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PROJECT DOCUMENT
FOR
COOPERATIVE AGROBUSINESS ENTERPRISE DEVELOPMENT PROJECT

COOPERATIVE LEAGUE OF THE U.S.A.
DEPARTMENT OF COOPERATIVES
GOVERNMENT OF INDONESIA

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I. INTRODUCTION

The problem of widespread dietary insufficiency among the approximately 160 million population of Indonesia is commonly recognized. The World Bank has estimated that 75 percent of the population of Java and 48 percent of the population of the outer islands of the archipelago have diets which do not provide them with a minimally adequate level of nutrition. According to a recent national workshop of food and nutrition, calorie/protein deficiency is the major nutritional problem in Indonesia, although serious vitamin a, iron, and iodine deficiencies are also present. The Ministry of Health reports that nine million children age 0-5 and 700,000 pregnant/lactating mothers suffer from protein calorie malnutrition. Approximately 45% of Indonesia's total population consume less than 1,900 calories per day compared to World Bank standards of 2,265. The USAID 1985 CDSS states "With increasing unemployment and a large percentage of people working in rural areas unable to earn enough to meet minimum needs, and in view of Government budget constraints following the downturn in the economy, there is a continuing need for Title II assistance to Indonesia."

Research findings from a variety of sources have demonstrated that the "poorest majority" of the Indonesian population simply lacks the resources to obtain the basic food items of a balanced diet. Appendix 1 shows the high correlation that exists on a national basis between income and nutritional levels and shows, for example, that 85% of the rural population have monthly per capita income levels below U.S. $ 5.00 and consume less than 2100 Kcal per day in food energy. Within the low income groups, AID and UNICEF studies further reveal that pregnant women, babies, and young children are the most seriously affected by dietary insufficiency. The consequences of this chronic nutritional problem are a high rate of child mortality, a negative effect on the physical and mental development of many children, a high incidence of skin, respiratory and eye diseases, and in general, a loss of the human potential of the "poorest majority". As stated in an AID research document, "Clearly.....food is Indonesia's most critical human need....."

Dietary insufficiency and low incomes among Indonesia's rural population are directly linked to chronic structural problems of the nation's rural economy. Most small and frequently landless farmers do not have access to competitive markets for inputs, rural produced commodities, or capital. Consequently, they pay maximum prices for their farm inputs, obtain limited credit facilities at interest rates of up to 1% per day, and receive

minimum prices for their produce. In economic terms, the result of this situation is that most farmers are perpetually financially constrained in their efforts to improve their productivity and income. In human terms, the lack of income growth means that most farmers will continue to be unable to provide an adequate diet for their families.

Although significant progress has been made in several areas in the recent past, this general lack of vitality of the nation's food production and marketing system contributes to making Indonesia one of the leading food importers in the world. Government efforts in support of food crop production have focused primarily on rice and have been successful in the dissemination of improved production technology and in increasing rice production. The rate of increase in the production of rice however has barely kept pace with population growth over the years. Production of other commodities (maize, soybeans, cassava, etc.) has declined on a per capita basis.

The challenge posed to development planners by this situation of low smallholder productivity and income, food deficits, and malnutrition is usually countered with partial solutions. Based on experience in Indonesia and several other countries, CLUSA believes that the best response to this challenge is an integrated approach which aims to improve the efficiency of the total food system, from the supply of production inputs and technology to consumption. The revitalization of Indonesia's smallholder and landless farmer cooperatives into dynamic business and service institutions through district level federation offers great potential for creating an environment for effectively dealing with the allied problems of food production, marketing, rural incomes and consumption. CLUSA has been successful in launching viable pilot projects within Indonesia based upon this concept and the Government of Indonesia has requested project replication in several areas of the country. This proposal presents a strategy for implementation of this integrated approach in four representative districts of Indonesia.

II. BACKGROUND AND PROJECT RATIONALE

A. THE INDONESIAN COOPERATIVE MOVEMENT

Prior to Indonesia achieving its status as an independent nation, cooperatives were seen by nationalist leaders as a means of liberating Indonesians from economic domination by both their colonial rulers and by non-indigenous businessmen. Consumer cooperatives were formed as early as the 1930s, and at that time prior to independence, may have been as much political as economic in their objectives. They were however exceedingly successful in their role of carrying out distribution of basic commodities in the middle of a tight economic blockade imposed by the Dutch. Following independence, and following the event from which the modern cooperative movement is dated, the Tasikmalaya cooperative conference on July 12, 1947, cooperatives grew rapidly in number.

Following the economic collapse and political explosion of the mid-sixties, existing cooperatives were screened for their political affiliations. Those with communist affiliations were disbanded and those with a true cooperative structure and purpose, approximately 14,000, of all types, remained in existence.

In the 1970s the new model cooperative (Koperasi Unit Desa or KUD), centered around rice marketing, began to emerge in and expand from Central Java. In 1973, the GOI linked these organizations as an instrumental component within their efforts to increase rice production, and utilized the KUDs effectively to distribute seed, fertilizer and pesticides, and market and process the crop. Thousands of such cooperatives were organized at this time and many were recipients of storage, milling and transport facilities either at no cost or with low-cost loans from the government, in order to encourage their participation in the rice procurement and marketing program of the government.

In early 1978, and later in 1983, two major events occurred during cabinet reorganizations which have been regarded as being of considerable importance with respect to their impact upon cooperative development in Indonesia. In 1978, the Directorate General of Cooperatives was transferred to the Ministry of Trade and Cooperatives, and placed under the responsibility of a newly appointed Junior Minister of Cooperatives, Mr. Bustanil Arifin SH who also retained his position as chairman of the Logistics Management Bureau (BULOG).

Later in early 1983, the Ministry of Cooperatives was formed and significantly expanded in size and administrative scope. Cooperative development has been upgraded in that the responsibility for cooperative development now reposes within a single Ministry and is headed by a single Minister solely responsible for the development of cooperatives.

B. GOI COOPERATIVE POLICY ENVIRONMENT/COOPERATIVE OPERATIONS

The Government has placed a substantial amount of effort, priority and financial resources into the development of cooperatives as a means of insuring a higher level of economic well being for the rural populace of Indonesia. Recent statements about cooperatives by President Soeharto in major speeches state:

"That the primary task of development is to uplift the common people from the abyss of poverty and the principle for raising the weak from poverty and destitute is through Cooperatives."

"Our aspirations for progress, prosperity and social justice will be materialized soon, if in thousands of villages were established KUD-KUD which are truely dependable and which can play a role in the economy of the villages and, when the time comes, of the nation as well."

