFC, (2) Director, Research and

Development, BULOG, (3) Secretary to the Minister, Department of Cooperatives, (4) Project Director, Secondary Food Crops Development Project and (5) USAID Project Officer. The Project Director will serve as Secretary to the Committee, prepares the agenda, and keeps records of all actions and decisions taken by the Coordinating Committee. The Committee will meet at least ones a month but special meetings can be arranged by the Chairman as the need arises. Chairmanship of the Committee will be rotated among the members. These members of the Steering Committee may be changed any time at the request of their respective Director General.

Replicability of Model

A key concern is the appropriateness of the administrative model that has been designed. Several alternatives were analyzed. In the end, this model was chosen because:

a. It provides a minimum number of full-time project staff and USAID advisors necessary for project implementation.

b. It is designed to strengthen existing permanent staff at all levels in addressing constraints on secondary crops.

c. Project staff is recruited and assigned from whithin a single agency, the DGFC, clearly invested with responsibility and management control for the project.

d. The Field Teams are to be temporary, or "portable" staff units, reassignable to other locations as progress towards adoption of technology is confirmed by evaluation studies.

e. It complements the existing lines of authority.

f. The size and organization of the project can be conveniently integrated in the regular functions and personnel of DGFC after completion of the project.

If successful, replicability can be achieved in the first instance by reassignment of Field Teams to new kabupatens, while the Project Office remains in place; or, Field Teams could continue where they are while new Field Teams are recruited and trained. Either alternative would imply still relatively small staff and resource commitments.

Replicability on a broader, even a national scale, is also possible but would clearly involve much larger commitments of budgets and staff. Whether such an effort is justified, on economic, technical and social grounds, is a question this project will help to answer after the third year of project performace.

B. Implementation Schedule

A five-year project is planned. Year 1 will involve key start-up activities including contracting of USAID technical assistance, recruitment and initial training of project Field Teams, completion of baseline surveys, establishing the operational mechanisms for DGFC coordination with CRIFC, BULOG, the universities and other agencies. Full-scale project activity should be underway in the six project sites from Year 2, and in a second six sites from Year 4 pending evaluation results.

Recommended Schedule

6/2/82 - Project Paper technical review.
4/15/83 - Project approval with authorization to negotiate Loan Agreement.
4/30/83 - Loan Agreement signed by USAID and GOI.
5/15/83 - RFP closing date.
5/30/83 - Bids evaluated, contractor selected.

Year 1

5/15/83 - Initial CPs met Project Office established. Project Director, technical staff assigned.
6/1/83 - Field Teams members identified in each project site.
6/30/83 - Baseline survey contracted, Field Teams training contracted.
6/1/83 - Contract for USAID advisors signed.
8/1/83 - Senior Technical advisor arrives.
9/1/83 - First semi-annual seminar conducted (organizational session).
10/15/83 - Operational plan for Year 2 for all project components reviewed, revised, and established.

Year 2

11/15/83 -Remaining two USAID advisors arrive.
3/1/84 - Semi-annual seminar, progress reports on trials/demonstrations/experiements/studies, revision of priorities, scheduling for next 6 months.
9/1/84 - Semi-annual seminar/etc.

Year 3

3/1/85 - Semi-annual seminar/etc. - to include planning for comprehensive evaluation during last part of Year 3.
9/1/85 - Comprehensive evaluation completed.
10/15/85 - Start-up completed for second six WKBPPs (if indicated by evaluation).

Year 4

3/1/86 - Semi-annual seminar/etc.
6/1/86 - Semi-annual seminar/etc.

Year 5

3/1/87 - Semi-annual seminar/etc.
9/15/87 - Comprehensive evaluation completed.

Note: Detailed planning for each project component will be needed. The above schedule established a framework within which this can be accomplished.

C. Evaluation Plan

The project is fundamentally a learning experience since it is the first project dealing simultaneously with production and marketing of secondary crops. Any number of experiments, trials, demonstrations, experiments, and socio-economic studies will be carried out with the view that the experience and the technology developed will be useful towards the design of a national program. Setting priorities, managing project funds, working out appropriate contracts with cooperating agencies, planning and designing a mix of training programs, and conducting comprehensive reviews all are aimed ultimately at evaluation of findings useful to decision-makers.

Management skills to organize and successfully carry out a project of this nature are key qualifications of the DGFC Project Director and the USAID advisors. They will be called upon especially during the planned semi-annual progress reviews and the comprehensive project evaluations scheduled in Year 3 and 5. Funds are budgeted specifically for outside assistance in carrying out these evaluation functions. It is anticipated that local and foreign consultants will be valuable resources.

Evaluation will include not only analysis of results from individual activities but will also address the success of the model itself, i.e. whether the organizational, staffing, contracting and budget arrangements of the project are adequate to the task. The latter concern will be especially relevant to decision-makers who need to consider the resource and cost implications of replication of the model on a broader scale.

The baseline surveys to be completed in Year 1 constitute clear starting point for much of the evaluation work.

D. Negotiation Status

The Project Design Team has developed the proposed project in close collaboration with the Directorate General of Food Crops. Other key coordinating agencies are AARD, CRIFC and BULOG. All are in agreement with the basic purpose and design of the project and are prepared to cooperate.

The target date for the Project Loan Agreement is April 1983. The DGFC has indicated already that the project is eligible for initial funding in the IFY 1983-84 budget with later funding scheduled annually until the termination of the project.

In addition to the standard conditions precedent to loan disbursement another condition is recommended to provide assurances that the Project Office is established within the first three months following loan signature, staffed by a senior-level Project Director and at least three technical specialists (the latter to be named later if necessary).

Nc covenants are proposed. On its side, the GOI/DGFC will commit approximately $6.291 million in rupiah equivalent budgets during IFY 1983-84 through IFY 1987-88 to cover, among other items, all project operational costs including required agriculture inputs.

A waiver will be needed for procurement of vehicles in Indonesia following the current procedures and should be incorporated in the Project Authorization.

ANNEX A

DETAILED PROFILE OF PROJECT SITES

The Secondary Food Crops Development Project is located in the provinces of Lampung, South Sulawesi, and East Java. These provinces were selected because (1) they are principal secondary food crops producing areas with potential for expansion, (2) population in these provinces use secondary crops as staples along with rice, (3) they differ in agro-climatic characteristics and ethnic population, and (4) production technology and cropping systems have reached a stage of development ready for dissemination and demonstration to farmers.

Two extension zones or Wilayah Kerja Balai Penyuluhan Pertanian (WKBPP) from each province have been selected as project areas. These include WKBPP Palattae and WKBPP Selli in Kabupaten Bone, South Sulawesi; WKBPP Abung Timur and WKBPP Banjid in Kabupaten North Lampung, Lampung Province; and WKBPP Sokorojo and WKBPP Pulong in Kabupaten Ponorogo, East Java. Together, the six WKBPPS include twenty-three kecamatans or towns covering an agricultural land area of 410,510 hectares cultivated by about 168,170 farm families and a total population of about 896,840.

The following profiles detail the agronomic, economic and institutional, and social characteristics of each of the project sites. Although the discussions are focused at the kabupaten level, reference to specific WKBPPs will be noted.

Agronomic Profile

1. North Lampung, Lampung Province

WKBPP Abung Timur which includes kecamatans Abung Timur, Abung Selatan and Tulang Bawang Udik and WKBPP Banjid which includes kecamatans Bahuga, Baradata, Kasung and Banjid were selected as project sites in Kabupaten North Lampung. Together, these two WKBPPs cover present and potential agricultural area of 232,100 hectares-cultivated by about 49,000 families with a total population of about 261,000. The average farm size is 2 hectares.

The land area is general hilly. The soil types are brown, yellow podzolic and latosols. They are generally acidic, low in potassium, poor in physical and chemical properties, high exchangeable aluminum and low in organic matter content. The surface readily slakes making it susceptible to erosion.

Rainfall is between 2500-3000 mm per year. Nine months is considered wet season and three months dry season. The average daily temperature is between 22°C- 33°C. Five rivers converge in the kabupaten, two of which have the potential to irrigate 20,000 hectares.

The cropping pattern is different for each WKBPP for WKBPP Abung Timur, the most widely used cropping pattern is rice/$\frac{\text{soybean + corn}}{\text{cassava}}$ while for WKBPP Banjid the cropping pattern is rice/$\frac{\text{peanut + corn}}{\text{cassava}}$. Yields, on demonstration farmer using FAO-recommended fertilizer dosages and yields achieved by farmers using their usual practices is shown below.

Crops	N	P	K	Expt'l Yield (Kg/Ha)	Farmer's Yield (Kg/Ha.
	(kg of nutrients ha used in experiments)				
Padi Cogo	90	90	30	400	135
Corn	45	45	30	300	130
Peanut	45	45	30	120	50
Soybean	23	45	30	120	60
Cassava	90	45	30	2400	1500

About 1% of the cultivated area is sawah, 35% rainfed and 64% homestead and alang-alang. Other important crops are coffee, coconut, pepper and horticultural crops. They provide employment and compete with food crops in the use of the land and family labor.

2. Bone, South Sulawesi

The project site in Bone, South Sulawesi consists of WKBPP Palattae which includes Kecamatans Kahu, Bonto Cani, Salamekko, Libureng and Pone, and WKBPP Selli which includes kecamatans Laparaja, Lamuru, Ulaweng and Palaka. Together they cover an agricultural area of 116,860 hectares, cultivated by about 46,960 families and a total population of about 281,740. The average size of farm is 2.5 hectares.

The soil is low in nitrogen, high in phosporous and potassium and generally lacking in organic matter content.

There are three district seasons. The dry season which lasts for six months starting from December to June, and the wet season from July to November.

The most widely used cropping pattern for WKBPP Palattae is rice/peanut/corn and for WKBPP Selli, rice/corn/mungbean. The average production per hectare is shown below:

Crops	Production in Kg/Ha
Rice	2000
Corn	600
Peanut	600
Soybean	400
Mungbean	300
Cassava	5000

Corn and rice are usually grown for household consumption while legumes are grown as cash crops.

The land use by cropped area is shown below:

Crops	Land Use in Percent
Rice	28
Corn	48
Peanut	10
Soybean	7
Mungbean	6
Cassava	1

About 15% of the land area in WKBPP Selli is sawah, about 60% rainfed, and homestead and alang-alang about is 25%.

3. Ponorogo, East Java

The project site in Ponorogo, East Java consists of WKBPP Sokorejo which includes kecamatans Sokorejo, Badegan and Sampang, and WKBPP Pulung which includes kecamatan Pulung, Sooko and Ngebel.

The project covers an agricultural land area of 61,551 hectares cultivated by about 72,210 farm families with a population of about 354,100. The present cultivated area per farm is .65 hectare.

Ponogoro is hilly and fertile, with soil mostly of the Mediterranean, granusols and lithosol types. It rains for about 8 months of the year, with an average rainfall of 2500 mm, enough to support rice and two crops of palawija. The most widely used cropping pattern is rice/corn/soybean in WKBPP Sokorojo and rice/corn/peanut in WKBPP Pulung. The average productivity is shown below:

Crops	Production (Kg/Ha)
Rice	3000 - 4000
Corn	900 - 1200
Peanut	600 - 1000
Soybean	700 - 1200
Mungbean	600 - 1200
Cassava	7000 - 9000

Of the total agricultural land, about 25% is in rice, 21% in corn, 31% in peanut and soybean, 19% in cassava and 4% in mungbean. About 30% is sawah, 46% is rainfed and 24% is homestead. Sugar is also an important crop and sugar mills provide off-farm employment around the communities where they are located.

Economic and Institutional Profile

Income and Employment

Agriculture is the primary source of employment in each of the project sites. Income from agriculture depends on the productivity of the land and the prices of the commodities produced. For example, in 1979, an average farm income in the project site in East Java following the traditional cropping pattern was Rp. 331,188 ($517) with peanut as the major income earner, followed by soybean, cassava, upland rice and corn.

The average farm income in the project site in South Sulawesi was Rp. 468,480 ($732) with corn, peanut, soybean and cassava as the principal income earners. In Lampung province the average farm income was Rp. 222,720 ($348) again with corn, rice, cassava, soybean and peanut as major income earners. These income levels are based on the traditional cropping patterns followed by farmers in 1979.

The average daily agricultural wage is Rp. 700 for women and Rp. 1000 for men plus three meals. Laborers with their own draft animals are paid Rp. 1500 per day.

There are limited non-farm employment opportunities in the project sites. For example there are sugar mills in Ponorogo and Bone and tapioca and gaplek factories in Ponorogo and Lampung. In addition farmers in Lampung produce estate crops such as pepper, rubber, coconut and coffee. Off-farm income from various sources were not included the income estimates cited above.

Transportation

The transportation system is well developed in each of the project sites. Bone is only four hours by paved roads from Ujung Pandang, a major seaport in the eastern part of Indonesia. The Road network within Kabupaten Bone and highways connecting it to the surounding kabupatens of Wajo, Sanjai and Maros are asphalted. Most of the roads connecting the different kecamatans are hard surfaced and can service heavy motor vehicles as well as busses and other forms of motor transport.

The railroad system in Lampung and the Trans-Sumatra highway provide an efficient means of transportation among the capital cities of the eight provinces of Sumatra. Other roads in Sumatra are primarily made of hard-surfaced dirt roads that are often impassable during the rainy season. The project site in Kabupaten North Lampung is accessible to two major metropolitan areas, Tanjung Karang/Telukbetung in Lampung and Palembang in South Sumatra.

The transportation system is well developed in Ponorogo, East Java. It is four hours from Surabaya, the second biggest port city in Indonesia. It is also easily accessible by highway to Jogyakarta, a major

metropolitan city in Java. The project site has approximately twenty market towns to which agricultural produce can be marketed and from which agricultural inputs can be obtained. In addition, there are several village markets surrounding the project site.

Extension Research & Demonstration

The extension system is well-developed in each of the project sites. Each WKBPP has 2 PPMs, 19-24 PPLs, with each PPL indirectly supervising about 1600 farmers farmers). On the average, PPLs visit 16 farmer groups headed by kontak tanis at least once every two weeks. Because most PPLs do not have motorcycles, their effective area of coverage and frecuency of visits are actually less than what is called for in their job descriptions. These PPLs are assisted by agricultural radio programs and various agricultural publications from the Agricultural Information Service of the province.

Research and demonstration in cropping systems, variety trials, and fertilizer yield response have been conducted in all of the project sites. For example, CRIFC has conducted cropping systems trials in Way-Abung, North Lampung and in Wajo, South Sulawesi. The Ministry of Agriculture and FAO have similar trials and demonstrations in East Java. Results of these work will be the basis for initial recommendation of cropping systems and agronomic practices in the project. Farmers are generally receptive to new agricultural technology if it promises increases in income, accompanied by appropriate inputs and technical assistance, and is supported by local leadership. For example the Lapo-asi program in Bone, South Sulawesi and the Tani-Makmur program in Lampung have demonstrated that farmers can produce upland rice yields equal to sawah yields provided sufficient inputs and intensive extension services are provided.

Credit

Private dealers, government owned companies such as the P.T. Pertani, P.T. PUSRI, and KUDs are the principal sources of agricultural inputs. Farmers obtain credit from various agricultural programs such as BIMAS and INMAS, usually through the BRI village unit banks.

Markets

Marketing is assumed to be a major constraint to increased secondary crops production. Although there are private traders and agents of wholesale dealers in project sites, prices offered are generally inadequate because of limited competition and low quality of produce. Procurement operations of the government for secondary crops are not fully operational because procurement prices are lower than market prices.

There are factories in Lampung and East Java for cassava and corn servicing the export and local markets for processed foods. The cassava export market is well developed in Lampung and the tapioca factories and corn processing plants in East Java serve the domestic market. An alcohol manufacturing plant using cassava is under construction in Lampung.

Social Profile

Each project site is populated by different ethnic groups. The primary groups are the Buginese in South Sulawesi, the Javanese in East Java, and Javanese, Bataks and Balinese in the transmigration areas of Lampung.

1. Buginese

Buginese are familiar with both lowland (sawah) agriculture and swidden (slash and burn) agriculture. As early as 1969, they are known to have used fertilizer and improved varieties of rice with guidance of extension workers. They also practice animal husbandry for meat and draft power.

The basic kin group is the nuclear family. A number of families tend to cluster around one important, successful and powerful family, based on a bilateral kin relationship. This cohesiveness is fostered by intermarriage among first, second or third cousins.

Formal education has always been an important element in the higher classes of Buginese society. Education is a means to gain status, power and prestige. Those who have gained status are expected to be authoritative and generous and in turn the subordinates are expected to be submissive and obedient. Consistent with their emphasis on education, the Buginese have great respect for religion, law, literature and culture which are the unifying elements in their culture. Buginese are adaptable to all types of ecological environments, with fishermen on the coast, farmers in the lowland and swiden agriculture in the interior. They also excel in trade and shipping.

2. Javanese

Javenese are primarily farmers who excel in irrigated agriculture. Rural life is centered around a village under the leadership of the lurah (village head). Community activities such as building and repairing irrigation canals and roads and community harvesting or planting known as gotong royong are generally practiced. Strife is avoided as much as possible and decisions are made by consensus rather than by vote.

Javanese wives are in charge of household finances. Women pay the bills and give allowances to all members of the family. Along with the men and grown children, women earn as well as manage the finances of the family.

Seniority and title are important in Javanese culture. If educated, a Javanese is addressed by his academic title.

Although rice is the most important crop, upland crops such as corn and cassava are also important especially in the mountain areas of Java. Agriculture is labor intensive, partly because of the nature of irrigated rice production and partly due to the high population intensity of the land.

The heavy farm activities such as land clearing and preparation are done by men. Women also participate in seedbed preparation, planting seeding and harvesting.

Social stratification is based mainly on land ownership. Those who become wealthy by commerce and trade do not gain as high a social status as land owners. White collar jobs and civil servants also occupy high status in the Javanese society. They are regarded with higher esteem than those in the professions and in business and trade.

Javanese societies are tradition bound, resisting economic, cultural and social influences unless these changes demonstrate improvement in their economic and social status. Once a new technology is finally accepted, it is often implemented through community self-help or "goting royong" indicating mutual concern for others. While equality among persons is emphasized, elaborate expression of respect and defference is accorded to leaders such as village heads, government officials and elders. Class stratification is minimal because of the narrow economic differences among the farmers. Those who own large tracts of land have patron like responsibility providing wage work or share crop to those who do not own lands.