".....We must promote and intensify cooperatives until they reach a truly dependable stage.....firmly established in the era of progress and will continue to grow in the dynamism of a modern economy beset with upheavals, and that they can operate in congruence and parallel with state-owned and private enterprises."

"Cooperatives should be a strong economic institution, in the sense of having the ability for self-management, self-growth and self development."

Stated clearly within Chapter 15, Section III: POLICY AND STEPS/-MEASURES of the GOI's fourth five year development plan is the following:

"The aim of cooperatives development is that each cooperative can become a strong economic institution and the members meeting has the highest authority, so that each cooperative can actually become an undertaking means which is capable to increase the economic activity and prosperity of its members, and will therefore become a principal means for the ecomonic development and the welfare improvement of the economically weak group."

Recent actions by the GOI have combined with other factors to comprise a favorable set of circumstances for the implementation of an integrated program designed to improve rural food systems, small farmer incomes, off farm employment generation and the nutritional state of the nation's poorest majority. A renewed emphasis on cooperatives as an institution for rural growth provides a unique opportunity for development of integrated programs geared toward eradication of poverty and improvement of nutritional levels in the rural areas.

Because of their current organization, location and developed infrastructure, village cooperatives in Indonesia constitute virtually the best vehicle to channel the efforts of the rural population towards improved food systems, rural employment generation, and increased family incomes. They offer perhaps the

only economically efficient way to reach a broadly based group of rural poor with an integrated program. There are more than 6,000 village level cooperatives which contain a membership of over 12 million rural families.

Rural cooperatives in Indonesia are structurally private enterprise economic organizations with a mandate to be run by and for the village people. Their purpose is to increase the productivity and wealth of all farmers of the rural areas. Within the GOI's Fourth Development Plan's section on Cooperatives, it is stated that "In the framework to speed up the cooperative growth.....it will be necessary to stimulate and develop the cooperation between cooperatives with private enterprises". The Plan also goes on to state "it will be necessary to increase the information/extension directed to the improvement of the cooperatives' and cooperative members' capacity in managing the cooperatives, to accumulate and mobilize funds for the cooperatives capital, to run the undertaking and exercise control on the cooperatives.....The KUD development will help the village community to stimulate the business development.....which in turn will stimulate the expansion of employment opportunities and the improvement of village inhabitants' productivity."

Problem areas however are several, as described in the following section. In their efforts to assist cooperatives and make them a more significant sector of the economy , the GOI has provided liberal capital credit, construction, equipment and commodity supply concessions that have placed operational priority within many of the KUDs upon the implementation of government programs rather than the specific needs of their membership. Although these facilities and cooperative operations have greatly assisted the government in implementing agricultural credit, input supply and commodity market stabilization, they have resulted in many areas in alienating the cooperatives from their role of specifically serving the needs of and feeling a responsibility towards their membership. A top down system of has evolved from the primaries to the national cooperative organization.

Under a program jointly financed by the GOI and the IBRD, the Cooperative League of the U.S.A. together with the Department of Cooperative's Research and Development Agency are currently close to the completion of a "Comprehensive Plan for the Accelerated Development of Cooperatives in Indonesia". The plan, to be implemented in phases over the long term, will call for significant changes in the GOI's policies towards cooperative development. These changes will include the status of district level cooperative federations, farmer credit programs through cooperatives, and business activities within the cooperatives. They will also place an operational emphasis upon the provision of services relevent to the needs of their membership.

This proposed program will attempt to initially implement the GOI policy changes as a result of the Comprehensive Planning Project in its limited locations. If and where proven viable through initial implementation at the proposed project sites, the changes

will be studied for further national replicability.

Village cooperatives in Indonesia currently, however, enjoy the unique position of being able to directly affect rural food systems from pre-planting land preparation through provision of dietary components to their people. The KUD typically undertakes one or more (in a few cases all) of the following activities:

1. Purchase of smallholder rice production and occasionally other crops.

2. Operation of a small capacity free standing rice mill unit usually milling for villagers' needs.

3. Agricultural input supply to farmers of fertilizers, pesticides and small agricultural equipment.

4. Kredit Candak Kulak-a system of low interest rate credit for small village traders.

C. COOPERATIVE MOVEMENT PROBLEM AREAS

Despite such great potential, existing infrastructure and governmental priority, a vast number of internal problems of the Indonesian Cooperative Movement remain. Rural cooperatives are not at present a satisfactorily effective force to improve the lives of the rural poor. There are both historical and technical reasons for this. A recently published report by the Department of Cooperatives illustrates twelve such internal problems and challenges:

1. The lack of ability and skill to understand the various needs of its members;

2. The efforts to meet and satisfy the needs of their members have not been fully based on economic principles which can give the maximum benefits to members;

3. A National Cooperataives System that functions as a stable, effective and efficient distribution channel cannot be materialized yet;

4. The funds, manpower and infrastructures possessed by and made available to the cooperatives cannot yet be utilized to the maximum;

5. The cooperatives themselves are not yet capable to use the various technological advances that can possibly be applied to their organization;

6. The insufficient number of executive personnel especially managers, and employees who are skilled in the field of business and have the ability to develop the whole organization of

cooperatives;

7. The cooperatives' organizational apparatus does not yet function well. This causes disharmony in the relationship between the executives, auditors, managers, and operational personnel;

8. The lack of managerial skills, particularly in the fields of planning and supervision;

9. The management information system has not been developed, thus the decision making process taken by the executives is not yet based upon complete and reliable information;

10. The absence of a pattern to develop business which can relate cooperative endeavours with the increase of new members and, simultaneously intensify their participation;

11. The cooperatives' educational and training systems are still unable to sustain the efforts to develop cooperatives;

12. The Indonesian Cooperatives Council is still ineffective as a National Organization in carrying out its task and function.

Although KUDs make a substantial contribution towards Indonesian development, they have come nowhere near their long-term potential. Currently, there is no systematic approach to remedy these problems and make cooperatives work as self-sustaining, profitable, farmer-owned organizations.

D. THE PUSPETA AND FCC COOPERATIVE PROJECTS

The Cooperative League of the U.S.A. (CLUSA) has been involved in active cooperative planning and development with the Ministry's Directorate General of Cooperatives during the last several years through the implementation of the PUSPETA Klaten and FCC Luwu Projects. These two projects, implemented in the widely diverse locations of Luwu, South Sulawesi and Klaten, Central Java have demonstrated that district level cooperative federations with financial and managerial autonomy, bottom-up organizational and planning priority, experienced and sufficiently paid management, and sound economically oriented operations can provide a wide range of viable and relevant services to the landless and smallholder farmers of Indonesia's rural areas through their primary cooperatives.

The PUSPETA Project, financed jointly through PL480 Title II and GOI funds is currently financially self sufficient, operates 23 non-governmentally subsidized business activities, and exhibits great potential for further expansion within Klaten and replication within Indonesia. These business activities include feed production, marketing and credit for beef and dairy cattle, poultry and freshwater aquaculture small farmer production, improved variety grain seed production and distribution, consumer cooperative supply and distribution, and handicraft input supply

and marketing. KUD membership, business volume and operational profits have all more than quadrupled since the project's inception and significant employment generation specifically attributable to the project and its activities has taken place. A pre-secondary cooperative is firmly in place to perpetually provide viable services based upon the economic requirements of the kabupaten's rural area.

Based upon the Klaten experience, the Minister of Cooperatives has recently requested replication of the FCC and PUSPETA projects in sixteen other areas of Indonesia. Although Cooperative Service Centers (PPK) and Primary Cooperatives (KUD) exist throughout the areas where the proposed program will operate, none can be classified with the successful organization described above. The PPK are considered branch operations of the provincial level cooperative organizations (PUSKUD), which oftentimes conduct their considerable business activities without reference to the kabupaten level PPKs or the kecamatan level KUDs. The PPKs have no financial or managerial autonomy, no capital resources, and no dictate to plan and implement activities other than those provided from the province (PUSKUD) down. Their primary and oftentimes only function has been to insure the steady flow of fertilizer for government sponsored credit programs.

E. THE UPLAND AGRICULTURE AND CONSERVATION PROJECT

The GOI places high priority upon area development programs in "critical poverty" areas which are concerned with increasing food production and the incomes of rural farmers. It is significant that these areas of poverty correlate closely with those watershed areas which, due to high population densities and the consequent introduction of sedentary agriculture on marginal lands, are experiencing rapid degradation of their soil and water resources base. With increasing population pressures, over exploitation of resources, and soil erosion, many people in the upland areas are experiencing absolute decreases in their standard of living from an already poor base. As a consequence, the GOI, AID, and the IBRD have initiated through area development projects a range of agricultural and conservation programs.

Both of the two new areas proposed for the Cooperative Agrobusiness Enterprise Development Project are situated within upland agricultural areas as described above. Both are also centrally located within the joint GOI/USAID/IBRD Upland Agriculture and Conservation Project (UACP), scheduled to begin operation in early 1985. The project's strategy, as contained within its project document is "to support experimentation with alternate approaches to the upland agricluture and conservation problems based on decentralized-unified management of farming systems services which strengthen the capacity of upland communities to increase on a continuous basis the productivity and sustainability of their farming systems practices" (UACP Project Document).

As with previous upland conservation programs, a critical element to the success of the UACP will be the project's ability to deliver the inputs necessary for the systems recommended through applied research and agricultural extension, and market their eventual surplus. The failure to insure such critical input supply and marketing services, especially on an institutional basis, has been greatly detrimental to the eventual impact of these projects. The PUSPETA proposed for implementation within these areas will be designed to attack these problems of input production and supply, and crop marketing in a manner similar to its current Klaten operations.

F. BACKGROUND SUMMARY

The strong commitment by the GOI and its Ministry of Cooperatives in support of CLUSA/Indonesia projects and widespread replication of several of their aspects, the GOI's clear record of working towards food self-suficiency, the great potential of village cooperatives in Indonesia, the implementation of the Uplands Agriculture and Conservation Project, and the established presence of an experienced U.S. cooperative development organization combine to create a favorable set of circumstances for helping improve the lives of the rural Indonesian people. The imminent completion of the Comprehensive Planning Project and the GOI's corresponding desire to test new cooperative approaches through the proposed project further adds to the importance of the projects undertaking. Finally, the substantial commitment by the GOI of Title I funding to implement the proposed project attests to the priority it has placed upon implementation. These circumstances offer an exceptional opportunity to implement an integrated development program which focuses on the areas of food crop production, storage, processing and marketing, nutrition, employment generation, family income, and long-term economic growth in rural Indonesia.

III. OBJECTIVE

The goal of the proposed project is to help improve indigenous capacity to fulfill the needs of the rural Indonesian people in the areas of food and nutrition, family income, employment generation, and economic opportunity.

The objective of the CAEDP is, through replication and intensification of the current PUSPETA Project, to develop the capacity within the cooperative system to plan, organize and implement programs which will provide comprehensive production and marketing services for food crop, livestock and fishery production to small farmers who have potential for increasing their production but have not previously benefited substantially from such services.

This will be achieved through the transformation of district level cooperative service centers into member service organizations providing an effective range of relevant, viable agrobusiness services to smallholder producers through their primary cooperatives. The project will focus upon the provision of business services in the areas of input supply, credit, processing and marketing to support smallholder production where these services are either non-existent, technologically yet to be introduced, or greatly inadequate and where their viable provision could greatly enhance small farmer production and income increases, create new markets, employment and production opportunities.

The system includes the selection, production and delivery of inputs required for specific crop, livestock or fishery combinations, coordinated farmer training in the use of these inputs and training for the proper management of credit by participating farmers where applicable. It includes the provision of marketing services based on prompt payment to the farmer for his produce combined with proper storage and handling of produce by cooperatives. The system to be implemented requires training for local cooperatives' staffs and assumes that the current activities of the cooperatives will be expanded in terms of services provided, clientele, and crop orientation. These modifications and the cooperative system, along with their further rationale, are discussed in greater detail in sections which follow.

The program would respond to the opportunity created by the current evolution of circumstances conducive to implementing an effective rural cooperatives development program. Its purposes and activities would correspond closely to the GOI's fourth Replita program for the development of cooperatives in Indonesia on a strong multi-sectoral economic basis. It would enhance, instrumentally affect and impact synergistically with the implementation of the joint GOI/IBRD/USAID Uplands Agricultural Conservation Project. Finally, the project outlined within this document would give tangible substance to three of the central themes articulated in the USAID/Indonesia Country Development Strategy Statement (CDSS); namely, increasing food production and

rural productivity, especially the agricultural productivity and incomes of the poor upland farmers; strengthening the capacity of local institutions to plan and manage development programs which reflect the specific priority concerns and needs of their own communities; and accelerating human resource development in fields related to Mission program activities.

In a wider context, the proposed program's implementation would directly affect the most pronounced problems common to cooperatives in Indonesia, viz. the lack of skilled manpower in management and administration, the lack of entrepreneurial skills and attitudes, the lack of equity and working capital, and the lack of effective control of all resources. Within its sectoral areas over a period of five years, the proposed program would aim to further demonstrate methods of cooperative development that could be adopted by the GOI for national application.