3. Bataks

Bataks, particularly those who came from the uplands of North Sumatra are familiar with upland agriculture. Double cropping and crop rotation practiced by the Javanese are not new to them. Men and boys do most of the farm work, building and repairing irrigation canals, clearing and preparing the land. Women and girls take care of planting and seeding while all members of the family harvest, transport and store the crops.

Bataks are aggressive, adventurous and ambitious. Many of them occupy high positions in government, business and retail trade. They are willing to migrate to more economically progressive areas. They are found in all levels in the civil service, blue-collared occupations as well as in business. They are not as concerned as the Buginese and the the Javanese with ranks and titles and the complexities of etiquette.

4. Balinese

The Balinese are very much like the Javanese before colonization and western influences were introduced in Java. There is a trace of a mild caste system with emphasis on titles that are not necessarily related with power, respect or wealth.

In agriculture, the irrigation society is a very important aspect of economic or social life which organized for the efficient use of water. Balinese are organization conscious people, forming all kind of associations each representing different interest groups. In this sense, the Balinese society is more flexible and stable, allowing modern agricultural technology to be introduced without disrupting the basic structure of the group. Unlike the Javanese, an agricultural society can exist independent of the village.

Other Social Characteristics

1. Consumption

People in the project sites eat secondary crops as basic staple along with rice. The most popular combination is rice/gaplek, rice/corn and corn/gaplek. The proportion of each crop combination depends on the relative prices of these commodities which in turn depend on the season.

Rice, soybean, and peanuts show positive income elasticity while cassava and corn show positive income elasticity at the lowest income group. While this pattern is generally true, in Indonesia, exception are found in secondary crops producing provinces where secondary crops are consumed as a natural part of their diet regardless of their income levels.

In the project sites, about one-half to two-third of rice production is consumed, about one-fourth to one-half for cassava, about two third for corn and about one-tenth of soybean, peanut and mungbean are consumed in the household. Sale of secondary crops is an important source of income and usually used to finance purchase of agricultural inputs and as a source of cash for daily household expenses.

2. Age Distribution and Level of Education

The age distribution for kabupaten Bone and North Lampung are shown below

Age Group	Distribution in Percent	
	Bone	North Lampung
0 - 4	15	16
5 - 9	18	16
10 - 14	13	12
15 - 24	16	19
25 - 49	28	29
50 and above	10	8

If one takes the labor force to be the non-institutional population between the ages of 16 to 65 as defined in U.S., it is evident that about 55% of the total opulation are in the labor force. This definition of the labor force from which dependency ratio is derived is not appropriate in the project sites and perhaps most of rural Indonesia because children as young as seven years old, or senior citizens as old as 75-80 years old continue to work in the farms. Almost every member of the family has certain responsibilities in the farm household regardless of his age. In terms of education, the younger generation of farmers have attained at least primary education. In Bone, about 68% and in North Lampung about 80% of the children in the 7-12 years old group are in the process or have completed primary school. The rest have never been or have dropped out of primary school.

These data suggest that the younger farmers are becoming more literate and perhaps more receptive to technological changes. More importantly, increased literacy among farmers improves their access to printed extension materials and they can follow instrucions more accurately than those who are unable to read and write.

3. Land Ownership, Sharing Arrangement and Size Distribution
Land

Between 65% - 87% of the lands are owned by farmers, between 8% - 12% are rented and the rest are farmed on own/lease arrangement. Tenancy problems of the type occuring in the Philippines are rarely encountered in Indonesia probably because of the absence of large tracts of lands owned by few families. Moreoever, the sharing arrangement between tenants and landlords which is 50:50 for rice and 60:40 for secondary crops is generally accepted by both parties.

The sharing arrangement cited above is true for a small proportion of the farmers because of the low percentage of lands under tenancy and because "gotong royong" is generally practiced. This is an arrangement where farmers exchange labor in planting, harvesting and in land preparation. Gotong Royong is generally practiced in both sites in Lampung, and WKBPP Selli in Bone, South Sulawesi and WKBPP Pulong in East Java.

Annex B
ALLOCATION OF PROJECT FUNDS

I N P U T S	UNITS AMOUNT	UNIT COST	DISTRIBUTION OF LOAN FUNDS DGFC/CRIFC	BULOG	DGCOOP/KUD	UNIVERSITIES	DISTRIBUTION OF GOI FUND DPOC	BPLPP	BRI	TOTAL LOAN	TOTAL GOI		GRAND TOTAL
Technical Assistance						-	-	-		-	1756	-	1756
Long-Term													
- Cropping System Spec.	60 MM	10.1	606	-	-	-	-	-	-	606		-	
- Post Harvest/ Marketing Spec.	36 MM	10.1	-	364	-	-	-	-	-	364		-	
- Agric. Economist	36 MM	10.1	-	-	364	-	-	-	-	364		-	
- Library Spec.	24 MM	10.0	-	240	-	-	-	-	-	240		-	
Short-Term													
- Agr. Economist, Storage Specialist and Quality Control Spec.	15 MM	12.1	-	-	182	-	-	-	-	182		-	
TRAINING						-	-	-	-	-	742	-	641	1383
Overseas													
- Cropping System	30 MM	3.9	117	-	-	-	-	-	-	117		-	
- Post Harvest	68 MM	3.8	31	117	117	-	-	-	-	265		-	
In-Country													
- Field Team	30 MM	2.1	-	-	-	-	-	189	-	-		189	
- PPM, PPL, PPS	250 MM	1.8	-	-	-	-	-	452	-	-		452	
- KUD, Farmers, Dealers	240 MM	1.5	-	-	360	-	-	-	-	360		-	
PERSONNEL													582	582
- Project Dir/Counter-parts	180 MM	0.8	-	-	-	-	144	-	-	-		144	
- Field Team/PPS	540 MM	0.5	-	-	-	-	270	-	-	-		270	
- Support Personnel	480 MM	0.35	-	-	-	-	168	-	-	-		168	
OPERATIONAL SUPPORT											2772	-		2772
- Cropping System Trials & Dan Farm	180 Unit	5.3	859	-	-	-	-	-	-	859		-	
- Post Harvest	180 Unit	5.3	-	929	-	-	-	-	-	929		-	
- Special Studies	-	-	-	-	-	-	-	-	-	-		-	
- Baseline & Evaluation	3 X	83.0	-	-	-	250	-	-	-	250		-	
- Monitoring	3 Areas	70.0	-	-	-	210	-	-	-	210		-	
- Policy & Market Dev.	5 X	69.6	-	-	-	348	-	-	-	348		-	
- Library & Management	5 X	11.2	-	56	-	-	-	-	-	56		-	
- Workshop/Seminar	-	-	95	25	-	-	-	-	-	120		-	
COMMODITIES	-	-	-	-	-	-	-	-	-	-	-		4036	4106
- Production/Tillage	-	-	-	-	-	-	119	-	-	-		119		
- Seed Production/Supply	-	-	-	-	-	-	687	-	-	-		687		
- Rhyzobium	2.6 tons	62	-	-	-	-	160	-	-	-		160		
- Lime	16.000 tons	7.8	-	-	-	-	-	-	1253	-		1253		
- Fertilizer	6.000 tons	1.4	-	-	-	-	-	-	877	-		877		
- Pest Control	60 tons	4.0	-	-	-	-	-	-	240	-		240		
- Post Harvest/Marketing	-	-	-	-	-	-	-	-	450	-		450		
- Office Equipment	-	-	-	-	-	-	250	-	-	-		250		
INFLATION & CONTINGENCY	-	-	376	367	216	171	353	126	553		1130	-	1032	2092
TOTAL			2084	2098	1239	979	2151	767	3373		6400		6291	12691

Annex Table B

SUMMARY OF COST ESTIMATES AND DISBURSEMENT OF FUNDS

in (000) US Dollar

No.	Category	Volume	Unit Cost	FY 1983 USAID FX	FY 1983 GOI LX	FY 1983 GOI LC	FY 1984 USAID FX	FY 1984 USAID LC	FY 1984 GOI LC	FY 1985 USAID FX	FY 1985 USAID LC	FY 1985 GOI LC	FY 1986 USAID FX	FY 1986 USAID LC	FY 1986 GOI LC	FY 1987 USAID FX	FY 1987 USAID LC	FY 1987 GOI LC	TOTAL USAID FX	TOTAL USAID LC	TOTAL GOI LC
I.	TECHNICAL ASSISTANCE																				
	Long Term																				
	- Cropping System Spec.	60MM	10.1	121.2	-	-	121.2	-	-	121.2	-	-	121.2	-	-	121.2	-	-	606	-	-
	- Post Harvest/Marketing	36MM	10.1	-	-	-	60.6	-	-	121.2	-	-	121.2	-	-	60.6	-	-	364	-	-
	- Agric. Economist	36MM	10.1	-	-	-	60.6	-	-	121.2	-	-	121.2	-	-	60.6	-	-	364		-
	- Library Spec.	24MM	10	120	-	-	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Short Term																				
	- Storage & Quality Control Spec.	15MM	12.1	-	-	-	-	-	-	60	-	-	61	-	-	61	-	-	182	-	-
	SUB TOTAL I.	171MM	-	241.2	-	-	362.4	-	-	423.6	-	-	424.6	-	-	303.4	-	-	1.756	-	-
II.	TRAINING																				
	Overseas																		117	-	-
	- Cropping System	30MM	3.9	78	-	-	39	-	-	-	-	-	-	-	-	-	-	-	226	-	-
	Post Harvest	68MM	3.9	39	-	-	78	-	-	109	-	-	-	-	-	-	-	-			
	In Country																		-		189
	- Field Team/PPS	90MM	2.1	-		189	-	-	-	-	-	-	-	-	-	-	-	-	-		452
	- PPH & PPL	250MM	1.8	-		216	-		236	-	-	-	-	-	-	-	-	-	-		
	- RUD/Farmers & Dealers	240MM	1.5	-	60	-	-	120	-	-	219	-	-	-	-	-	-	-	-	399	-
	- Operational Cost	17MM	2.26	-	-	122	-	-	163	-	-	-	-	-	-	-	-	-	-	-	400
	SUB TOTAL II	678MM	-	117	60	405	117	120	236	109	219								343	399	641
III.	PERSONNEL																				
	- Project Director/ Counterparts (3)	180MM	0.8	-	-	28.8	-	-	28.8	-	-	28.8	-	-	28.8	-	-	28.8	-	-	144
	- Field Team/PPS (9)	540MM	0.5	-	-	54	-	-	54	-	-	54	-	-	54	-	-	54	-	-	270
	- Support Personnel (8)	480MM	0.35	-	-	33.6	-	-	33.6	-	-	33.6	-	-	33.6	-	-	33.6	-	-	168
	SUB TOTAL III	1200MM	-	-	-	116.4	-	-	116.4	-	-	116.4			116.4			116.4			582

). Category	Volume	Unit Cost	FY 1983 USAID FX	FY 1983 USAID LX	FY 1983 GOI LC	FY 1984 USAID FX	FY 1984 USAID LC	FY 1984 GOI LC	FY 1985 USAID FX	FY 1985 USAID LC	FY 1985 GOI LC	FY 1986 USAID FX	FY 1986 USAID LC	FY 1986 GOI LC	FY 1987 USAID LC	FY 1987 GOI LC	TOTAL USAID FX	TOTAL USAID LC	TOTAL GOI LC
I. OPERATIONAL SUPPORT																			
- Cropping System Trials & Demfarms	180 Us	5.3	-	75.4	-	-	165.8	-	-	261.2	-	-	356.6	-	-	-	-	859	-
- Post Harvest	180 Us	5.3	-	53	-	-	106	-	-	159	-	-	318	-	-	293	-	929	-
- Special Studies/ Baseline & Evaluation	3 X	83.3	83	-	-	-		-	83	-	-	-	-	-	84	-	250	-	-
- Monitoring	5 X	42	42	-	-	42	-	-	42	-	-	42	-	-	42		210	-	-
- Policy & Market Dev.	5 X	69.6	69	-	-	69	-	-	70	-	-	70	-	-	70	-	348	-	-
- Library & Management	5 X	11.2	11	-	-	11	-	-	11	-	-	11	-	-	12	-	56	-	-
- Tech. Workshop/ Seminar	-	-	-	20.0	-		25.0	-	-	25.0	-	-	25.0	-	-	25.0	-	120.0	-
SUB TOTAL IV	-	-	205	148.4	-	122	296.8	-	206	445.2	-	123	699.6	-	208	318	864	1908	-
. COMMODITIES																			
- Production	-	-	-	-	9	-	-	1	-	-	22	-	-	33	-	-	44	-	119
- Seed Production/ Supply	-	-	-	-	42	-	-	65	-	-	130	-	-	190	-	-	260	-	687
- Rhyzobium	2.6Ts	62	-	-	10	-	-	15	-	-	30	-	-	45	-	-	60	-	160
- Lime	1600 Ts	.078	-	-	-	-	-	128	-	-	250	-	-	375	-	-	500	-	1253
- Fertilizer	6000 Ts	.14	-	-	-	-	-	94	-	-	174	-	-	261	-	-	348	-	877
- Post Control	60 Ts	-	-	-	20	-	-	24	-	-	48	-	-	72	-	-	96	-	240
- Post Harvest & Marketing	-	-	-	-	-	-	-	45	-	-	90	-	-	135	-	-	180	-	450
- Office Equipment	-	-	-	-	50	-	-	50	-	-	50	-	-	50	-	-	50	-	250
SUB TOTAL V	-	-	-	-	111	-	-	432	-	-	794	-	-	1161	-	-	1538	-	4036
TOTAL I UP TO V			563.2	208.8	632.4	601.4	416.8	784.4	738.6	664.2	910.4	547.6	699.6	1277.4	511.4	318	1654.4	2963	2307	5259
I. INFLATION & CONTINGENCY	-	-	172	41	124	125	83	154	160	124	179	115	139	251	108	63	324	680	450	1032
GRAND TOTAL	-	-	735	250	756	726	500	938	899	788	1090	663	839	1528	620	381	1978	3643	2757	6291

ANNEX B.1

Illustrate One Year Budget: Long Term Technical Assistance

1.	Posting		$ 14,000
	International Travel for Family of Four	$ 5600	
	Un-accompanied Baggage	$ 2400	
	Household Effects	$ 6000	
2.	Housing and Utilities		$ 23,000
3.	School Allowance		$ 9,000
4.	In-Country Travel and Per Diem		$ 5,000
5.	R & R and Home Leave		$ 4,000
6.	Fringe Benefits (25% of Base Salary)		$ 11,376
7.	Post Differential (15% of Base Salary)		$ 6,750
8.	Salary and Wages		$ 45,000
9.	Insurance (4% of Salary and Fringe Benefits)		$ 2,250
	Sub Total: One Year		$ 121,076
	Sub Total: Thirteen Men Year (1x5+2x3+1x2)		$1,574,000

Annex B.2

Illustrative One Month Budget: Short Term Consultant

1.	International Travel	$ 2,500
2.	Per Diem (30 days at $77/day)	$ 2,310
3.	In-Country Travel	$ 600
4.	Consulting Fee (26 days at $250/day)	$ 6,500
5.	Miscellaneous	$ 220
	Sub Total: One Month	$ 12,310
	Sub Total: Fifteen Months	$ 182,000

Annex B.3

Illustrative Summary for Technical Assistance Costs

1.	Long Term Technical Assistance (B.1)	$1,574,000
2.	Short Term Consultants (B.2)	$ 182,000
	Total	$1,756,000

Annex B.4

Illustrative Budget for Training

1.	Overseas Training on Cropping Systems(30 MM at $3900/MO)	$ 117,000
2.	Post Harvest Training Abroad and attendance to prof. conferences (68 MM at $3900/MO)	$ 265,000
3.	In-Country Field Team Training (54 MM at $2100/MO)	$ 189,000
4.	PPS, PPM, PPL Training (250 MM at $1800/MO)	$ 452,000
5.	Farmers, KUD, Dealer Training (100 MM at $2100/MO)	$ 210,000
6.	Operational Cost and Fee of Training Agencies	$ 150,000
	Total	$1,383,000

Annex B.5

Illustrative Budget for Operational Support

1.	Experiments and Trials in Cropping Systems (180 units at $5300 each)	$ 859,000
2.	Post Harvest Laboratory (B.5.1)	$ 303,000
3.	Post Harvest Demonstration at (118 X $5.3)	$ 626,000
4.	Baseline and Evaluation Monitoring Survey	$ 460,000
5.	Special Studies (5 at $70 each)	$ 348,000
6.	Library Equipment and Facilities	$ 56,000
7.	Workshop/Seminar	$ 120,000
	Total	$2,772,000

Annex B.5.1
List of Equipment for Post Harvest Operations

1.	Processing/Storage Systems (3 at $36,000 each)	$ 108,000
2.	IRRI Dryers (15 at $2000)	$ 30,000
3.	Drying Floors (12 at $8000)	$ 96,000
4.	Miscellaneous Equipment (Bags, Sheets, Shellers, Etc.)	$ 69,000
	Total	$ 303,000

Annex B.6
Illustrative Budget for Personnel

1.	GOI Counterparts (5 x 12 x 3 x $800)	$ 144,000
2.	Field Teams (5 x 12 x 18 x $350)	$ 378,000
3.	Support Personnel (5 x 12 x 3 x $350)	$ 60,000
	Total	$ 582,000

Table B.7
Illustrative Budget for Commodities

1.	Production Equipment and Draft Animals (B.7.1)	$ 120,000
2.	Equipment for Seed Production and Supply (B.7.2)	$ 686,000
3.	Pesticide/Insecticide (104 tons at $2,300)	$ 240,000
4.	Fertilizer (6000 tons at $2300)	$ 877,000
5.	Office Supplies and Equipment (4 offices at $62500)	$ 250,000
6.	Lime (1600 tons at $7800)	$ 1,253,000
7.	Rhyzobium (2.6 tons at $62,000)	$ 160,000
8.	Post Harvest Equipment (B.7.3)	$ 450,000
	Total	$ 4,036,000

Table B.7.1
Production Equipment

1.	100 Draft Animals at $600 each	$ 60,000
2.	200 Plows and Harrows at $100 each	$ 20,000
3.	10 Small Tractor Power at $3000 each	$ 30,000
4.	Miscellaneous Cultivators and Sprayers	$ 10,000
	Total	$ 120,000

Table B.7.2
Equipment for Seed Processing/Storage Centers (3) in Project Kabupatens

Item No.	Description	Quantity	Estimated Cost Unit Cost	Estimated Cost Total
1.	Drying floors	12	$ 8,000	$ 96,000
2.	Drying sheets (no and size to be determined)	-	-	60,000
3.	Dryers (IRRI type)	18	1,500	27,000
4.	Corn shellers	18	800	14,400
5.	Peanut shellers	18	800	14,400
6.	Cleaners	18	400	7,200
7.	Gunny bags	1000	5	5,000
8.	Godowns	6	12,800	76,800
9.	Other: Furniture, generation, storage equipment.	3	20,000	60,000
10.	Rehabilitation of Seed Centers	3	108,000	326,280
	GRAND TOTAL			$686,000

Table B.7.3
Post Harvest Equipment

Item No.	Description	Quantity	Estimated Cost Units Cost	Total
Farmer Level				
1	Drying sheets	180	$ 20	$ 3,60
2.	Mannual blowers for drying, cleaning	60	100	6,000
3.	Corn sheller	600	4	2,400
4.	Cassava slicer/chippers	120	4	480
5.	Peanut shellers	60	100	6,000
6.	Processing and storage equipment to be determined	-	-	$ 36,000
				$ 54,480
Farmer Group Level				
1.	Power thresher/shellers	12	$ 800	$ 9,600
2.	Cassava chippers	24	250	6,000
3.	Cassava cube machine	12	800	9,600
4.	Peanut shellers	18	800	14,400
5.	Drying systems to be determined	-	-	54,000
	Total			$ 93,600
Village Level (60% private) (40% KUDs)				
1.	Threshers	12	$ 100	$ 12,000
2.	Cleaners	24	400	9,600
3.	Corn grinders	12	4,000	48,000
4.	Peanut shellers	36	800	28,000
5.	New/improved cassava processing systems	-	-	21,000
6.	Drying systems to be determined	-	-	96,000
7.	New systems to be designed/ introduced for post harvest handling	-	-	36,000
				$254,000
WKBPP/Kabupaten Level				
1.	Moisture testers	12	$ 800	$ 9,600
2.	Quality control equipment	-	-	36,000
				$ 45,600
	GRAND TOTAL			$450,000

Term of Reference for Technical Advisors

Three long-term experts are scheduled for the project. All should be agricultural scientists with strong academic credentials (MS or PhD) and broad experience with production programs for some or all of the principal crops involved in the project (soybean, peanut, cassava, corn, and mungbean).

The three experts will be assigned to the Secondary Food Crops Project Office in Jakarta but will travel to and work closely with the provincial and kabupaten agricultural services in support of project activities in the six selected sites. These include a wide range of activities from agronomic field trials and demonstrations to post-harvest handling and marketing studies to socio-economic studies and evaluations. While it is not expected that each expert will have depth of expertise in all the disciplines involved, each should have broad knowledge of agricultural production problems and experience in planning and carrying out multi-disciplinary production programs.

Special expertise in post harvest-handling of food crops may be a desirable additional qualification for one of the experts. Requirements for other special qualifications may best be determined after the project gets underway. Since two of the experts will be assigned at least a year after the start of the project, more precise and detailed job descriptions and required qualifications for them may be deferred until it can be determined what professional skills will best complement the Indonesian staff assigned to the project.

One of the experts will be designated as Senior Technical Advisor. This should be a person of stature as an agricultural scientist with strong administrative skills. He will serve as counterpart to the Project Director and will have major liaison and coordination responsibilities. Specifically, he will:

- provide leadership and supervision of the project team experts.
- be principal spokeman interacting with GOI on matters involving the project team.
- be principal liaison with USAID/Jakarta.
- be principal liaison with the U.S. contractor responsible for activities in the U.S.
- be responsible for planning, coordinating and supervision of all short-term technical consultants required during the period of the project.
- participate with project staff in planning in-country training programs and selection of candidates for training.
- coordinate training programs to be conducted overseas in the United States and third countries.
- in conjunction with Project Director coordinate equipment procurement, delivery and installation at project sites.
- coordinate all studies, analyses, reports and evaluations of the project and make periodic presentations to GOI officials, USAID staff, and other interested parties on project progress.

ANNEX C

LOGICAL FRAMEWORK ANALYSIS
(GOAL)

Narrative Summary	Verifiable Indicators	Means of verification	Assumptions
I. Increased production of secondary crops.	I. Production increased by 50% in demonstration farms, 30% in six WKBPPs and 15%-20% in kabupaten.	I. baseline and evaluation studies; crop statistic report of MOA; farm records and accounts.	I. Normal weather prevails during the period of the project.
II. Increased marketing system of secondary crops.	II. Increase volume of supply by 30%; improved quality of supply, more even temporal and spatial distribution of supply; reduce marketing spoilage.	II. baseline and evaluation studies from records of KUD and private dealers. Farm records and accounts.	II. Incentive prices prevail during life of the project
III. Increased volume of consumption.	III. Increased household consumption by about 10%-15% for all families in six WKBPPs and in kabupaten.	III. baseline and evaluation survey; farm records and accounts.	III. Increased substitution of rice for secondary crops in the diet of the poor. Increased family income.
IV. Increased in employment in production and post harvest handling.	IV. Increased cropping intensity by 50%. Increased labor requirement in production, harvesting, drying, milling, processing and grading by 30%.	IV. baseline and evaluation survey; farm records and accounts.	IV. Farm wages continue to increase with productivity.
V. Increased Farm Income.	V. Increased farm income by 15%-20%.	V. baseline and evaluation survey; farm records and accounts.	IV. Increase farm productivity, farm prices, and wages.

LOGICAL FRAMEWORK ANALYSIS
(PURPOSE)

Narrative Summary	Verifiable Indicators	Means of verification	Assumptions
I. To introduce improved cropping systems.	I. About 50% of farmers in the six WKBPPs and about 30% of farmer in kabupatens Bone, Ponorogo and North Lampung will adopt improved cropping systems.	I. Evaluation and baseline survey; farm records and accounts.	I. Appropriate cropping systems have already been tried and proven successful in project areas.
II. To increase use of commercial inputs, and improve agronomic practices.	II. About 50%-75% of farmers in six WKBPPs have adopted improved agronomic practices; about 50-75% increased in their use of commercial inputs.	II. Farm records and accounts; Evaluation and baseline survey.	II. Improved agronomic practices have been recommended; adequate amount of inputs are available on timely basis.
III. Improved systems of post-harvest management.	III. Improved products quality for home consumption and for the market; reduced food losses.	III. Farm records and accounts. Records of private dealers and KUDs.	III. Premium prices paid for improved quality. Government procures products only products of acceptable quality.

LOGICAL FRAMEWORK ANALYSIS
(OUTPUT)

Narrative Summary	Verifiable Indicators	Means of Verification	Assumptions
I. Palawija Project Office	I. An office consisting of three technical advisors and three GOI counterparts officials was created in the DGFC to implement project.	I. DGFC organizational chart. DGFC staffing pattern.	I. Personnel of the required training and experience are available from overseas and local sources to serve as technical advisors.
II. Field Teams	II. Six Field Teams, each consisting of Agronomy and Cropping Systems Specialist, Marketing and Post Harvest Specialist and Agricultural Economist stationed in Bone, North Lampung, Ponorogo. Each Team is attached to the office of the Chief, Dinas Pertanian in each Kabupaten.	II. DGFC organizational chart in Bone, North Lampung and in Ponorogo.	II. There are available extension staff with desired training and experience to staff the Field Teams.
III. Demonstration Farms and Trials.	III. About 162 demonstration farms and 18 trials are located in three project sites.	III. Reports of Palawija Project Office. Reports of Field Teams.	III. Farmer groups are willing to make their farms available for trials and demonstration purposes.
IV. Trained extension staff of DGFC, KUD managers and private dealers and contact farmers.	IV. One thousand two hundred man-months of training given to PPL, PPM, PPS, KUD managers, private dealers contact farmers and other DGFC staff.	IV. Training records of PPO; Contract agreement between DGFC and BULOG/CRIFC.	IV. CRIFC and AETE are capable of providing training on production BULOG is capable of providing training on marketing and post harvest management.
V. Baseline Monitoring and Evaluation Studies	V. One baseline study, one interim evaluation study and one final evaluation study.	V. Reports of baseline and evaluation studies.	V. There are available in-country capability to conduct baseline and evaluation studies.
VI. Special studies on agronomic, socio-economic, marketing and policy studies and nutritional assessments.	V. Agronomic studies (e.g. cropping systems, variety trials, fertilizer response, etc.) will be conducted on demonstration farms and trials. Socio-economic and marketing studies will be kabupaten, regional and and national in scope. Policy studies will be national in scope	V. Reports on Project File	V. There are expatriate consultants and local experts to conduct these studies.
VII. Commodities All in place in project sites	VII. Fertilizers, insecticides, seeds, storage facilities, post-harvest facilities, motor vehicles and draft animals.	VII. Property list and inventory of commodities in each project site.	VII. Commodities can be procured from local or U.S. sources.

LOGICAL FRAMEWORK ANALYSIS
(INPUTS)

Narrative Summary		Verifiable Indicators	MM	USAID $1000	GOI $1000	Total $1000	Means of Verification		Assumptions	
I. Technical assistance to provide management and technical advisory services to the Project.	I.	A. One Sr. Tech. Adv.	60	$ 606	-	$ 606	I. There is 48 mm of FAO Tech. Assistance on Cropping Systems Demonstration and Fertilizer Yield Response. Marketing and Post Harvest. Problems are not addressed.	I.	Technical assistance of the required training and experience is available from U.S. or other countries.	
		B. Two Assoc. Adv.	72	728	-	728				
		C. Librarian	24	240	-	240				
		D. Short Term Consultant	15	182	-	182				
		Sub Total		$1756	-	$1756				
II. TRAINING	II.	A. Cost at $3900/mo of training at IRRI, AVRDC, CIMMIT, ICRISAT, IITA & others.	30	117	-	117	II. A. Number of professional conferences and short-term training on production and marketing secondary crops.	II.	A. DGFC staff are available for advanced overseas training on cropping systems and post harvest management.	
A. Overseas and attendance to professional conferences.										
B. Overseas Specialized training at research institutes or universities.		B. Cost at $3900/mo	68	265	-	265	B. Same as A		B. Same as A	
C. In-country training for Field Teams		C. Cost at $2100/mo	30	-	189	189	C. Same as above		C. DGFC or newly hires staff are available for field team training.	
D. In-country training of PPL, PPS, PPH.		D. Cost at $1800/mo	250	-	452	452	D. Same as C		D. Extension staff consisting of selected PPS, PPH and PPL from project sites are available for training	
E. In-country training of contact farmers, KUD staff, private dealers.		E. Cost at $1500/mo	240	360	-	360	E. Same as above		E. Contact Farmers, KUD staff, and private dealers are available and willing to be trained.	
		Sub Total: Training	-	742	641	$1383				
III. PERSONNEL	III.						III.	III.		
A. GOI counterpart administrative, technical and support staff assigned to PFO.		A. Three senior GOI counterpart staff at $800/mo	180	-	$ 144	$ 144	A. Staffing pattern of Palavija Project office.		A. There are available DGFC staff or new hires to staff the Palavija Project Office.	

B. Six Field Teams.	B. Eighteen PTH/PPS level from GOI at $500/mo	540	-	$ 270	$ 240	B. Staffing pattern of DGFC at kabupaten Bone, Pon:rogo, and North Lampung.	B. There are available DGFC staff or new hires to staff Field Teams.
C. Operational Support Personnel	C. Four drivers and four secretaries and two assistants at $350/mo	480	-	$ 168	$ 168	C. Staffing pattern of PPO and Field Team offices	C. There are available trained secretaries and drivers to staff PPO and Field Teams.
SUB-TOTAL: Personnel		1200	-	$ 582	$ 582		
OTHER OPERATIONAL SUPPORT	IV.					IV.	IV.
A. Demonstration and research on cropping systems	A. 180 units of demonstration and experiments at $5.3		-	859	- $ 859	A. Project Files	A. CRIFC and Sang Yang Sri are capable of conducting research and development programs on cropping systems and seeds production and multiplication. BULOG. can conduct research and development on post harvest management.
B. Post Harvest Experiments and Demonstration				929	$ 929	B. Project Files	B. Same as A
C. Baseline, Monitoring and Evaluation Survey	C. Selected Universities		-	$ 460	- $ 460	C. Project Files	C. There is in-country capability for baseline and evaluation survey and special studies.
D. Special studies feasibility, policy, market development, demand and consumption.	D. Selected universities		-	$ 348	- $ 348	F. Project Files	D. Same as E

E. Library Operations/ Management		-	$ 56	-	$ 56	E. Project Files	E. Program for Development has been approved and acquisition of materials has been initiated.
F. Technical Workshops		-	$ 120	-	$120		
	SUBTOTAL: OPERATIONAL Support	-	$2772	-	$2772		
V. COMMODITIES	V.					V.	V.
A. Production commodities.	A. Animal or mechanical power, sprayers, cultivators and other equipments.	-	-	$ 119	$ 119	A. Project Files	A. All commodities can be obtained in US or in-country
B. Post Harvest/Marketing Equipment	B. Drying floors Dryers, Godowns, Eqpt.	-	-	$ 450	$ 450	B. Project Files	B. Same as above
C. Pest Control	C. Pesticides, fungicides, rodenticides, etc.	-	-	$ 240	$ 240	C. Project Files	C. Same as above
D. Fertilizers	D. Urea, TSP.	-	-	$ 877	$ 877	D. Project Files	D. Same as above
E. Lime		-	-	$1253	$1253		
F. Seeds	F. Corn, Peanuts Soybean, Cassava, Mungbean.	-	-	$ 687	$ 687	F. Project Files	F. Project Files
G. Rhyzobium	G.			$ 160	$ 160	G. Project Files	G. Project Files
H. Office Eqpt. and supplies.	H. Desks, typewriters, calculators, and supplies.	-	-	$ 250	$ 250	H. Project Files	H. Same as above

I. Motor vehicles, and their operation and maintenance.	1. Four jeeps, six Pick-ups, sixty motor-bikes.	-	70	-	$ 70	H. Project Files	H. Same as above
	SUB-TOTAL: Commodities	-	70	$4036	$4106		
VI. SUMMARY	SUB-TOTAL: PROJECT	-	$5340	$5259	$10599		
	Inflation and Contingency	-	$1060	$1032	$ 2092		
	GRAND TOTAL		$6400	$6291	$12691		

ANNEX D

ENVIRONMENTAL ASSESSMENT OF THE USE OF PESTICIDES IN THE "SECONDARY FOOD CROPS DEVELOPMENT" PROJECT - INDONESIA

1. SUMMARY

The Secondary Food Crops Development Project, with emphasis on improved cropping and marketing systems for the secondary food crops, should have beneficial environmental effects except for the use of pesticides. Pesticide use will be kept to a minimum, with mainly USEPA-approved pesticides being recommended for the project. The option is left open for the use of USEPA-restricted pesticides, and pesticides not registered by USEPA, after approval by USAID Washington on a case by case basis. Mitigating measures incorporated into the project include (i) the stimulation of pest management research, (ii) training of pesticide users, (iii) provision for storage of pesticides, and (iv) monitoring of pesticide use as the project develops. If these recommendations are followed, there should be minimum adverse environmental effects.

2. PURPOSE

The Secondary Food Crops Development Project

The Secondary Food Crops Development Project is intended to increase production and improve the marketing system of palawija. Palawija is the collective name for secondary crops in Indonesia. The most significant of these are corn, cassava, peanut, soybean, mungbean, and sweet potato.

Low productivity and an inefficient marketing system are generally agreed to be the principal constraints to development of secondary crops in Indonesia. Low productivity is due to several factors: poor soil conditions, extreme climate and season patterns, and traditional cropping practices. Since independence, the Indonesian government has concentrated its efforts in agricultural development on the national staple, rice. In concentrating on rice production, the Government has purposely neglected development of palawija crops. Because palawija crops have been relatively neglected, introduction of new varieties and improved agronomic practices has been very slow. The majority of Indonesian farmers still grow traditional varieties, using traditional production techniques.

Now, however, that Indonesia has achieved virtual self-sufficiency in rice production, attention is being turned to palawija. The Secondary Food Crops Development Project embodies that new interest. Cropping systems research in upland areas conducted by IRRI in Lampung and

fertilizer-yield response trials conducted by FAO in South Sulawesi have achieved significant yield increases when optimum levels of inputs are provided and used in conjunction with appropriate agronomic practices. The Secondary Food Crops Development Project will demonstrate this potential to a wide audience of farmers in three regions of Indonesia. It is also expected that the project will establish a suitable model on which the Government of Indonesia can base its efforts in the future to extend palawija development throughout Indonesia.

3. ALTERNATIVES

The proposed action represented by the Secondary Food Crops Development Project involves a wide variety of support activities. These are described in detail in the Project Paper. This Environmental Evaluation addresses only those aspects of the project pertaining to pesticides.

The major issue to be addressed at this stage is selection of the pesticides to be utilized under the project. Five alternatives are identified:

1. Use any pesticide that is registered for use by the Ministry of Agriculture of the Government of Indonesia. This would make a broad array of pesticides available for the project.

2. Use those materials that are approved for distribution through P.T. Pertani for the BIMAS/INMAS program. This still would include a large number of pesticides.

3. Use mainly USAID approved pesticides (USEPA registered) with the option of using a few non-USEPA registered and restricted materials that fit into an integrated pest management program and are approved safe on a case by case basis by USAID Washington. All proposed pesticides for the project are already approved by the Government of Indonesia. No additional materials would be approved without the prior approval of the Indonesian Government.

This is the proposed alternative and the project paper has been written in this manner. All of the insecticides suggested for use are registered by USEPA, except a fungicide for seed treatment of corn is included that is not yet registered by USEPA. It is included because it seems essential for control of mildew, which could seriously threaten the success of the project. A single USEPA restricted pesticide has been suggested for use in the project. It is included because there are no unrestricted alternatives for fumigating grains and seeds.

4. Use only government of Indonesia and USAID approved pesticides with no restricted or unregistered materials included in the project. This would be a desirable alternative, but much research on rice and tropical crop pest management is being done outside of the United States,

and such an option might exclude some very valuable selective and safe materials just because they are not used in the U.S. A complete ban on all USEPA restricted materials would leave the project without any effective method for controling serious insect pests in grain storage.

5. The last alternative would be to use no pesticides at all in the project. Although very limited amounts of pesticides are currently being used on palawija crops, there is a need for pesticides at critical times, on each of the crops. This is particularly true to protect the newly emerged seedlings and to protect the grains and pods as they begin to mature and after they have been harvested and are placed in storage. Without insecticides and fungicides to protect the various crops there would be serious crop losses that would undermine the confidence of growers in the program. Furthermore, the project aims to develop a model for palawija expansion on a national basis. Pesticides will inevitably be utilized by Indonesian farmers. Insofar as the project can set a standard of judicious selection and careful use of pesticides on palawija, it will support the Government of Indonesia's efforts to insure effective crop protection with minimal environmental and human impact.