IV. PROPOSED PROGRAM

A. PROJECT PARTICIPANTS

The primary beneficiaries of this project are to be those smallholder or landless farmers who have been characterized as less progressive but who also have the potential to become progressive farmers, i.e. those who have the capacity to utilize credit and modern farming techniques, and diversify their production. Generally, these are farmers who consume most of their production and who have not benefitted from integrated cooperative credit, supply, production and marketing services before.

Project participants depending upon their location and environmental and economic circumstance will be elligible for a variety of services through the project. In addition to improved availability of general input supply and marketing services to rice and secondary crop farmers, the project will design specific credit, training, supply and marketing service facilities to agrobusiness and off farm employment activities innovative to each respective area. In this way, farmers will have the opportunity to intensify or diversify their current operations and increase their incomes.

Project participants will become full KUD members by paying its share capital requirements. It will be conditional that full payment of entrance fees and share capital contributions will not be mandatory at the time of entrance into a program and this will not affect full membership status. Participating farmers will sign agreements allowing KUDs to deduct entrance fees and share capital contributions from produce payments at times of harvest.

B. PROJECT LOCATIONS

The Department of Cooperatives and CLUSA have designated the following additional PPKs to participate in the project:

Province	District	PPK
East Java	Malang	PPK Malang
Central Java	Boyolali	PPK Boyolali
Central Java	Klaten	PPK Klaten
South Sulawesi	Luwu	PPK Mangkutana PPK Bone-Bone PPK Walenrang PPK Luwu Selatan

The areas in Central and East and Java are for the most part involved in agricultural pursuits and typify the rural situation of overpopulated Java with extremely heavy rural population densities of between four hundred and two thousand people per square kilometer. Population densities nearly double when divided by the square kilometers of agricultural lands available and exceed 3000 people per km2 in some of the more arable project subdistricts. Each of the districts contain substantial upland areas classified by the GOI as "critical lands". Kabupatens Malang and Boyolali will also be the initial focus of implementation of the first phase of the Uplands Agriculture and Conservation Project in East and Central Java respectively. Table I illustrates land utilization in each of the three kabupatens.

TABLE I

Land Utilization (ha): Kabupatens Malang, Klaten and Boyolali

Type/Kabupaten	Malang	Klaten	Boyolali
1. Irrigated Paddy	46,848	34,588	12,343
2. Rainfed Paddy	6,158	-	11,837
3. Upland Grain Crop	136,106	25,824	32,571
4. Tree Crop	28,389	32	576
5. Forest	113,772	1,259	15,053
6. Homes/Yards	37,124	-	23,506
7. Fish Ponds	1,780	447	-
8. Other	5,148	3,406	8,735
Totals	375,325	65,556	104,621

Sources: (1) Kantor Bappeda Dati II Malang
(2) Kantor Koperasi Dati II Boyolali
(3) Kantor Pemda Dati II Klaten

Kabupaten Luwu in the province of South Sulawesi is, however, much the opposite in terms of population density, land utilization and rural productivity. The kabupaten, with an area of over 25,000 square kilometers has a population density of approximately 20 persons per km2. Over 12,000 families of Indonesia's landless poor have been resettled through GOI transmigration programs from overcrowded areas in Java, Bali and Lombok to the district's unutilized agricultural lands. The kabupaten contains over 270 thousand hectares of potential agricultural land, with approximately 40 percent of it irrigable. Only approximately 40,000 hectares are however currently under production. Major infrastructural development projects undertaken in the recent past have removed previously severe obstacles to increased agricultural production. Problems however with agricultural credit and input availability, lack of farm mechanization, and seasonal crop marketability continue to hamper Luwu's agroeconomic development and completely stifle its great aquacultural potential.

Smallholders are predominent in all four districts. The average farm family holding in the districts located within Java is less than one half hectare while that in Luwu is somewhat higher. Table II lists farm family populations in each of the areas and existing cooperatives by type.

TABLE II
EXISTING COOPERATIVES BY TYPE

Data/Kabupaten	Klaten	Boyolali	Malang	Luwu
Farm Population	271,361	352,528	1,160,842	378,032
Coop Member Families	56,799	41,685	176,075	-
KUD Member Families	39,766	31,736	99,555	10,435
No. of Cooperatives	108	88	342	73
No. of KUDs	35	21	40	34
Ann. Turnover(Rp000,000)	14,103	4,947	49,139	3,471

Sources: Kantor Koperasi Kabupatens Luwu, Klaten, Malang and Boyolali

C. PROJECT FINANCING

The combination of monetized PL 480 Title II Food for Peace or Section 416 with GOI allocated Title I funds are felt most appropriate in utilization for financing the proposed project as it is geared to attack the cause of the chronic nutritional problems for Indonesia's poorest majority. The utilization of Title II or AA 416 funds for a limited portion of the project's financing would enable CLUSA and the GOI to apply the resources flexibly to the specific local needs of the cooperatives and their membership, and to avoid the inevitable delays and financial inflexibility in administering GOI development project budgets for specific essential line items. The office of the Minister for Cooperatives has expressed to CLUSA its desire for this type of assistance to be channeled directly through CLUSA to cooperatives and cooperative programs and recognizes the need for the project's ability to respond in a timely and dynamic manner to the widespread opportunities created by the existing momentum for cooperative development.

The use of funds generated by the local sale of Title II or AA 416 resources to support village cooperative agrobusiness development is considered to be a creative application of those resources with great potential for multiplier effectiveness well beyond that of normal programming channels. It would promote rural economic and community development in the critical area of rural food systems, and help Indonesia's smallholder and landless farmers to produce sufficient food for themselves. During implementation, the nature of the import and sales mechanism would be closely controlled and serve to ensure the full value of the food

commodities is expended on program needs.

As heretofore mentioned, the Cooperative League of the U.S.A. is currently implementing a similarly funded and implemented project in Klaten, Central Java, Indonesia. The PUSPETA project's ability through the Title II funding mechanism to immediatly respond to the urgent requirements of the area's farm population has been instrumental to its significant achievements to date. The Farm Cooperatives Center Project in Luwu, South Sulawesi is conversely financed through a USAID government to government loan program. The latter project has experienced extreme financial and administrative difficulties which have detrimentally affected project implementation. The extremely long lead time required through budgetary stages, later inflexibility in making project related expenditures, and the many unforseen administrative expenditures involved have rendered the project partially unresponsive to urgent seasonal small farmer requirements and less than optimally conscious of its non-governmental enterprise development role.