4. AFFECTED ENVIRONMENT

Project sites will be located in three Provinces:Lampung, South Sulawesi, and East Java. In each of these areas the project will cover two WKBPPs. Each WKBPP averages 33,000 farmers, of which about one quarter are expected to participate in the project through adoption of recommended technology including pesticides. Depending on the region, average size of the farms varies from 0.5 - 2.5 hectares; the total area directly affected by the project will be approximately 48,000 ha. Since the project is essentially a demonstration for widespread grower acceptance, the long term impact should be substantially larger. The project design calls for possible expansion to an additional six WKBPPs in Year 4 and if successful the project would be adopted as a model for more widespread replication in the future.

The three project sites are located within 5-7° of the Equator. Rainfall is heavy and seasonal at each site, although annual amounts vary from 2,400 mm in Lampung to 1,500 mm in South Sulawesi. Seasonal distribution of rain also varies; Lampung and East Java receive most of their rain from December to March and have a relatively dry period in August, while in Kabupaten Bone of South Sulawesi peak rainfall comes in May and June with the dry period in October.

The soil in the project areas vary from recent volcanic in East Java to red yellow podzolic in most of the other areas. The red yellow podzolic soils are characterized by being highly acid (pH 4.5 - 5). This can be neutralized with the addition of lime and crop residues. Acidic soils slow the breakdown of pesticides, but they will still be exposed to biological degradation.

All of the project sites have been disturbed by agriculture with most of the area presently under cultivation. Invasion of agriculturally disturbed land by alang-alang (Imperata cylindrica) poses a serious threat to efficient farming in some of the areas. Slash-burn farming is sometimes practiced in efforts to control this weed.

Palawija are grown mainly in rainfed upland areas with moderately sloping to rolling topography. Ordinarily, palawija crops are grown in the dry season utilizing residual moisture remaining after harvest of the main crop, rice. However, the harvested products of palawija are higher in moisture content and therefore are more difficult to dry than rice. These characteristics cause problems in grading, storing, and marketing and contribute to pest and disease attack during processing and storage.

5. ENVIRONMENTAL CONSEQUENCES

5.A GENERAL DISCUSSION OF ENVIRONMENTAL IMPACTS

Fertilizer Use and Soil Quality

The only environmentally sensitive aspect of the project will be the use of pesticides. During the course of assessing the project, however, the possible problems associated with use of fertilizers were examined. A brief discussion of the project's implications for fertilizers and preservation of soil quality is in order here.

The proposed cropping systems -- which incorporate interplanting, alternation of crops and mulching of crop residues -- should have a beneficial effect on the environment. Continuous cropping and mulching of all crop residues will help to prevent soil erosion. Mulching will also help soil fertility. However, there will be a need to use commercial fertilizers and soil ammendments to maximize the productivity of the cropping

Crop rotation with leguminous crops inoculated with the proper strains of Rhizobium should reduce the need for nitrogen. Anticipated requirements of chemical fertilizers such as nitrogen, phosphate, and potash should not have adverse environmental effects. Because soils in some of the project areas are highly acidic (pH 4-5), it will be necessary in those areas to add lime (1-2 tons/ha) to the soil. In coastal regions of Indonesia, lime is frequently mined from inshore coral reefs. However, there are adequate terrestrial sources of lime in all of the project areas.

Pesticides

Very small quantities of pesticides are presently used on palawija crops. This project should keep pesticide use at a minimum. The reasons to keep pesticide inputs low include: low margin of profit of these

crops, lack of knowledge and training on pest problems and their control, difficulties of crop residues where crops are interplanted and harvested at different times and lack of good pest management information for efficient and nondisruptive use. However, there is strong evidence that judicious and intelligent use of pesticides can contribute to higher yields and are needed to insure against catastrophic losses by some farmers which could undermine confidence in the whole program.

The cropping systems proposed in this project will reduce pest problems but not eliminate them. Interplanting and alternation of crops will help in the control of many insects and diseases and mulching of all crop residues will help reduce competition from weeds. On the other hand, the use of higher yielding varieties and fertilizers will probably make the crops more susceptible to pest attack.

Because rice has received strong research emphasis in Indonesia, pest management is relatively well advanced on irrigated rice, sawah. As everywhere, pest management theory is more sophisticated at the higher levels of administration than that practiced by the farmer. Resistant varieties are heavily relied upon and alternation of crops and simultaneous planting are stressed to reduce pest problems. Good information is available on the number of pests or incidence of disease that justifies the use of pesticides on sawah. The relatively large amount of pest control research that has been devoted to sawah is paying off in sound control procedures and the helathy production of rice. In contrast, little research has been devoted to pest control on the secondary food crops, and as a consequence, little is known about the most appropriate varieties and the degree of damage caused by various populations of pests and diseases.

The Secondary Food Crops Development Project is not oriented toward research, but is designed to show what can be accomplished with the present day state-of-knowledge. However, there is going to be an urgent need for improved integrated pest management information on palawija crops if this project is to meet its full potential. All levels of research will be needed from simple field trials to more sophisticated research on varietal resistance, the ecology and epidemiology of pest outbreaks, and the pest populations that justify chemical controls. The cooperation of AARD and the Directorate of Food Crop Protection within the DGFC will be essential for proper success of this program. As palawija crops increase in economic importance, pest management research is going to have to be directed to them. Certainly any integrated pest management projects that would provide information on palawija should be supported heavily.

An example of the kind of information needed is the topic of natural biological control mechanisms in palawija crop ecosystems. The uniform climate of Indonesia and the cropping systems to be used in this project are both very conducive to parasites and predators that are very important in helping to control insect pests on palawija. However, if these natural enemies are to be conserved, we must know more about them, what levels of pests can be tolerated and what pesticides will give control of target pests without aggravating other pests because of intense disruption of natural biological controls.

Granular systemic insecticides such as carbofuran will control a number of important pests on palawija crops as well as on rice. They should be given preference for use because they have several distinct advantages over liquid pesticide formulations. These advantages include:

- granules are safer to handle by both experienced and nonexperienced farmers;
- granules are to a large extent target pest specific with minimal adverse effect on natural enemies;
- granules can be applied with simple shakers and dispensers that are more available than expensive sprayers; and
- small farmers readily accept granules because they are used to applying granular insecticides and granules are least error prone of all the pesticide formulations.

There is no doubt that all these advantages outweigh the one disadvantage -- higher cost because of formulation and transportation costs. Within this project it would be wise to maximize the use of granules and seed treatments. To further this cause it would be wise for the government to subsidize the use of granular formulations to stimulate their use.

5.B. ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Alternatives 1 and 2

Use any of the 286 pesticides registered for use by the Government of Indonesia or made available through P.T. PERTANI for the BIMAS/INMAS program. This would not be an acceptable course of action because within the list are a number of highly toxic insecticides such as (monocrotophos- acute oral 18-21 and phosphamidon-acute oral 15-23) that are restricted for use in the United States by trained applicators with sophisticated and well kept ground equipment. These may be appropriate for use by some sophisticated farmers and government employees who have the equipment and training to safely handle such pesticide, but this will not be true of the farmers in the project areas. Since many of the farmers in the project areas cannot read and do not understand the hazards of dermal exposure to pesticides, it would not be realistic to overcome these difficulties with training and education. The other compelling reason that highly toxic pesticides should not be used in the program is based on the unsophisticated hand sprayers that are used by the farmers. Such sprayers are not adequate for the application of highly toxic pesticides by even the best of trained workers.

Alternative 3

Use largely USAID approved pesticides with the option of using a few non-registered or restricted use materials that are approved on a case by case basis. This option will insure that only low to moderately toxic pesticides are used by farmers in the project and will insure that there are not harmful or illegal residues at the time of harvest. Since restricted pesticides will be used by a small number of trained personnel there should not be undue risk with this option.

Alternative 4.

Use only pesticides that are registered without restriction in the U.S. This alternative would insure that only relatively safe pesticides are used in the project and there should not be illegal pesticide contamination at the time of harvest.

Alternative 5

Use no pesticides on the crops in the project. This option theoretically would remove all detrimental environmental effects from the project, but in reality would probably undermine the confidence of the farmers because of crop damage and yield losses. This could jeopardize the success of the project and result in the loss of the projects beneficial environmental effects. It also would force farmers to obtain pesticides outside of the project with the potential of much more dangerous materials being in the project.

5.C. DISCUSSION OF PESTICIDES SELECTED FOR USE UNDER THE PROJECT

The pesticides that have been selected for use in the program include granular carbofuran, sprays of carbaryl, cyanofenphos, diazinon, endosulfan, and fenitrothion. They have been tested for efficacy by the Indonesian Ministry of Agriculture and are included in their latest (1981) pest control recommendations. They have been selected because they are registered for similar use by USEPA, and they are not on the restricted material or RPAR list. Carbaryl, diazinon, and fenitrothion are of moderately low acute toxicity (66-300) with no known long-term toxicological hazards. Both diazinon and carbaryl are registered for home garden use in the United States. Carbofuran has a high acute oral toxicity (8-14 mg/kg) but a very low dermal toxicity (10,000 mg/kg). By restricting its use to the 3 percent granular formulation there should be no undue storage or application hazards. Endosulfan is the only chlorinated hydrocarbon included on the list. It does not accumulate in the soil and does not persist in the environment. It is of high toxicity to fish, but this should not be a problem if its use is restricted to upland rice. It should not be used in the vicinity of ponds that are being used for fish culture. This insecticide of moderate acute toxicity (80-110 mg/kg) is included in the list because certain bugs (Hemiptera) such as the rice bug are difficult to control with phosphate and carbamate insecticides. Cyanofenphos (acute oral 1000 mg/kg) is included because it appears to be a potential control for these bugs in areas where endosulfan cannot be used safely.

Ridomil is the only pesticide proposed for use under the project that is not listed for approved use by USAID. Although no tolerance has been established for Ridomil on corn, there should be no problems with grain contamination at harvest because of the small amount used on the seed (1 gm/ kg) at planting time. The low mammalian toxicity of Ridomil (1,656 mg/kg) makes it safe for use as a seed treatment, but the treated seed should be given a warning color if it is to be stored before use. Ridomil is included on the list because downy mildew, Sclerospora maydis, remains a constant threat to corn production in Indonesia. Resistant

varieties and crop rotation should be the main methods of control relied upon, but fungicides will be needed because of the difficulty of maintaining resistant corn lines with constant cross pollination. To prevent mildew strains adapting to the resistant varieties and slow resistance to Ridomil, crop rotation and early and simultaneous planting should be incorporated into the control program.

Phostoxin (aluminum phosphide) is the only restricted use pesticide that is included in the project. There is a serious need to be able to fumigate seeds and grains in storage, and Phostoxin is a much safer alternative than methyl bromide because it can be handled in pellet form. BULOG has the equipment and trained experts to safely work with methyl bromide in their large storage sheds, but this will not be the case in the rural areas of the project. With proper training, Phostoxin can be safely used in the program, but this probably would not be the case with methyl bromide.

5.D RECOMMENDED MITIGATION MEASURES

1. The project managers should do everything possible to enlist the aid of the AARD and the Directorate of Food Crop Protection within the DGFC to develop more sophisticated pest management for the palawija crops. There is little doubt that crop intensification is going to be directed toward these crops in the future, and it is essential to have better pest management information as increasing amounts of fertilizer and pesticides start to be used on these crops.

2. The project managers should make assurance that pesticides are not allocated along with fertilizers on a per farmer or per hectare basis. It is essential that the project instill the philosophy that pesticides used when needed can help maximize yields, but when used without cause can have serious detrimental side effects that can reduce yields.

3. Although only moderately toxic pesticides will be used on the project, there needs to be a pesticide training program built into the project. A major component of the project will be extension worker and farmer training. Effective and safe use of pesticides should be taught along with the cropping systems training. Properly labelled pesticide containers are essential but cannot be relied upon because of the illiteracy of many farmers. The only realistic means of training farmers on the proper and safe use of granular and liquid pesticides will be through extension training.

Since Phostoxin will be used as a seed and grain fumigant, special training will have to be given to the relatively small number of people involved in fumigation. It is suggested that this activity be under the direct supervision of the field teams who can be more readily trained because of their technical background.

4. Some provision will have to be made for pesticide storage in the local areas of the project. It is clearly evident that there is inadequate storage on the farms or around the homes of the farmers. Even

though the pesticides to be used in the project are of moderate toxicity, they could cause serious illness if they were to get into the hands of children or other individuals who do not know about the dangers of pesticides.

5. Field trials with the different components of crop production will be an important part of this project and will undoubtedly include trials with pesticides. Such trials should only be carried out with pesticides that have been approved for use in Indonesia and have been shown to be toxicologically and environmentally safe by the manufacturers. When such trials involve pesticides without tolerances, the treated crops should not be used for human or animal consumption, and provision should be made to reimburse the farmers for their loss of crops.

6. Since the Field Teams and PPLs will be working closely with farmers on cropping systems, varieties and fertilizer rates, it should be possible to monitor pesticide use quite easily. It would be very desirable to get baseline data on pesticide use at the beginning of the program so that comparisons can be made as the program progresses. Pesticide use should be monitored at the farmer level and also through the sources of distribution.

ANNEX E

CROP PROTECTION

Corn (Maize)

The seedling fly, Antherigona exigua (lalat bibit), causes serious losses of corn seedlings. This can be minimized by alternation of crops or spray of carbofuran granules at the time of planting. Such treatment will also control Phyllophaga helleri, which attacks corn in some areas. The stalk borers, Ostrinia furnacalis and Sesamia inferens, as well as Downy mildew, Sclerospora maydis, remains a constant threat to corn production in Indonesia. The best means of control is use of the resistant varieties, Arjuna, Harpan or H-6. In areas with severe mildew problems, the seed can be treated with a systemic fungicide such as Ridomil. Although no tolerance has been established for Ridomil on corn, there should be no problems with grain contamination because of the small amount used on the seed at planting time. To prevent biotypes adapting to the restraint varieties and slow resistance to Ridomil, crop rotation and early and simultaneous planting should be incorporated into the control program.

Soybean

The most often mentioned pest is the bean fly, Ophiomyia phaseoli, which mines the leaves and stems causing the death of the seedlings. This pest can be controlled most effectively with systemic insecticide granules applied at the time of planting. Carbofuran granules are presently giving good control and would also help against the white grub, Phyllophaga (uret). If granules are not used and high populations are encountered, sprays of diazinon or carbaryl should be used 5-8 days after planting. However, sprays will be less effective and could even stimulate later leafminer, Agromyza dolchostigma populations because of the adverse affect of the sprays on natural enemies.

The soybean leaf beetle, Phaedonia inclusa, can cause serious defoliation but should be suppressed by alternation of crops and early and simultaneous planting of soybean. Diazinon or carbaryl sprays should give control if populations are causing serious damage at 45-65 days after planting.

Three other pests can cause serious defoliation of soybean. They include the leafworm, Spodoptera litura, the leaf roller, Lamprosema indicata, and the leafminer, Biloba (Stomopteryx) subsicivella. These pests can be controlled with either carbaryl or diazinon.

Poor pod set appears to be a serious problem with soybean in Indonesia. This can result from weak and unthrifty plants, but also can be caused by insects that attack the developing seeds. Such pests include the soybean bug, Riptortus linearus, the green stink bug, Nezara viridula, and the lima bean pod borer, Etiella zinckenella. These pests attack the developing pods from 45-65 days after planting and can be controlled with fenitrothion. Another material, cyanofenphos (Surecide) should give

control and has USAID approval for use on soybean. Damaging populations h[illegible] not been determined for these pests, but one or two per plant would probably warrant control.

Peanut

Diseases are a serious problem with peanut and the alternation to non-legume crops proposed by this project should greatly to alleviate many of these problems. Bacterial wilt, Pseudomonas solanacearum; rust, Puccinia arachides; mottle virus and witches broom virus can be reduced by crop rotation. The mottle virus can be controlled further by the use of virus-free seed, roguing of infected plants and controlling Aphis crassivora, when virus infected plants are present in a field. The other virus, witches broom, can be reduced by planting the resistant varieties Macan, Gajah and Kijang and controlling the leafhopper, Orosius, when symptoms are noticed in a field. Leaf spot, Cercospora personata can be suppressed with fungicides such as maneb, but controls should only be used when leaf loss is substantial because the biweekly sprays necessary to obtain control can be a very expensive input.

The insects on peanut include the leafminer, Biloba (Stomoptaryx) subsicivella, the caterpillar, Chrysodeixis chalsites, and the leafhopper, Empoasca. Since the two spotted mite, Tetranychus urticae, is a serious potential pest of peanut, insecticides, particularly carbaryl, should be used as little as possible because of their stimulative effect on the two-spotted mite. It should be possible to control and leafminer with diazinon and the caterpillars and Empoasca with carbaryl. If white grubs, Phyllophaga (Uret), are a problem in some areas, diazinon granules at planting time should give control.

Cassava

There are considerable number of pests and diseases reported on cassava around the world, but in Indonesia pests seem to be a minor constraint on production. Many of the pests (scales, mealybugs, thrips, white flies) and diseases can be avoided by selection of clean planting stock. Cuttings certainly should not be taken from unhealthy fields. Crop rotation and resistant varieties will be the main way to avoid disease problems. The cropping systems to be used in this project should help greatly to alleviate disease problems. If planting material could be selected from the most vigorous plantings in the area, it would help obtain the best planting stock for all farmers in the area. It also will be an advantage to assure that the cassava and corn rows do not reoccur in the same place year after year.

Weed Control

Herbicides are used very little on rice and palawija. This is proper and should remain that way because misuse could cause serious damage to crops and high herbicide inputs are a poor trade-off where labor needs employment.

If alang-alang infested land (Imperata cylindrica) is to be brought under cultivation, it might be advantageous to use herbicides. Paraquat (Gramoxone) although effective, should not be used because of serious hazard to the applicator. Although more expensive, the use of glyphosate (Roundup and Dalapon) is recommended. Since they should be used before any crops are planted, there should be no crop injury. Drift to surrounding crops should be guarded.

Storage Problems

The project stresses the use of better used varieties and storage of grain for improved marketing (both can be plagued with storage pests). Rapid and thorough drying will help reduce quality losses from insects and fungi, but problems must be anticipated in warm tropical climates. Grain storage should be constructed with pest control in mind. Tight construction is essential to help exclude rodents and insects and also to facilitate fumigation. Sanitation is essential. Insecticides can be used to treat cracks and crevasses in storage areas and the grains themselves. However, extreme caution must be exercised to prevent illegal or dangerous contamination of the grain for human consumption. Malathion will probably be an acceptable insecticide but expert technical guidance may be necessary. Seeds can be treated with a wider array of insecticies but should be brightly colored at the same time to indicate they are not for human consumption.

The wide array of storage pests that will be found in Indonesia are given in Annex E. Rats are the most recognized of the pests because of their size, but there is little doubt that insects pose an even bigger threat to long-term tropical storage. The USAID approval rodenticides are also given in Annex E. It must be kept in mind that these anticoagulant baits are dependant on multiple feedings so a continuous source of bait must be provided until rat populations are eliminated. On the other hand, these relatively safe baits are advantageous because the rats do not develop bait shyness.

Because the project will be dealing with storage of both seeds for future planting and grains for human consumption, there will be an urgent need for some sort of insect control beyond sanitation. The only practical approach will be fumigation of tight structures or under plastic. The choice is between methyl bromide or Phostoxin. Since working with methyl bromide in the gaseous form requires considerable equipment and expertise, Phostoxin which comes in pelleted form is the most desirable alternative. Phostoxin is restricted for use by trained personnel in the U.S., and should only be used by trained personnel on the project.

Recommended Actions

The foregoing analysis indicates several actions to be taken to contribute to a successful project. The following activities should be supported or funded directly through the project:

1. Seed improvement: selection, processing, storing.
2. Research on selection and production of rhyzobia inoculum.

3. Field trial research on fertilizer and lime, variety adaptation, and cropping patterns.
4. Demonstration of results of field trials.
5. Inoculum supply: imported initially, production by Year 4.
6. Training: short-term in country for Field Teams, extension agents, and other personnel.
7. Technical assistance: project sites Field Teams, long-term USAID specialists and short-term consultants. Recommended actions to meet each of those need are briefly described below:

Seed improvement activities will include research field trials in the province or kabupaten in which field demonstrations are to be established. New cultivars (varieties) that have been developed at Bogor or other plant breeding centers will be tested under the soil, climate, pest pressure, and growing season conditions at project sites. The superior cultivars for each crop at each location will be used in the demonstration fields. Seed harvesting, cleaning, drying, and storage including pest treatment will be included in the research and demonstration aspects of seed improvement. Personnel and equipment will be required. Where possible, project-related research activity will be available without recourse to project funds. However to guarantee development of seed of good varieties and quality in the project sites, funds have been allocated for contractual arrangements with provincial CRIFC research institutes to carry out varietal adaptation trials.

The project will support this process through contracts with AARD, IPB or other agencies with qualified scientists to conduct the following research and development work on rhizobia:

1. Selection of effective N-fixation strains of Rhizobium japonicum for soybeans, peanuts, and mungbean.

2. Testing the adaptation of these strains to the soils, cultivars, and climate conditions of the three project test sites.

3. Selecting a suitable and readily available carrier for the bacteria, such as peat.

4. Development of a functional model for rhyzobium production unit.

5. Determining the storage and handling techniques required for distribution of the inoculum to farmers.

Field Trials should be conducted for three years at each project site on crop varieties, fertilizer and lime rates, and cropping pattern and sequence. Field trials will also be conducted in potential areas for expansion. This site-specific research will be contracted to a unit of CRIFC in the provinces involved. Field trials will occupy about one-tenth of the field space used directly in the project.

Demonstration fields will be established for the cropping patterns recommended from previous research and from field plot research in this project. Agronomists on the Field Team assigned at kabupaten levels and PPLs assigned in the six WUAPPs will help direct the demonstrations carried out in farmers' fields.

Inoculum for legume crops will be imported for use in the field demonstrations until a production capability is developed in the nation. This requirement is discussed in the following section on input supply and distribution.

Training is a vital part of the project. The ultimate achievement of project goals will depend in large part on the expertise of the project. Field Teams at each site and on the skills of the permanent extension staff in the kabupatens affected. Field Team members will have a minimum of three months intensive training before initiating demonstrations and other activities at the project sites. Training will also be designed for PPS, PPM and PPL staff and be integrated within on-going training schedules established by the DGFC. Short-term observation tours and programs, training for contact farmers, progressive farmers, private dealers and KUD staff are also planned. Short-term observation tours available at international institutions such as IRRI, IITA, and CIAT will be utilized.

Technical assistance will include three Field Teams stationed at the project kabupatens, three long-term USAID technical advisors at the province level and in Jakarta, short-term specialists as required, plus senior DGFC project staff in Jakarta. This technical assistance will be carefully integrated into the existing structure of DGFC extension work.

CROP PROTECTION TABLES

Table E.1. Major Pests of Upland Rice and Palawija Crops in Indonesia

UPLAND RICE (PADI GOGO)

White grubs, *Phyllophaga helleri*

Rice Seedling Fly, *Antherigona exigua*

Rice Bug, *Leptocorixa oratorius*

Rice Blast, *Pyricularia oryzae*

CORN

Rice Seedling Fly, *Antherigona exigua*

White Grubs, *Phyllophaga helleri*

Purple Stem Borer, *Sesamia inferens*

Maise Borer, *Ostrinia furnacalis*

Corn Earworm, *Heliothis armigera*

Soybean Leafroller, *Lamprosema indicata*

Army Worms, *Spodoptera litura and exempta*

Downy Mildew, *Sclerospora maydis*

SOYBEAN

Bean Fly, *Ophomyia phaseoli*

White Grubs, *Phyllophaga helleri*

Leaf Miners, *Agromyza polichoetigma* and *Biloba (Stomopteryx) subsecivella*

Soybean Leaf beetle, *Phaedonia inclusa*

Armyworm, *Spodotera litura*

Looper, *Chrysodeixis (Plusia) chalcites*

Leaf Roller, Lamprosema indicata

Flea Beetle, Longitarsus suterelines

Pod Borer, Etiella zinckenella

Soybean Bug, Riptortus linearis

Green Stink Bug, Nezara viridula

MUNGBEAN

Very similar to soybeans

PEANUT

leafminer, Biloba (Stomopteryx) subsecivella

Looper, Chrysodeixis (Plusia) chalcites

Leafhopper, Empoasca SP.

Aphid, Aphis craccivora

Two spotted Mite, Tetranychus urticae

Leafspot, Cercospora personata

Rust, Puccinia arachidis

Wilt, Pseudomonas solanacearum

Mottle Virus

Witches Broom Virus

Source: Names based on "The pests of crops in Indonesia." 1981. Kalshoven, L.G.E.; Revised by P.A. van der Laan. P.T. Ichtiar baru - van doeve, Jakarta.

Table E.2. Pesticides Registered by the Government of Indonesia and USAID suggested Use Patterns on Rice and palawija Crops.
(After C.R. WARD and C.W. COLLIER, 1981) a/

Pesticide	Rice	Corn	Soybean	Peanut
Insecticides				
Bacillus thuringiensis (Dipel)	Y	Y	Y	Y
Carbaryl (Sevin)	Y	Y	Y	Y
Carbofuran (Furadan)	Y	Y	Y	T
Chlorphyrifos (Dursban)	T	Y		
Cyanofenphos (Surecide)	Y		Y	
Diazinon (Basudin)	Y	Y	Y	Yb/
Endosulfan (Thiodan)	Y	T		
Fenitrothion (Agrothion)	Y		Y	
Malathion (Gisonthion)	Y	T	Y	T
Fungicides				
Benomyl (Benlate)	Y		T	Y
Chlorothalinol (Daconil)		T		Y
Copper oxychloride (Cobox)				Y
Edinfenphos (Hinsan)	Y			
Mancozeb (Dithane)		T		Y
Maneb (Manzate)		T		
Herbicides				
Artrazi - (Gesaprin)		Y		
Bentazon (Basagran)	Y	T	T	T
Benthiocarb	Y			
2, 4-D (Weedamine)	Y	T		

Pesticide	Rice	Corn	Soybean	Peanut
Dalapon (Dowpon)		T	T	
Linuron (Afalon)		T	Y	
MCPA (Weedone)	Y			
Oxadiazon (Ronstar)	Y			
Propanil (Stam)	Y			
Glyphosate (Round-up)	Registered for use before planting			

a/ "Y" indicates USAID approved use. "T" indicates tolerance established and use approvable.

b/ Residue data required if used close to harvest.

Table E.3. Pests That Will Be Found in Stored Grains and Legumes

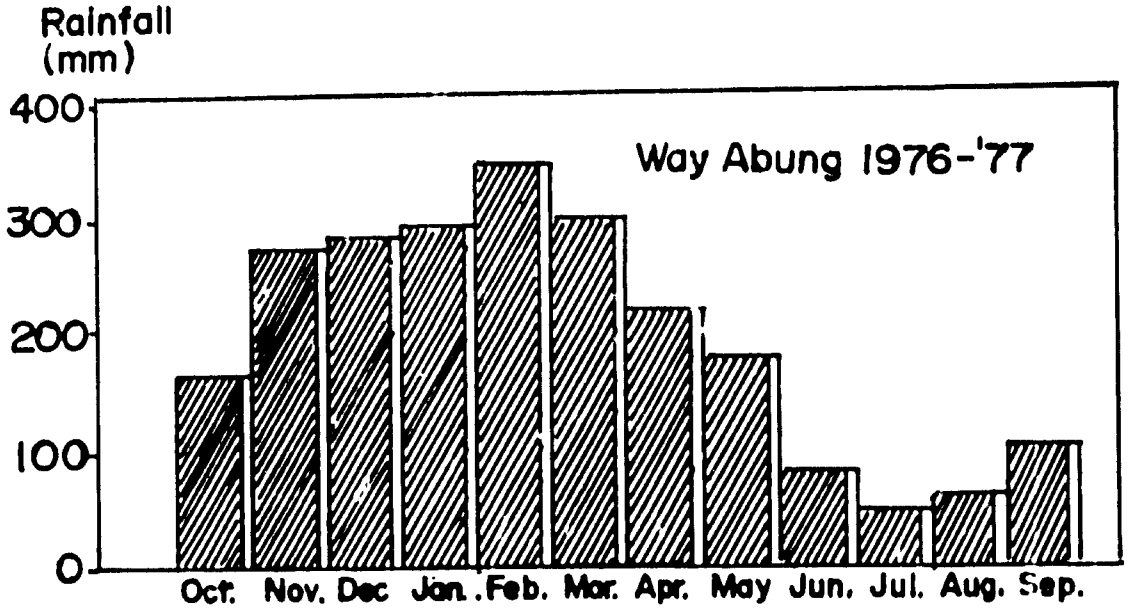
Common Name	Scientific Name
Rice Weevils,	Sitophilus zeamais and oryzae
Kapra Beetle,	Trogoderma granarium
Saw Toothed Grain Beetle,	Oryzaephilus surinamensis and mercator
Tropical Warehouse Moth,	Ephestia cautella
Indian Meal Moth,	Plodia interpunctella
Rice Moth,	Coricyra cephalonia
Emerald Green Cereal Moth,	Doloessa viridis
Lesser Grain Borer,	Rhizopertha dominica
Corn Sap Beetle,	Carpophilus dimiatus
Rust Red Flour Beetle,	Tribolium castaneum
Tobacco Beetle,	Lasioderma serricorne
Drug Store Beetle,	Stegobium paniceum
Cowpea Bruchid,	Callosobruchus chinensis
Rat,	Rattus argentiventer

Table E.4. Rodenticides Registered by the Government of Indonesia and Approved by USAID for Use in and around Building and Storage Structures (After C.R. WARD and C.W. COLLIER, 1981).

Common Name	Trade Name
Brodifacoum	Talon
Coumafuryl	Ratlin
Diphacinon	Diphacin

ANNEX F

CROPPING SYSTEMS



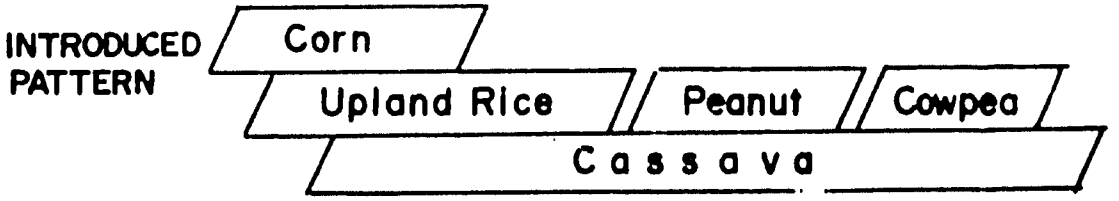
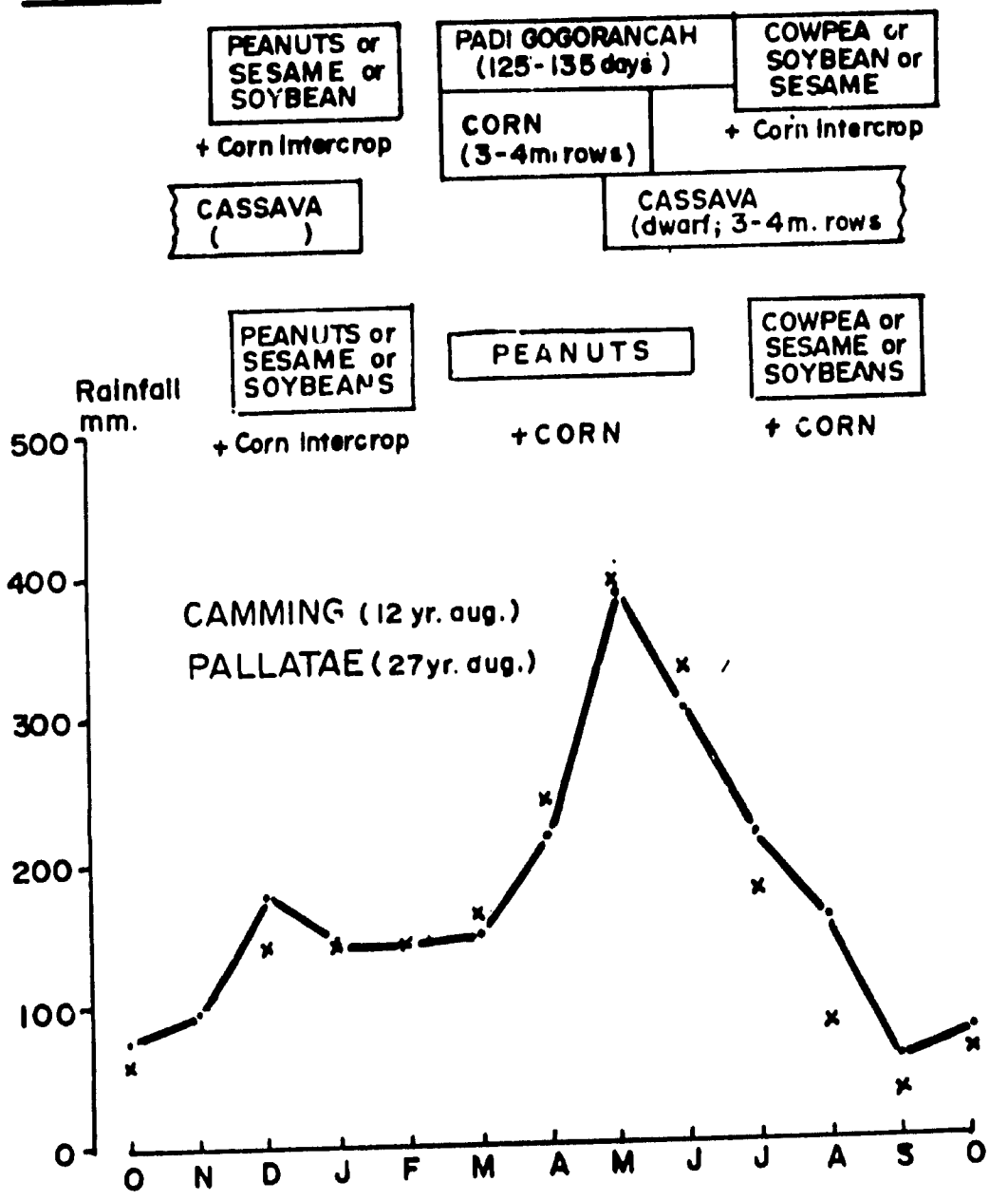


Figure Monthly rainfall distribution and year around cropping pattern commonly tested on red-yellow podzolic soils (Lampung)

Source: A CROPPING SYSTEMS TO PRESERVE FERTILITY OF RED-YELLOW PODZOLIC SOILS IN INDONESIA

by: J. L. McIntosh, Inu Candana Ismail, Suryatna Effendi and M. Sudjati

Upland



Lowland

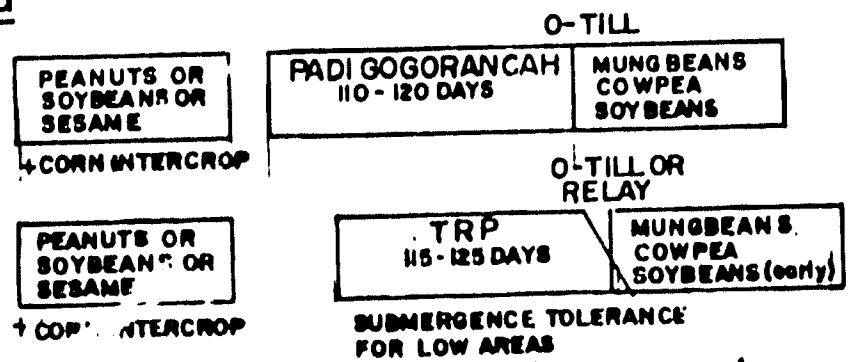


Figure F.2: Monthly rainfall distribution and year around cropping pattern in PALLATAE, BONE, S.SULAWESI
Source: Dr. JIM HOOPER, IRRI-CRIFC