Through the success of the PUSPETA Project funding systems methodology used via the full monetization of Title II commodities and its eventual relevant and immediate utilization, and the difficulty experienced in the FCC Luwu Project's implementation under a Government to Government loan disbursement apparatus, CLUSA and the GOI feel it essential to the project's success that PL 480 Title II or AA 416 funding be the vehicle for a sufficient portion of the project's financing.

The Department of Cooperatives and the National Development Planning Agency (BAPPENAS) have committed six million dollars of FY 85 Title I funding to the project's implementation. This represents approximately 70 % of the project's total financing requirement of $8.691 million. GOI Title I funds will be utilized for all of the project's construction, land procurement, equipment, machinery and vehicle procurement, its working capital and training requirements, and the creation of a Cooperative Rural Enterprise Development Fund. Monetized Title II or AA 416 funding will be utilized for the project's required technical assistance and a portion of its initial salary subsidies.

Title I funding, due to the somewhat stringent regulations governing its disbursement, will be utilized for the above mentioned capital outlays due to their financing nature. The construction of facilities, procurement of land and, disbursement of training funds can be undertaken within governmental budgetary guidelines without seriously delaying or affecting the project's implementation. Title I funds will be made available to the project through the Department of Finance's Directorate of Investment Capital (Direktorate Dana Investasi). The funds will be placed into a project Capital Investment Account (Rekening Dana Investasi) where they will be disbursed to the project treasurer according to a schedule of project withdrawls.

Remaining project expenditures however will require flexible financial availability to respond effectively to the specific day to day needs of project implementation as described above.

Initial consideration by the GOI has been given to wheat, as a first preference and then soybeans as the most appropriate commodities to be monetized for the AA 416 or Title II financed portion on the basis of consumption and need in the Indonesian market. The actual commodities to be shipped will be open to further negotiation between AID, USDA, the GOI, and CLUSA.

Wheat is the commodity of preference due to Indonesia's substantial annual consumption and corresponding import increases. The yearly amount required would be less than one percent of projected annual imports and thus could be imported without interfering with normal marketing requirements. BULOG, the GOI Logistics Management Bureau is responsible for all basic food importations and for releasing these stocks into marketing channels as a price stabilization measure. As all imported wheat is sold directly to three local flour mills, none would go directly into the consumer market. BULOG would receive the imported wheat, and upon selling it to the flour mills as with the previous project, deposit the proceeds into a special CLUSA bank account for the specific purpose of funding the proposed project.

The Ministry of Cooperatives has preliminarily concurred with utilizing the same methodology for price determination of the monetized Title II or AA 416 commodities. CLUSA, BULOG, and USAID/Indonesia would agree on a landed market price for each shipment based upon the world market price at the time of the shipment. BULOG would pay an amount equal to what it would pay for a similar purchase through regular commercial channels.

V. PROJECT ORGANIZATION AND MANAGEMENT

A. CENTRAL MANAGEMENT

The Cooperative League of the U.S.A. (CLUSA) and the Department of Cooperatives' Research and Development Division (DCRD) will share the responsibility for management and coordination of the project. To ensure the continuity of project funding and the fulfillment of USAID administrative and reporting requirements, the physical locus of project management and administration for Title II or Section 416 funded expenditures will be within CLUSA. Likewise, the administrative and reporting requirements for the disbursement of the Title I funding through the Rekening Dana Investasi system will be undertaken by the Department of Cooperatives' appointed Project Management Unit.

The DCRD is seen as the appropriate Department of Cooperatives implementation agency through Ministerial Instruction No. 5 of 1984. This instruction's Chapter 5, Section 3 states that the Head of the DCRD will have the responsibility to "implement, evaluate and provide guidance to pilot and example projects to accrue, test, prove and prepare data concerning several systems or technical methods that have yet to fully become operational systems or policies and are still within their research and evaluation stage." The DCRD is also the counterpart implementation agency of CLUSA in the Comprehensive Planning Project.

An Inter-Directorate General Coordinating Committee made up of the following Officials or their designees will be organized to together with CLUSA provide general oversight to project operating officials:

Director General of Cooperative Business Affairs

Director General of Cooperative Organizational Guidance

Head of Cooperative Research and Development Division

The Committee will be responsible for:

(a) Establishing General Project Policies

(b) Coordinating Project Activities of Involved Bodies

(c) Conducting Periodic Reviews of Project Progress

(d) Reviewing the Results of Periodic Project Reports

The Committee will convene at the call of the Project Management Unit described below.

The executive arm of the Committee will be a Project Management Unit composed of the CLUSA Resident Representative, the Department of Cooperatives' Foreign Project Coordinator, and the Project Development Officer. The PMU's responsibility will be to coordinate the implementation of all project related activites occuring at the national level.

The DCRD will appoint a Project Development Officer (PDO) at the national level to act as a full time counterpart to CLUSA specifically for the implementation of the CAEDP. The PDO will, in addition to acting as a liasion between the DCRD, CLUSA, and the field project organizations through his participation with the PMU, assist in national level project-related administration and act as an interministerial liasion in Jakarta.

To insure sound operational integration with the Uplands Agricultural Conservation Project in Kabupatens Malang and Boyolali, the PMU will maintain close communication with the National Interministerial Policy Committee of the UACP. The principle task of the UACP Interministerial Committee would be to put in place the overall policy framework that governs the execution and reviews the annual progress of the project. Overall guidelines on the direct participation and role of the PUSPETA organizations in Kabupatens Malang and Boyolali will emanate from the committee as the Uplands Project is implemented.

B. PROVINCIAL LEVEL MANAGEMENT

At the provincial level, direct project participation by the Provincial Cooperative Officer will be discretionary since activity directly connected with the project will be concentrated at the district and subdistrict levels. The provincial level offices, however, will assist the Project Management Unit with project related problems that involve areas beyond district jurisdiction.

C. DISTRICT LEVEL MANAGEMENT

A Temporary Advisory Board (TAB) be established for each district composed of the following participants:

Project Development Officer

District Cooperative Officer

Local Government Economic Section Head

Local Cooperative Council Chairman

CLUSA Representative

The Board will meet on a bimonthly basis with the Project Development Officer serving as Chairman. The Board will act as a local advisory body and initially possess organizational manage-

ment authority for the PUSPETA entities.

As local primary and secondary cooperative management capability is developed within the proposed PUSPETA framework, a joint primary cooperative committee (Panitia Bersama) will be formed and consist of the PUSPETA management and a representative designated by each KUD. The committee will meet on a bimonthly basis and primarily function as a body for the coordination of the project's services and activities with the necessities of the small farmers through their cooperatives.

In addition to the above function, the encouragement of such participation by the primaries into the planning and provision of the PUSPETAS' services will also serve to implant a feeling of grass roots participation into and serve as a practical training ground for the management of what will eventually become their user-owned entity.

Field operations will be centered around the seven PPK and 130 existing KUD within the project areas. PPK managers will assume responsibility for the operational aspects of the program while existing KUD managers and operational staff will handle the increased services to members.

The National Pusat Pelayanan Koperasi Program has been firmly established in nearly all the country's kabupatens. In the program's target areas of Malang and Boyolali, the PPKs have operated for a period of approximately three years and have received office and transport facilities from the GOI. Thirteen staff have been trained and placed at the PPKs and have received nearly total salary subsidy from the GOI since inception.

The current status of the PPKs is that of a Project Unit. It was originally planned that the PPKs would eventually operate as branches of the provincial secondary cooperative (PUSKUD) and be financed eventually through increased PUSKUD profits due to PPK impact upon its operational efficiency. Experience has however shown that this may either not be possible or require a much more lengthy project implementation life than originally envisioned.

National level policy review on this issue is currently taking place and several aspects of experimental kabupaten level institutional organizations such as PUSPETA are seriously being studied for replicability.

The Department of Cooperatives, as with the PUSPETA project, would, through a working agreement, sanction financial and managerial decision making autonomy at the PPK (kabupaten level). This would be achieved through the TAB's creation and the granting of PMU status to the PPK organizations.

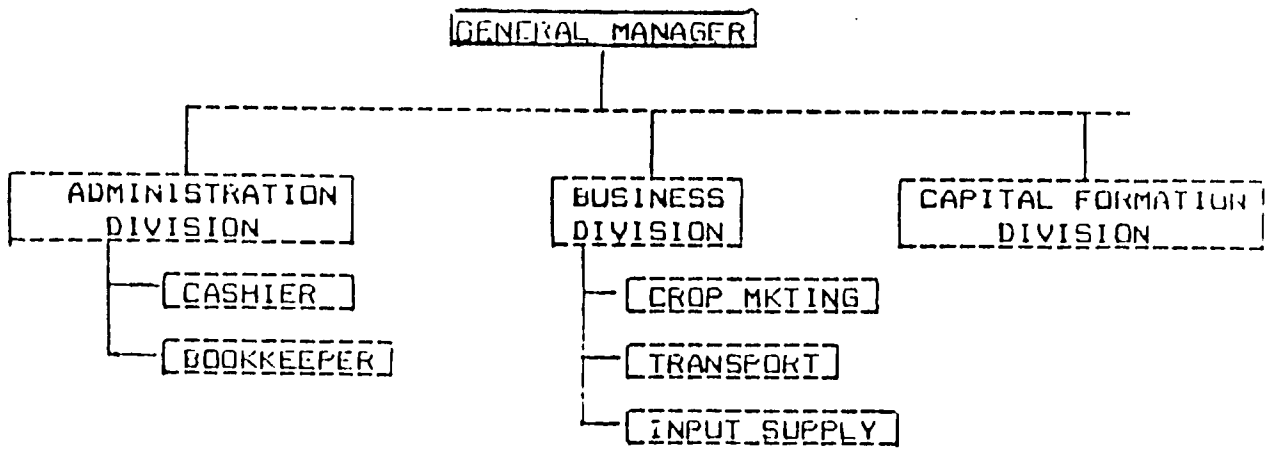
In addition, the PPK through its financial and managerial autonomy and its PMU status will be permitted to transact business with KUDs, the private sector, and parastatal consumer goods (BULOG), fertilizer (PUSRI) and pesticides (PT PERTANI) suppliers

under its own name. Profits accruing as a result of operations will either be reinvested in additional PPK investments or be divided among member primary cooperatives. To facilitate such business operations, the Department of Cooperatives will also assist the PUSPETA in obtaining additional long term working capital loans (usually six years including two one-year grace periods) under their PMU status and from the Department of Finance's Directorate of Investment Funds.

As with the current Luwu and Klaten Projects, the enhanced PPKs proposed through this project will be long-term and pilot in nature. Their future post-project status will thus depend substantially upon future government cooperative policy and in their performance in mobilizing project area KUDs as grass roots organizations with effective business operations and a demonstrated potential PPK management capability. As previously mentioned, the overall project goals will thus place most emphasis upon the cooperative sector's ability to provide essential services to the target beneficiaries and to achieve the management and operational levels required for the long-term, viable provision of services.

The following illustrates the current organizational structure of the PPK kabupaten level model existing in the project locations:

PPK ORGANIZATION STRUCTURE



In addition to the above, each PPK has a typist, driver and guard, thus totalling 13 employees. To insure efficient operations, several additional staff will initially and at later phases be required at each PPK. The pattern of each PUSPETA's staffing requirements will be according to each area's particular operational services planned and will be enumerated within the project's budget.

VI. PROJECT COMPONENTS

A. STRATEGY

The basic strategy of project implementation in the targeted areas will be the creation of a cooperative structure that will be responsive to the needs of the small farmers of the locality. CLUSA's experience in Indonesia through the Klaten and Luwu Projects has demonstrated that to attain a responsive cooperative entity, three main conditions must initially be met:

1. The cooperative must have the managerial and administrative capacity and entrepreneurial incentives to plan, initiate and implement the wide range of activities that its membership requires. For the targeted PPKs, this most likely means the recruitment of top-level, experienced and qualified management personnel from the private sector and the provision of salaries competitive with those of the private sector. For the targeted primary cooperatives, this will require initial intensive training activities for general administrative, accounting and organizational development and, later, technical training in specific areas of business.

2. Sufficient long and short-term capital must be made available to the project to initiate the planned business activities and develop the infrastructure required for their implementation.

3. The membership of the primary cooperatives must be broadly based and educated in the role and functions of their cooperatives, and the system must provide significant economic benefits to justify their support through business patronage.

CLUSA's implementation methodology will, therefore, initially focus upon the following three critical areas: (1) the development of qualified management and administrative capability within the cooperative sector in the project areas; (2) the initial availability of long and short-term capital resources to finance operational expansion and the development of a system guaranteeing its continual availability; and (3) the provision of membership training to enable broad based participation in the management and business activities of the cooperatives.

Through CLUSA's PUSPETA Klaten experience, these tasks will be accomplished most efficiently through the development of training and business activities around a three-level cooperative structure within each targeted development area. The basic units of this structure will consist of:

(a) small farmer member groups of around 15-30 individuals organized around a common economic activity or service provided through the cooperative structure;

(b) existing primary cooperatives (KUD) at the village level;

(c) The Cooperative Service Center (PPK-PUSPETA) to act as a pre-secondary organization providing assistance to the primary cooperatives.