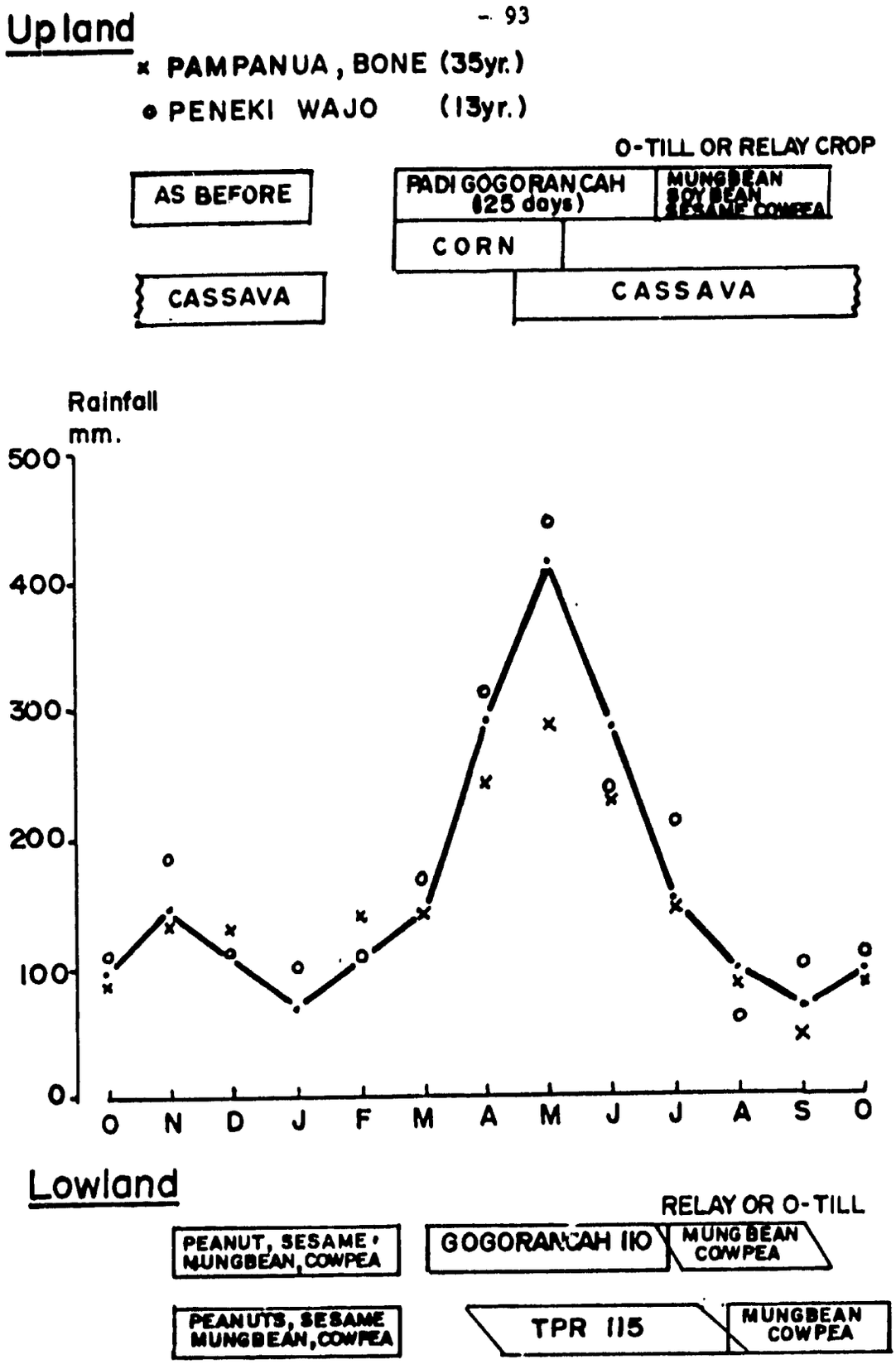
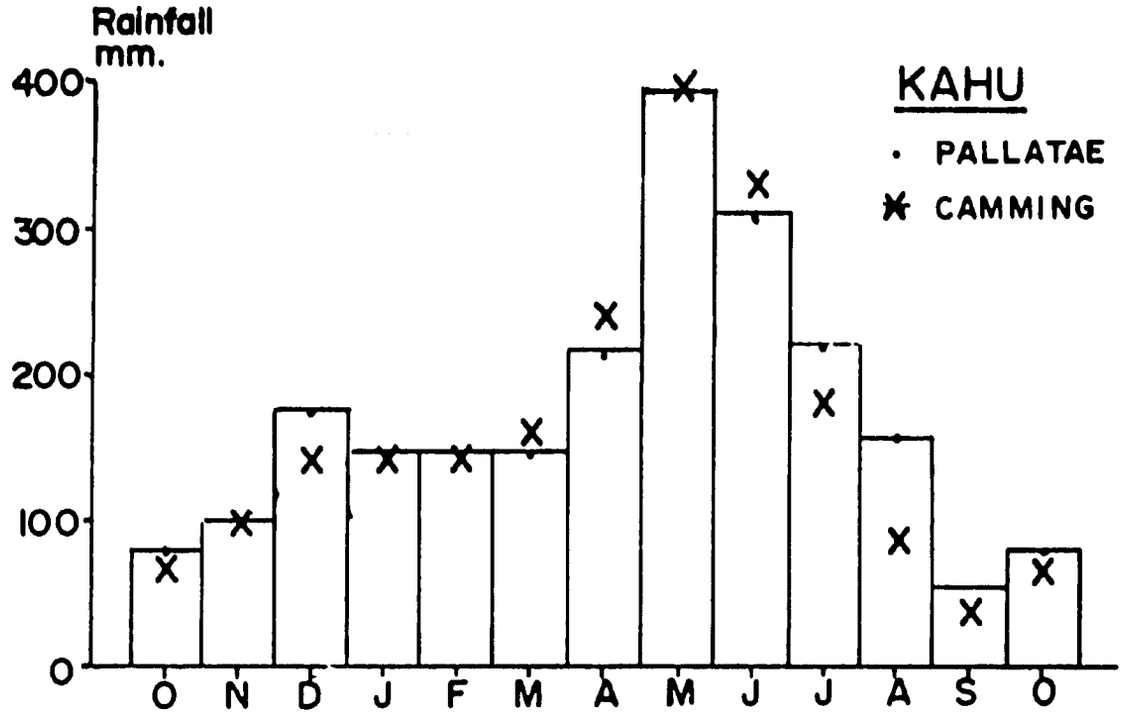


Figure F.3: Monthly rainfall distribution and cropping pattern in WAJO and BONE, S. SULAWESI.

Source: Dr. JIM HOOPER, IRRI-CRIFC, Maros Station



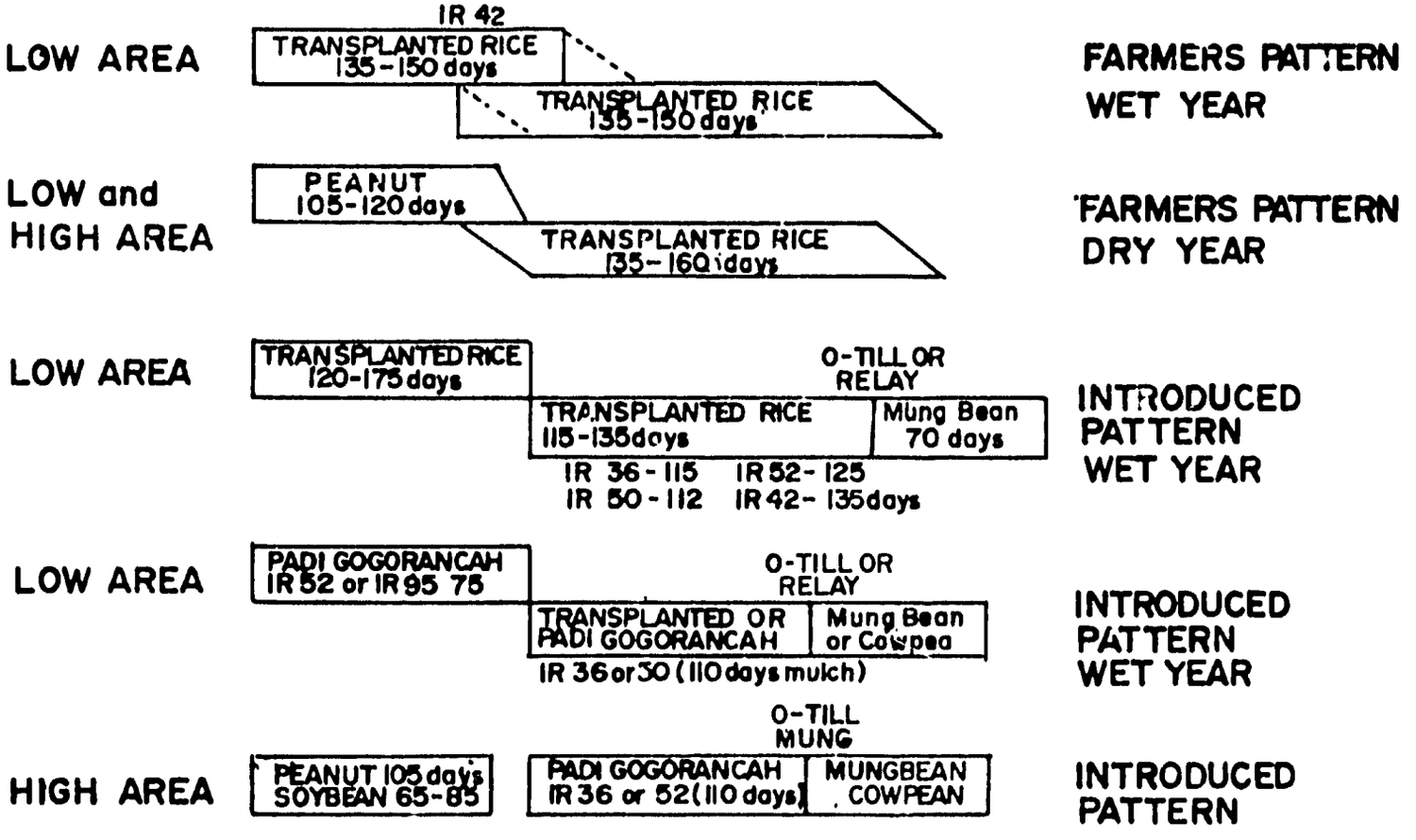


Figure F.4. MONTHLY RAINFALL DISTRIBUTION AND YEAR AROUND CROPPING PATTERNS IN PALLATAE AND CAMMING
Bone, S. Sulawesi Source by: Dr. JIM HOOPER
IRRI - CRIFC

ANNEX G

Fertilizer - Crop Prices

The price ratio between crops and fertilizer is a key factor in decisions of farmers to adopt improved varieties and to buy and use expensive fertilizer once improved varieties and fertilizer become available. It is not just the actual price ratio at any time which is important but farmers' expectations and degree of certainty. Large harvests resulting in a decline in prices discourage purchase of expensive inputs. Stability and reduced risk achieved by an effective floor price, even at a somewhat low level, may be more important than a higher but fluctuating price in stimulating fertilizer use and crop production.

From 1963 to 1968 inflation was rampant and price policy seems to have be quite erratic. Table G.1 shows prices of rice and urea and the ratio of rice to urea prices. A well known authority to have said that farmers would find it profitable to use urea only with a ratio above 1.0 (Price of paddy rice divided by price of urea/kg).

The ratio was 6.7 in May 1963, but steadily thereafter to 0.5 in May 1967. It was only 0.6 in Oct. 1966. Off take of N appears to have bottomed in 1967 when the ratio was lowest and recovered as the ratio increased beyond 0.6.[1] However, fertilizer consumption had begun to fall off in 1963/64 when the ratio was between 3.0 and 4.0. Apparently price uncertainty and fertilizer supply and destribution constraints were critical factors.

By 1968/69 the government had established a policy of supporting rice paddy prices and holding urea proces constant. For five years rice paddy was supported at Rp. 20.9 and urea sold at Rp. 26/kg for a ratio of 0.8. From then to 1977 the ratio fluctuated between 0.7 and 0.98 with sharp price increases in both urea (Rp. 70) and rice (Rp. 67.5) by 1977.

Nitrogen consumption increased by several fold - probably as much as was feasible given other constraints imposed by supply, distribution, credit, improved seed and extension. Most of that increase went on Food Crops (Tab. G.2) and within the food crops it went mostly on rice.

2/1 Data from the June 1968 USAID Fertilizer Report, Chapter IV. It is not clear but it appears that the rice price used was the floor price of dry stalk paddy.

Since 1976/77 the price of urea has ben held constant while the rice support was raised reaching Rp. 135 per Kg in 1982. This brought the ratio for 1982 to 1.93, more than twice the ratio during the period of excellent growth in nitrogen consumption (1968-73).

The 1980 price ratio would mean that it would take only 1.13 kg of paddy rice to buy a kg of nitrogen in urea form. Considering that farmers should be able to get 10 kg of additional paddy with a margibnal application of 1 kg of N at national use averaged, this would imply a return of almost Rp. 7 for each Rp. 1 spent for urea. A return of 3.0 to one is considered adequate to stimulate increased use of N especially with effective support prices to reduce price risk. The problem from 1974 to 1976 was not much the price ratio but with the sharpness of price increase and probably supply and distribution.

For other crops, price stability and price risk STWL are more serious problems since the official support commitment for corn, peanut, soybean and mungbean have not really been tested. At current farm prices it will require about 1.5 kg of corn to but a kg of N or P_2O_5, about 5 kg of cassava, about 0.25 kg of peanut about 0.5 kg of soybean. All of these ratios appear to be very favorable at the farm level. Illustratively,

for corn this is only 25% of what U.S. farmers must pay in terms of product for a kg of N. For soybean it is 20-25% of what U.S. farmers must pay out, and for peanut 25-30%./2 Of course U.S. farmers have available nitrogen fixing inoculum for use on soybean and peanut which makes it possible to produce heavy yields with no other nitrogen supplied. Usually in the U.S. only P and K are used for soybean and peanut. The project has as one of its objectives to provide this low-cost, high-energy conserving technology for Indonesian farmers.

It seems evident that the current price rarioa are very attractive for all crops and fertilizer consumtpion is limited only by fertilizer supply and distribution and availability of other parts of package; that is, good seed, suitable technical know-how, possibly credit and ability to prepare the crop for good market acceptance. Uncertainty of price and market acceptance factors, of course.

/2 The Indonesian farm price of corn is about Rp. 100/kg, soybean Rp. 325; and peanuts Rp. 700/kg

Table G.1: Fertilizer and Rice Prices in Rp/kg and Price Ratio

	Urea	Paddy Floor	Ratio of N to Paddy
1968	26	20.9	0.8
69	26	20.9	0.8
70	26	20.9	0.8
71	26	20.9	0.8
72	26	20.9	0.8
73	40	30.4	0.76
74	60	41.8	0.70
75	80	58.5	0.73
76	70	68.5	0.98
77	70	70	1.01
78	70	75	1.07
79	70	85	1.21
80	70	105	1.50
81	70	120	1.71
82		135	1.93

Table G.2 Food Crop Base Prices1/, 1977 -1982
and Jakarta wholesale prices 1978-81
(Rupiah per Kg)

Crop	1977	1978	1979	1980	1981	1982
Base Support prices						
Rough rice /2	71	75	95	105	120	135/4
Corn /3	-	40	42.5	67	95	105
Soybean /3	-	-	-	210	240	270
Mungbean /3	-	-	-	260	290	310
Peanut /3	-	-	300	390	425	
Jakarta wholesale prices						
Peanut	-	360	584	663		780/5
Soybean	-	190	272	309		355/5

/1 Prices to be paid to the farmer by government-sponsored cooperative (KUDs) for crops of standard quality and moisture levels.

/2 Base price effctive on February 1 for years 1977-1981; effective on January 1 for 1982.

/3 Base price effective November 1 of the previous calendar year.

/4 Purchases from farmer groups participating in the government's INSUS program received a premium of 3 rupiah/kg in 1981, and will receive atleast this premium in 1982.

/5 First 4 months

Note: US$ 1 = Rp. 635 (November 1, 1981)
Source: BULOG and Agriculture Attache/Jakarta

Table G.3 Government Subsidies for Food Crops
(Rp million)

Crop	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Rice	118,700	27,110	7,450	-	7,190	59,530	87,200
Wheat	18,400	22,890	16,380	-	25,120	21,080	62,700
Sugar	6,400	-	15,280	-	-	-	19,800
Coconut oil	-	-	-	-	6,700	1,380	-
Rice for Timor	-	-	-	-	4,400	-	-
Total	143,500	50,000	39,110	-	43,480	81,990	169,700

Source: Ministry of Finance as reported by World Bank, Nov. 1981

CIF, Support and Actual Prices of Selected Secondary Crops, 1981 in Rp/Kg.

Crops	CIF Price	Support Price	Actual Price
Milled Rice	225	214	214
Corn	100	105	100
Peanut	325	425	700
Soybean	200	220	325
Mungbean	-	310	700

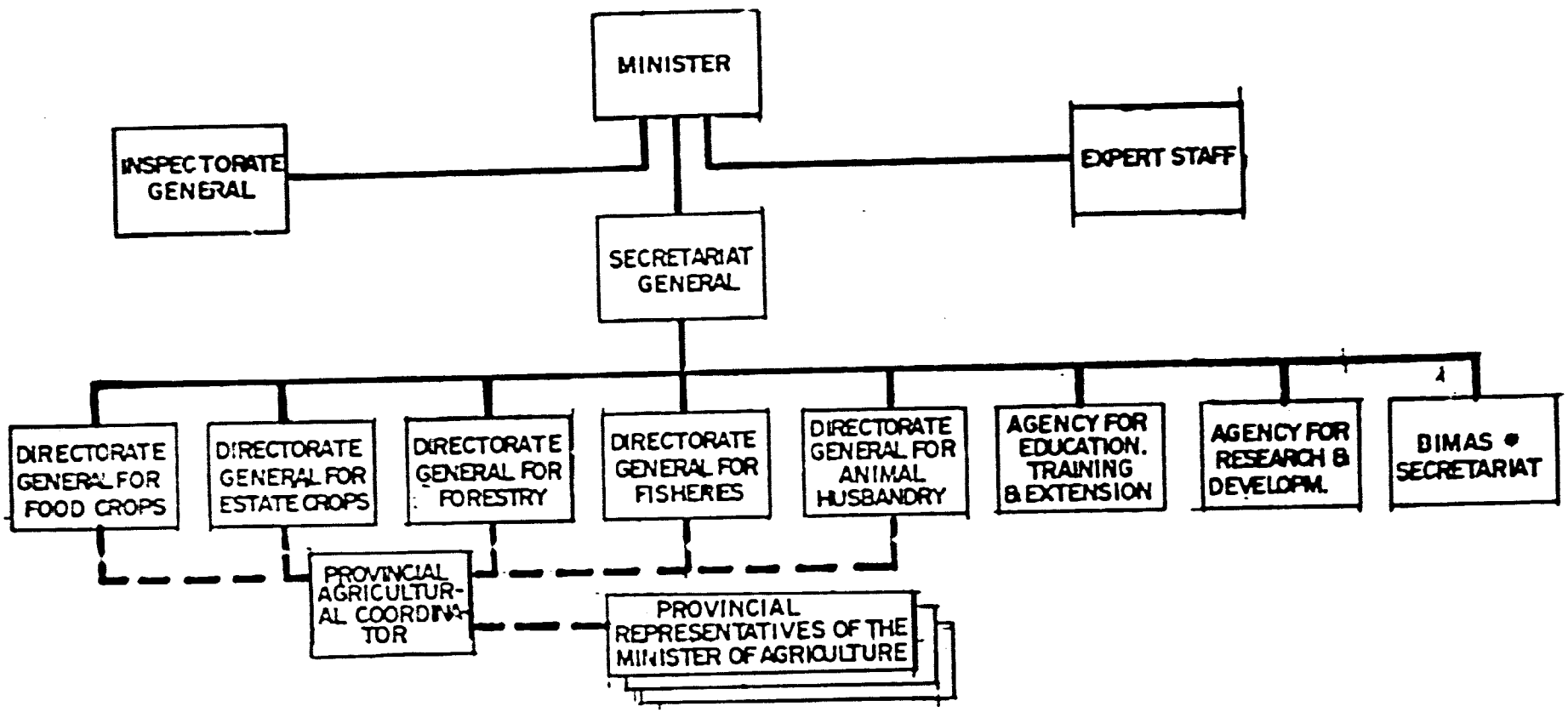
Costs of Fertilizer and Pesticide In relation to Farmers' Price, 1981, in Rp/Kg.

Input		Base Cost	Distribution Cost	Total Cost	Price to Farmers
Urea					
	CIF	160	40	200	70
	Local	111	35	146	70
TSP					
	CIF	154	40	194	70
	Local	240	35	275	70
Pesticide				5000	1250

ANNEX H

MISCELLANEOUS CHARTS

INDONESIA
SECONDARY FOOD CROPS PROJECT
MINISTRY OF AGRICULTURE ORGANIZATION



THE DIRECTOR GENERAL OF FOOD CROPS IS CURRENTLY ALSO HEAD OF THE BIMAS SECRETARIAT

Figure 2

INDONESIA
SECONDARY FOOD CROPS PROJECT
ORGANIZATION OF DIRECTORATE GENERAL FOOD CROPS

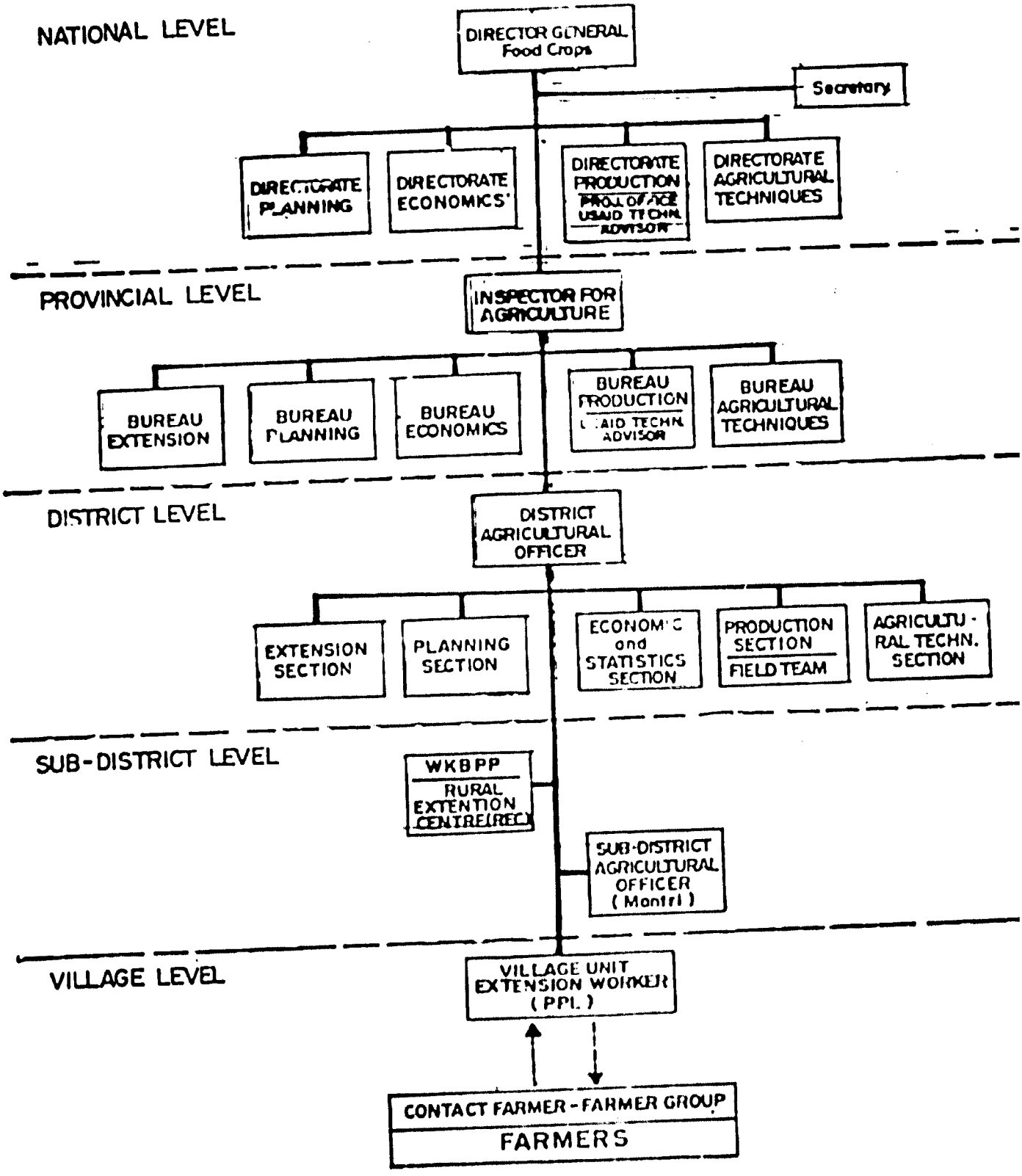


Figure 3

INDONESIA
SECONDARY FOOD CROPS PROJECT
PROPOSED ORGANIZATIONAL STRUCTURE FOR AGENCY AND AGRICULTURAL RESEARCH AND DEVELOPMENT (AARD)

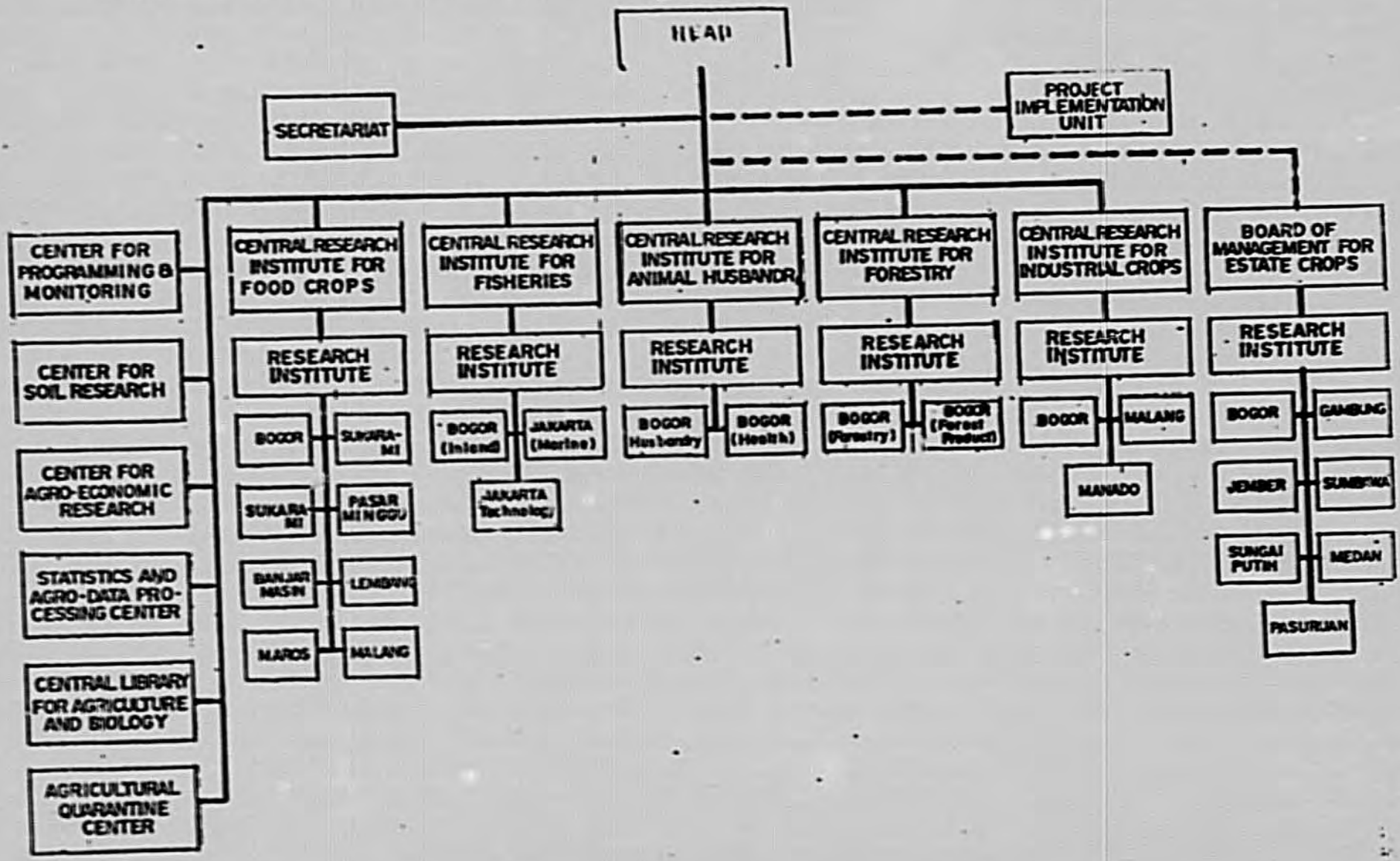
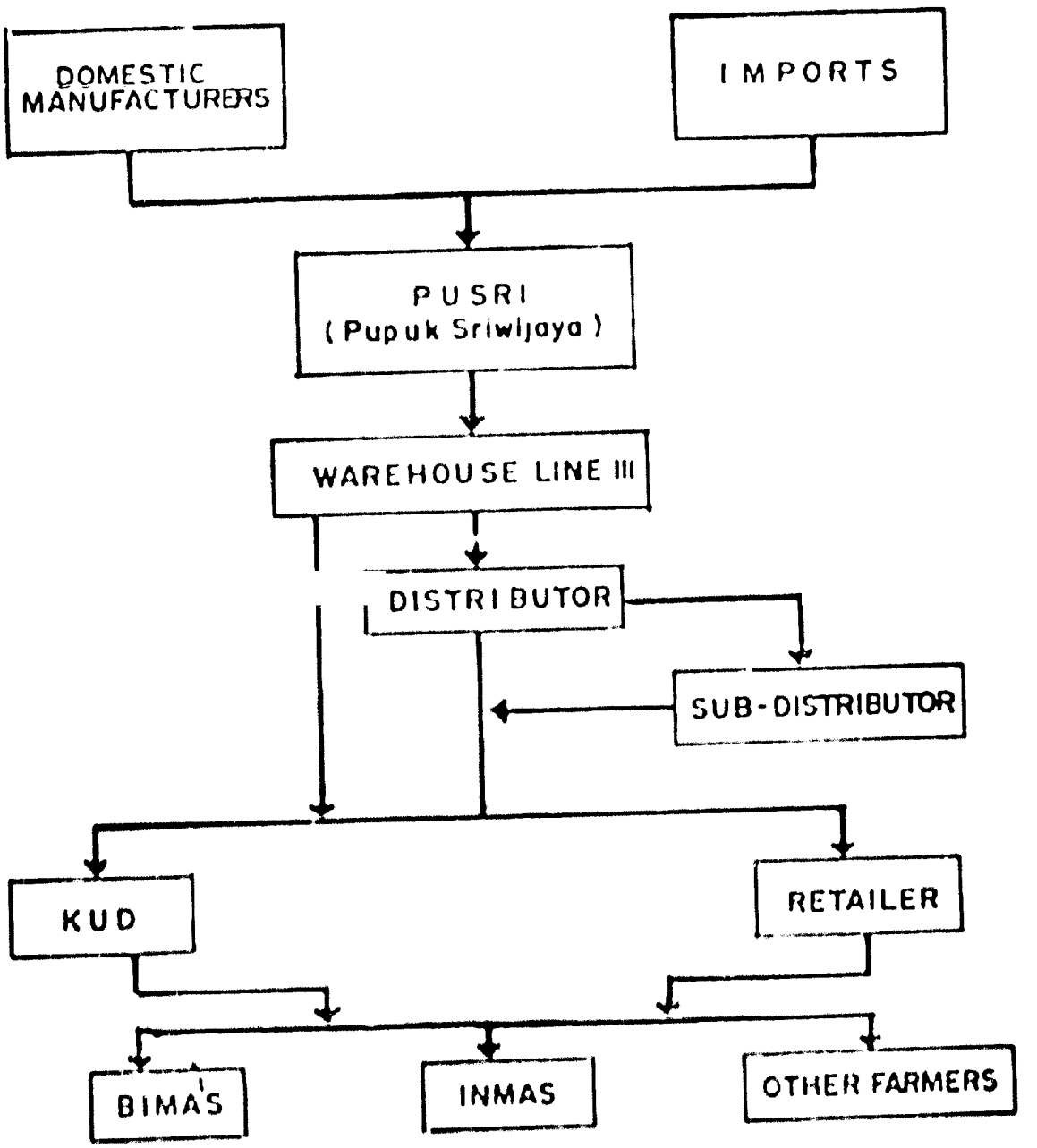


Figure 4

INDONESIA
SECONDARY FOOD CROPS PROJECT

DISTRIBUTION CHANNEL OF FERTILIZER FOR FOOD CROPS IN INDONESIA
1980



ANNEX I

OPNAVZCZCJA0654
PP RUFFJA
DE RUEHC #6570/01 2681341
ZNR UUUUU ZZH
P 2512237 SEP 81
FM SECSTATE WASHDC
TO AMEMBASSY JAKARTA PRIORITY 1597
ET
UNCLAS STATE 256570

26 SEP 81
TOR: 1412
CN: 39088
CHRGE: AIT 9
INFO: AMP ADCM E[illegible]
AIM CPRON 14/GD

AIDAC

E.O. 12065: N/A

TAGS:

SUBJ: APAC - SECONDARY FOOD CROPS DEVELOPMENT PID
PROJECT NO. 497-0304

REFS: JAKARTA 13070

THE ASIA PROJECT ADVISORY COMMITTEE (APAC) APPROVED THE SUBJECT PID ON SEPTEMBER 14 WITH THE FOLLOWING CAVEATS AND COMMENTS:

1. GENERAL CONCLUSIONS: THE APAC ENDORSES, IN PRINCIPLE, A STRATEGY TO PLACE GREATER EMPHASIS IN USAID/INDONESIA AGRICULTURAL ASSISTANCE ON SECONDARY CROPS. THE DIVERSIFICATION OF EFFORT THAT THIS WILL IMPLY, I.E. BUILDING UPON PRIOR EXPERIENCE IN PROJECTS FOCUSED PREDOMINANTLY ON RICE, OFFERS LONG-TERM OPPORTUNITIES FOR INNOVATION IN AN AREA WHICH IS BECOMING A HIGH PRIORIT FOR THE GOI AND WHICH HAS THE POTENTIAL TO DIRECTLY BENEFI THE RURAL POOR. THE REVISED PID WAS A SUBSTANTIAL IMPROVE MENT OVER THE EARLIER PID SUBMISSION IN 1980. HOWEVER, AS THE PP IS PREPARED, THE USAID WILL NEED TO SATISFY

SEVERAL CONCERNS, AS DESCRIBED BELOW:

2. BUDGET LIMITATIONS: PROJECTED BUDGET LEVELS FOR INDONESIA WILL REQUIRE CAREFUL PLANNING WITH SPECIAL ATTENTION TO INCREMENTALLY FUNDED PROJECTS AND MORTGAGES ON FUTURE FUNDS. AT PRESENT, THE SECONDARY CROPS PROJECT IS NOT INCLUDED IN THE ASIA BUREAU ABS FOR FY 83. WHILE WE WILL SUPPORT THE PREPARATION OF A PP AS RECOMMENDED IN ITEM NO. 9, BELOW, THE USAID WILL NEED TO REEXAMINE ITS PROJECTED BUDGET LEVELS FOR FY 82 AND 83 TO DETERMINE HOW SOON THIS PROJECT CAN BE FUNDED. TO BE INCLUDED IN THE FY 83 CP, THE MISSION WILL NEED TO REDUCE PLANNED FUNDING FOR OTHER PROJECTS OR POSSIBLY ELIMINATE ANOTHER PROJECT.

3. MACRO DEMAND/MARKETING ANALYSIS FOR SECONDARY CROPS: THERE ARE FUNDAMENTAL QUESTIONS RELATED TO CURRENT AND POTENTIAL DEMAND AS WELL AS MARKETING OUTLETS FOR SECONDARY CROPS IN INDONESIA WHICH SHOULD BE ADDRESSED

IN THE PP. WORLD BANK STUDIES, IN PARTICULAR, HAVE INDICATED THAT EXPECTED CONSUMPTION MAY NOT KEEP PACE WITH INCREASES IN PRODUCTION, THAT INCOME ELASTICITIES OF DEMAND ARE NEGATIVE FOR SOME SECONDARY CROPS, AND THAT OVERALL DEMAND, EITHER FOR DIRECT HUMAN CONSUMPTION OR FOR INDUSTRIAL USE AND EXPORT, IS NOT PROMISING. THEREFORE, THE LONG-TERM VIABILITY OF PROMOTING INCREASED PRODUCTION WILL DEPEVOIVTZRPRENGTHENED AND SUSTAINABLE DEMAND. WHILE THE PROJECT ITSELF IS MOST IMMEDIATELY CONCERNED WITH DEMONSTRATING PRODUCTION POTENTIAL IN A FEW KABUPATENS AND HOW IT CAN BE MARKETED LOCALLY, A NATIONAL PROGRAM WILL HAVE TO INCLUDE PROGRAMS AND POLICIES NEEDED TO STIMULATE DEMAND, INSURE PRICE INCENTIVES ATTRACTIVE TO PRODUCERS AND MARKETERS, AND PROMOTE COMMERCIAL/INDUSTRIAL USES AND EXPORT. THE PP SHOULD BE PREPARED WITH THIS CONTEXT IN MIND, PERHAPS INCLUDING FUNDS FOR ADDITIONAL MACRO-ECONOMIC STUDIES TO DETERMINE THE NATIONAL DEMAND/MARKETING STRUCTURES REQUIRED TO ECONOMICALLY ABSORB SIGNIFICANTLY INCREASED SUPPLY OF SELECTED SECONDARY CROPS. SUCH STUDIES AND THEIR RECOMMENDATIONS WILL BE ESSENTIAL TO ANY DECISION TO ADOPT ON A NATIONAL SCALE THE RESULTS AND LESSONS LEARNED IN THE PILOT KABUPATENS.