To insure the close relationship between the critically important aspects of management training and membership education, these activities will be designed around the development of cooperative business activities. Within the initial trial run/on-the-job training period of the restructured PPK organizations, priority will be placed upon enhancing, through more efficient administrative and operational methodologies, the services currently (albeit less than optimally) implemented by some of the primaries in the target areas. These services will include:

1. The supply of fertilizers, seeds and pesticides to smallholders through their primary cooperatives.

2. The management and administration of the Sugarcane Credit and Production Intensification Scheme's input supply, planting, harvesting, transport and repayment operations.

3. The efficient supply of a diversified line of consumer goods to primary cooperative stores to insure a non-seasonally associated source of income.

4. Assistance in the rice marketing operation through limited financial, processing and transport assistance.

5. Expirimental secondary and perishable crop procurement, processing and marketing operations.

6. Initial livestock concentrate feed marketing.

At that time, the project management will further research plans for specific subprojects and their viability and relevance to the proposed target areas. It will then initiate the implementation of capital asset acquisition and construction activities as planned by this document and reinforced through further study, field trial and economic circumstance. As management capabilities are increased and new technologies are tested in pilot areas, and as farmer participation and service adoption increases, additional project activities will be defined and developed into viable businesses.

B. APPROACH

In addition to the strategy described above, the project will focus upon one subsector in each of the target areas. Within the three districts located on Java (Malang, Klaten and Boyolali) the project will concentrate upon an integrated service approach from the production of secondary crops (and utilizable crop residues) to marketing and processing. The project will provide farmers

with an innovative, economically viable technological package for year-round feed production and will create a cooperative market infrastructure to guarantee poultry, beef and dairy production profitability to project participants.

Operational concentration within the FCC Luwu project will be further placed upon the area's aquacultural production sector. The project will, through the establishment of a tiger prawn hatchery operation and the corresponding provision of training, extension, credit and marketing facilities, remove the remaining barriers to increased production and incomes in a marketing environment of virtually limitless potential.

Within each of the two areas subsectors, several specific subprojects have been identified and designed to operate compatibly with existing and future Kelompok-KUD-PUSPETA operations. As these subprojects achieve viability or are judged to be non-viable due changed economic or political circumstances, the flexibility of the project will enable the development of new subproject activities within or outside these sectors.

The two subsectors (and within them the several individual but interrelated subprojects that have been identified) were chosen primarily to focus project efforts upon longstanding and critical problems of the respective areas that, if resolved, have the potential to provide a substantial lift to small farmer incomes, productivity, and nutrition while, at the same time, further testing a cooperative development model that is currently showing great potential. Under further test, will be an approach that integrates technology, credit, production and marketing based upon a comprehensive understanding of production and marketing relationships, critical linkages between the local smallholder grain producer and his livestock production counterpart's input supply requirements. The understanding is driven primarily by demand, beginning with the well defined export shrimp and local livestock markets, extending back through the input, finance and market supply line to the small farmer producer.

The subprojects, rather than sequentially overcoming constraints, will incorporate simultaneous actions at many points in the supply to market chain. These actions will not be interdependent, but each will be designed to have impact upon its own. When taken together, however, all of the activities will be mutually reinforcing, multiplying the effects of all subproject activities. Exhibit 1 illustrates the principal organizational relationships of these actions.

The project is designed for interventions to impact upon the cooperative sector whenever solutions have not been adequately provided by the government or private sector. The coordinated interventions will be managed from outside a governmental line agency, but within the framework and purview of existing governmental monitoring and policy review, providing an operational base that can affect Ministry of Cooperatives decisions in support of cooperative sector development.

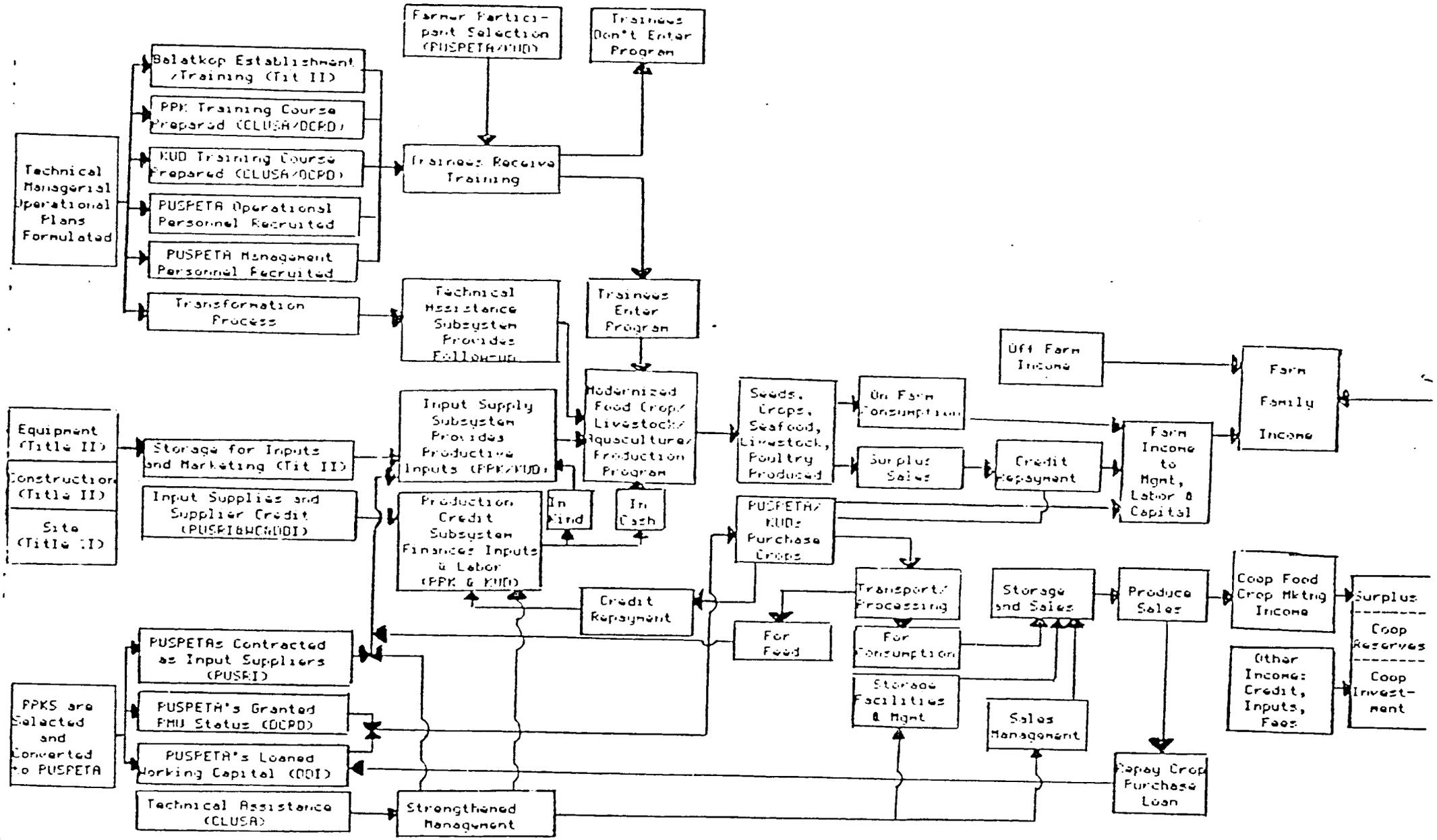


Exhibit 2: Principal Nodes and Relationships
Cooperative Agrobusiness Enterprise Development Project