4. COMPLEXITY OF PROPOSED PROJECT/IMPLEMENTATION STRATEGY: FOR PP PREPARATION, SPECIAL ATTENTION SHOULD BE GIVEN TO (A) GEOGRAPHIC SCOPE, (B) THE DUAL FOCUS ON PRODUCTION AND MARKETING, (C) NUMBER OF CROPS TO BE INCLUDED, AND (D) THE GOI INSTITUTIONAL AND MANPOWER REQUIREMENTS ESSENTIAL FOR PROJECT SUCCESS:

4. A. GEOGRAPHIC SCOPE: GIVEN THE EXPERIMENTAL NATURE OF THE PROJECT, AND AS ALLUDED TO IN THE ISSUES SECTION OF THE PID, THE SCOPE OF THE PROJECT MIGHT BE REDUCED TO THREE OR FOUR PILOT KABUPATENS WITHOUT COMPROMISING THE PROJECT'S PURPOSE. THIS WOULD HELP SIMPLIFY PROJECT MANAGEMENT AND PERHAPS REDUCE TOTAL PROJECT COST, PARTICULARLY IF COMBINED WITH A REDUCTION IN THE PROPOSED NUMBER OF HECTARES AND FARMER BENEFICIARIES TO BE DIRECTLY AFFECTED IN EACH PILOT KABUPATEN. ON THE LATTER POINT, THE PID CITES AN AVERAGE OF 70,000 HECTARES AND 30,00 FARMERS IN EACH PILOT AREA. ASSUMING A GRADUAL EXPANSION OF HECTARES COVERED IN EACH KABUPATEN, BY THE LAST YEAR OF THE PROJECT IT WOULD BE MORE REALISTIC TO PLAN ON PERHAPS A TOTAL OF 40,000 HECTARES AND A CORRESPONDINGLY LOWER NUMBER OF DIRECT BENEFICIARIES TO BE INCLUDED PER PILOT KABUPATEN. ADDITIONAL EXPANSION WOULD THEN RELY ON INDIRECT SPREAD EFFECTS TO FARMERS IN NEIGHBORING AREAS AS PROVEN PRODUCTION TECHNOLOGIES ARE ADOPTED OUTSIDE THE IMMEDIATE PROJECT AREAS.

4. B. PRODUCTION AND MARKETING: THE INTERRELATIONSHIP OF THESE TWO ELEMENTS WILL BE INTEGRAL TO ULTIMATE PROJECT SUCCESS. AS ALREADY HIGHLIGHTED IN ITEM NO. 3, ABOVE,

THERE ARE BROAD CONCERNS RELATED TO MACRO-LEVEL DEMAND/MARKETING ANALYSIS FOR SECONDARY CROPS WHICH WILL HAVE A DIRECT EFFECT ON PROJECT VIABILITY AND SHOULD BE ADDRESSED IN THE PP. AT THE MICRO OR FIELD LEVEL IN THE PILOT KABUPATENS, THERE MUST OF COURSE BE AN ANALYTICAL BASIS IN THE PP THAT EXPECTED LOCAL PRODUCTION INCREASES WILL BE MARKETED AT REMUNERATIVE PRICES TO GROWERS. WHILE PRIMARY EMPHASIS IN THE EARLY YEARS OF THE PROJECT WILL LOGICALLY BE FOCUSED ON PRODUCTION PROBLEMS, THROUGH THE INTRODUCTION OF SUCCESSFUL PRODUCTION TECHNOLOGY APPROPRIATE TO LOCAL CONDITIONS, SUFFICIENT ATTENTION MUST BE GIVEN TO LOCAL DEMAND, PRICE, POST-HARVEST STORAGE, TRANSPORTATION, PRODUCT QUALITY AND OTHER MARKETING CONSTRAINTS WHICH WILL AFFECT INCENTIVES AND PROFIT. THE APAC THOUGHT THAT INITIAL PROJECT PREFERENCE SHOULD BE GIVEN TO SECONDARY CROPS ALREADY HAVING ESTABLISHED MARKETING CHANNELS AND THAT GREAT CARE IS NEEDED IN THE AREA OF GOI

PRICE SUPPORTS AND SUBSIDIES. TO THE DEGREE THAT A STEP-BY-STEP APPROACH TO PRODUCTION AND MARKETING PROBLEMS CAN BE DESIGNED (RATHER THAN WORKING ON ALL PROBLEMS SIMULTANEOUSLY), THIS MAY HELP SIMPLIFY PROJECT MANAGEMENT AND SHOULD BE SPELLED OUT IN THE PP.

4.C. NUMBER OF CROPS: IN OUR JUDGEMENT THE CROPS/CROPPING SYSTEMS SELECTED FOR EMPHASIS SHOULD FOCUS ON THOSE WITH THE MOST FAVORABLE COST/BENEFIT PAYOFFS FOR PARTICIPATING FARMERS. WHILE IT IS UNDERSTOOD THAT LIMITING THE NUMBER OF CROPS MAY NOT BE PRACTICAL, THIS SHOULD BE CONSIDERED AS THE PP IS DEVELOPED.

4. D. INSTITUTIONAL AND MANPOWER REQUIREMENTS: THE PP TEAM SHOULD INSURE THAT OPERATIONAL RESPONSIBILITY FOR THE PROJECT WILL REST AS COMPLETELY AS POSSIBLE WITH A SINGLE AGENCY, THE DIRECTORATE GENERAL OF FOOD CROPS (DGFC). AS DESCRIBED IN THE PID, THE PALAWIJA PROJECT OFFICE WITHIN THE DGFC IN JAKARTA WILL MANAGE THE PROJECT AND PROVIDE TECHNICAL SUPPORT THROUGH A TEAM OF INDONESIAN AND U.S. CONTRACT ADVISORS. WHILE THE ROLES OF OTHER PARTICIPATING AGENCIES JUSTIFY THE NEED FOR THE PROJECT ADVISORY BOARD, ALSO DESCRIBED IN THE PID, IT SHOULD BE CLEAR THAT DIRECT RESPONSIBILITY IS WITH THE DGFC. AT THE FIELD LEVEL, THE SUPERVISORY LINE OF RESPONSIBILITY BETWEEN DGFC IN JAKARTA AND THE FIELD EXTENSION TEAMS, AND HOW THIS FITS WITH THE COORDINATING AND ADMINISTRATIVE ROLE OF THE BUPATI, SHOULD BE FULLY EXPLAINED IN THE PP. REGARDING MANPOWER REQUIREMENTS, THE PROJECT WILL BE MORE MANAGEABLE TO THE DEGREE THAT THE 30 FIELD EXTENSION TEAMS MENTIONED IN THE PID CAN BE REDUCED TO FEWER TEAMS, IN LINE WITH POSSIBLE REDUCTION IN THE NUMBER OF PILOT KABUPATENS AND HECTARES COVERED BY THE PROJECT. APPROPRIATE CP'S OR COVENANTS SHOULD BE RECOMMENDED AS NEEDED TO ASSURE PROVISION OF SUFFICIENT QUALIFIED MANPOWER TO CARRY OUT THE PROJECT.

5. SEED CENTER DEVELOPMENT: THE APAC IS CONCERNED THAT MAXIMUM PARTICIPATION AND INCENTIVES BE GIVEN TO THE PRIVATE SECTOR SEED INDUSTRY IN MEETING THE SEED REQUIREMENTS OF THE PROJECT.
INDUSTRY FOR CORN HAS A VERY STRONG COMPARATIVE AD-

SUPSECTOR TO A PRIVATE ENTERPRISE MODE WOULD BE A STRONG PLUS FOR THE PROJECT. THIS SHOULD BE FULLY DISCUSSED AND IF POSSIBLE INCORPORATED IN THE PP.

6. COORDINATION WITH OTHER PROJECTS: THE PP SHOULD CITE SPECIFICALLY HOW SECONDARY CROP RESEARCH CAPACITIES

SUPPORTED THROUGH THE CURRENT SUMATRA AG. RESEARCH (497-0263) AND APPLIED AG. RESEARCH (497-0302) PROJECTS WILL BE COORDINATED WITH RESEARCH PLANNED FOR THE SECONDARY CROP PROJECT, AS WELL AS AREAS OF COMPLEMENTARITY WITH OTHER EXISTING AID PROJECTS. A SUMMARY OF PROJECTS FINANCED BY OTHER DONORS AFFECTING SECONDARY CROPS SHOULD ALSO BE PROVIDED.

7. IEE: BECAUSE PESTICIDES ARE AMONG THE INPUTS REQUIRED FOR CROP PRODUCTION, THE APAC COULD NOT ACCEPT THE NEGATIVE DETERMINATION AS RECOMMENDED IN THE PID. AN ENVIRONMENTAL ASSESSMENT SHOULD BE PREPARED AS PART OF THE PP PRESENTATION.

8. TITLE XII: THE PROPOSED PROJECT MAY BE RESERVED FOR IMPLEMENTATION THROUGH A TITLE XII INSTITUTION PENDING RECOMMENDATIONS IN THE PP AND THE SUBSEQUENT APAC REVIEW.

9. PP TEAM: SUBJECT TO THE CAVEATS IN ITEM NO. 2, AND FOLLOWING PRELIMINARY DISCUSSION BY ASIA/TR AND ASIA/PD WITH ERNESTO LUCAS, THERE IS CONSENSUS THAT THE MISSION SHOULD CONSIDER FORMATION OF A PP TEAM TO ADDRESS ALL ISSUES RAISED BY APAC AND PREPARE A COMPREHENSIVE PP. SUGGESTED TEAM WOULD CONSIST OF FIVE CORE INDIVIDUALS AS FOLLOWS: TEAM LEADER FROM ASIA/PD; AN AGRICULTURAL ECONOMIST CONCERNED WITH MICRO-LEVEL ECONOMIC ANALYSIS ON PRODUCTION/MARKETING/ CONSUMPTION WITHIN THE SELECTED PILOT AREAS; AN AGRONOMIST SKILLED IN A VARIETY OF KEY SECONDARY CROPS GROWN IN TROPICAL ENVIRONMENTS; A SENIOR SPECIALIST SKILLED IN AGRICULTURAL ORGANIZATION AND

MANAGEMENT OF RESEARCH/EXTENSION SYSTEMS; AND AN ENTOMOLOGIST RESPONSIBLE FOR PREPARING THE ENVIRONMENTAL ASSESSMENT. THEY WOULD WORK CLOSELY WITH MISSION STAFF INCLUDING LUCAS AND STEPANEK. STEPANEK WOULD BE ESPECIALLY VALUABLE IN ASSISTING MACRO-ECONOMIC ANALYSIS AS STATED IN ITEM NO. 3. (NOTE: REGARDING ENVIRONMENTAL ASSESSMENT, DR. CHARLES WARD, WHO DID EA ON PESTICIDES USE IN LUWU, HAS BEEN RECOMMENDED TO DO EA FOR PRE AND POST HARVEST LOSS CONTROL PROJECT. WE PROPOSE THAT DR. WARD, DURING HIS TDY FOR ABOVE PROJECT, ASSESS WORK REQUIREMENTS FOR EA FOR SECONDARY CROPS TO SEE IF HE COULD UNDERTAKE BOTH EA'S SIMULTANEOUSLY.

10. WORK SCHEDULE: PLEASE ADVISE WHEN AND IF USAID DECIDES TO PROCEED WITH THIS PROJECT. EARLIEST FEASIBLE DATES FOR PP TEAM WOULD BE JANUARY 1981. HAIG
BT
#6570

NNNN

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects under the FAA and project criteria applicable to individual funding sources: Developmen. Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriation committees of Senate and House have been or will be notified concerning the projec'; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that amount)?

The Committees in appropriation of Senate and House were notified of the project through the FY 83 Congressional Presentation (ASIA Program, page 74) and through a Congressional Notification.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,00, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Yes.

3.	FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No further legislative action is required.
4.	FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973?	N.A.
5.	FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	N.A.
6.	FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	No.

7.	FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	This project should directly encourage (c) and (e).
8.	FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	N.A.
9.	FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	Normal project disbursement procedures assure this.

10.	FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.
11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12.	FY 1982 Appropriation Act Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N.A.
13.	FAA 118(c) and (d). Does the project take into account the impact on the environment and natural resources? If the project or program will significantly affect the global commons or the U.S. environment, has an environmental impact statement been prepared? If the project or program will significantly affect the environment of a foreign country, has an environmental assessment been prepared? Does the	This project has limited effect on the environment. Insofar as the project can set a standard of judicious selection and careful use of all types of agricultural inputs for secondary crops, it will support the GOI's efforts to insure effective crop protection with minimal environmental impact.

	project or program take into consideration the problem of the destruction of tropical forests?	
14.	FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N.A.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

	a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward	This project is designed to benefit the rural poor.

better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?	
b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?	Yes.
c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	Yes.
d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activitiy with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?	Yes.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?	N.A.
f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	Yes.
g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes esential to self-government.	This project supports GOI efforts to improve quality of secondary crops products, reduce spoilage, increase consumer & market acceptance and increase prices. and improve nutritional status.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of	GOI is able to repay the loan.

the country to repay the loan, at a reasonable rate of interest.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? — N.A.

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)? — N.A.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102? — N.A.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? — N.A.

c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance — N.A.

	of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?	
d.	FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	N.A.
e.	FAA Sec. 133. Notwithstanding any other provision of this joint resolution, none of the funds appropriated under section 101(b) of this joint resolution may be available for any country during any 3-month period beginning on or after October 1, 1982, immediately following the certification of the President to the Congress that such country is not taking adequate steps to cooperate with the United States to prevent narcotic drugs and other controlled substances (as listed in the schedules in section 202 of the Comprehensive Drug Abuse and Prevention Control Act of 1971 (21 U.S.C. 812) which are produced, processed, or transported in such country from entering the United States unlawfully.	N.A.

ANNEX K

WORKING COPY

REPUBLIC OF INDONESIA
NATIONAL DEVELOPMENT PLANNING AGENCY
JAKARTA, INDONESIA

No. : 898/B.V/4/1983

Jakarta, April 12 , 1983

U.S. Agency for International Development
c/o American Embassy
Jakarta

RECEIVED
APR 27 1983
USAID/C&R
Jakarta

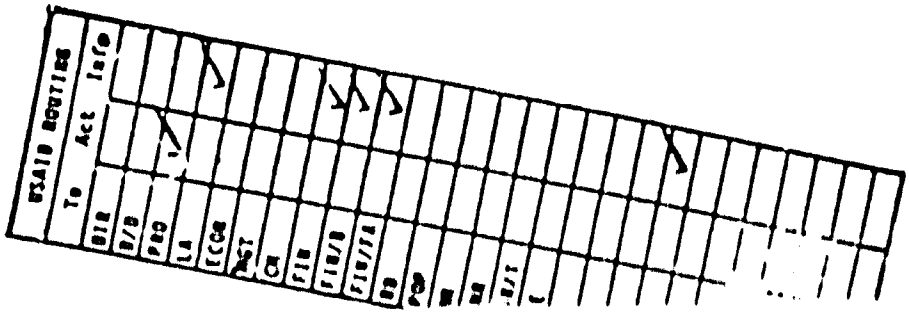
Attn : Mr. Jonathan L. Sperling

Re : Secondary Food Crops Development

Dear Sir,

Having discussed the Secondary Food Crops Development Project with Directorate General of Food Crops, Directorate General of Cooperatives and the National Logistics Agency (BULOG), we herewith request a loan of up to six million four hundred United States dollars (US$ 6.4 million) for the following purpose and subject to the provisions hereinafter stated :

1. The purpose of this project is to increase the production and to improve the market system of secondary crops such as corn, soybean, peanut and cassava in three provinces, Lampung, East Java and South Sulawesi.
   In the first three years, the project covers three districts (Kabupaten) and each district consists of two Rural Extension Areas (Wilayah Kerja Penyuluhan Pertanian/WKPP) covering twenty-one sub-districts (Kecamatan).
   In the next two years the project will cover the whole potential sub-districts of the three provinces mentioned above.
   It is expected that through the development of the project the Village Unit Cooperatives (KUD) could be developed as a viable economic entity both as production as well as a marketing unit. At the completion of the project it is expected that all activities can be carried out by KUD utilizing the existing facilities developed throughout the implementation period.



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REPUBLIC OF INDONESIA
NATIONAL DEVELOPMENT PLANNING AGENCY
JAKARTA, INDONESIA

2. The project will be implemented by Directorate General of Food Crops assisted by Central Research Institute for Food Crops, BULOG, Directorate General of Cooperatives, Agency for Agricultural Education,Training and Extension, Bank Rakyat Indonesia (BRI) and the Agricultural Universities/Faculties.

3. It is estimated that the total cost of the project is of US$ 12,691 million for five years starting from 1983/84. The cost approximated is broken down as follows : US$ 6,4 million from proceeds of the loan and US$ 6,291 million provided by the Government of Indonesia which mostly consists of the existing facilities and others being developed under the on-going programs.

4. The proceed of USAID loan of US$ 6,4 million will be use to finance counterpart activities as tentatuely estimated as follows :

   - Agricultural Universities (special studies : base line & evaluation, monitoring and policy and market development) : US$ 968,000.-
   - Directorate General of Food Crops : Technical Assistance and cropping system/post harvest training : US$ 2,131,000.-
   - BULOG : Technical Assistance, training and post harvest equipments (chanelled through BRI's Credit) : US$ 2,075,000.-
   - Directorate General of Cooperatives/KUD : Technical Assistance and training : US$ 1,226,000.-

Looking forward to your favourable consideration.

Sincerely yours,

F.R. Almatsier
Head of Bureau for Foreign
Economic Cooperation