Subprojects span a wide range of economic circumstances and opportunities. The secondary crop/livestock feed production and marketing subproject will begin in areas having intensified secondary crop research and extension assistance under the USAID/IBRD/GOI Upland Agricultural Conservation Project. These are areas of established livestock and secondary crop production, (with relatively very low yields in both), no secondary seed crop availability, an extremely low utilization of available feed technologies, and pronounced dry season variations in feed availabilities and prices. The tiger prawn production and marketing subproject begins with a well-defined and seemingly limitless export market, and moves backwards to problems of fry supply.

While significant implementation activities are focused upon the two subprojects, the small core of CLUSA advisors and their DCRD counterparts will insure that the proposed cooperative organizational model is effectively tested, will provide overall management guidance and document the lessons learned, insure coordination among the project activities, and will raise policy issues to the appropriate levels for resolution.

The subprojects selected for initial implementation thus represent promising initial interventions in regard to both impact and further testing of the current PUSPETA cooperative model across a wider area and differing economic environments. Their selection was based upon a specific set of criteria that will also be used to measure the potential of future subproject possibilities. These criteria include (1) subproject viability; (2) potential beneficiary impact; and (3) subproject context.

Finally, a cooperative rural enterprise development fund (REDF) will be established to finance innovative and rural employment generating business operations identified during the life of the project. The REDF will be administered by the Project Management Unit and function as regenerative seed capital credit to either enable the expansion of existing viable operations or the start of newly identified high potential operations within the project's guidelines.

The PUSPETA model is designed to play its role in a dynamic economic environment in which production and market relationships will change during the life of the project. The areas of implementation are within economic sectors in which some decisions are left to the discretion of the farmer and his cooperative organization and some are not, with some degree of uncertainty between the two categories.

Based upon the criteria stated above, the subprojects chosen to be the focus of the early efforts of the project are indeed likely candidates for successful development. The PUSPETA model will find its strength in the approach taken toward the development of these subprojects (as well as others that may be initiated at later stages) as these will become the vehicles through which a significant portion of the project's total benefits will be provided. It must be emphasized, however, that the critical

element that will guarantee the success of the project is the organization of a viable, locally-owned and managed business entity capable of responding to the economic needs of its targeted beneficiaries. The overall project depends on the success of carefully planned and implemented subprojects.

VII. SECONDARY CROP/LIVESTOCK FEEDING PRODUCTION AND MARKETING SUBPROJECT

A. Background

i. Production-Secondary cropping systems utilized throughout the three districts proposed for this subproject are quite diverse and usually include upland area intercropping patterns reflecting differing agroclimatic conditions, agricultural input availability and what have become fairly stabilized seasonal market conditions.

Depending upon an area's environmental conditions, three general types of secondary crop upland farming are predominant. Where elevations exceed 700 meters and precipitation rates are greater than 3000 mm/year, farmers devote much of their activity to estate and horticultural crops such as cabbage, cucumber, clove and coffee. Preferred livestock are dairy cows and, where found, cultivated patches of napier grass correspond.

The second general system of upland farming utilized occurs in areas with precipitation rates between 2,500 and 3000 mm/year with an eight to nine month rainfall distribution. These areas usually occur at elevations between 250 and 700 meters above sea level and are common within the three project areas. The general pattern in these areas is to have two intercrop plantings per year. At the onset of the rainy season, the first planting cycle commonly includes an intercropping of cassava, upland rice and maize. The second cycle will then frequently include interplanted corn and peanuts along with the first cycle's yet to be harvested cassava.

The major characteristics of the third type of project area upland farming are precipitation rates below 2,500 mm/year with rainfall lasting seven months or less. As with the second system, these areas generally utilize two planting cycles with intercropped cassava, maize and peanuts, or corn monoculture dominating the first cycle. Farmers will then usually intercrop maize and soybeans, or maize and peanuts or monoculture soybeans.

Accurate yield data for these areas is difficult to obtain due to intercropping system prevalence in these areas and governmental data not differentiating yields from irrigated and non-irrigated lands. Crops monocropped on irrigated land would normally yield much higher than those intercropped in the upland areas. Existing data on all areas however report very low yields for each crop under this generalized reporting format.

Table 3 lists areas currently planted under maize, soybeans and peanuts in the project areas.

Table 3: Project Area Secondary Crop Production Data (ha)

District	Maize	Soybeans	Peanuts
Malang	87,665	2,445	2,958
Boyolali	33,276	4,373	3,948
Klaten	7,528	3,321	1,925

Sources: Department of Agriculture, Central Java
BAPPEDA, Malang, East Java
Pemdad Dati II Klaten

Upland areas within two of the three districts are also central areas of dairy cow production in their respective provinces and also supply a significant portion of domestic milk production. The industry virtually began in these areas between 1979 and 1981 when fresien holstein heifers were provided to landless or smallholder upland farmers through Presidential Aid and BRI-Cooperative credit programs. Table 4 lists dairy cattle population in the three project areas.

Table 4: Dairy Cattle Population/Production in Project Areas

District	Heifers Provided Under Programs	Current Heifer Population	Production ltrs/day
Malang	3,750	20,978	68,011
Klaten	1,019	1,200	4,600
Boyolali	3,283	5,426	19,100

Sources: Kantor Koperasi Boyolali
Kantor Koperasi Klaten
Kantor BAPPEDA Malang

ii. Secondary Crop Seed

Maize is one of the most popular and by far the most cultivated of the several traditional food crops produced by the project area's upland smallholder. Due to current producer taste preferences, the production of local, low producing, short maturing white varieties predominate. Yields from non-intercropped plots are estimated to range from 600-1,000 kgs. per hectare.

Much higher yielding improved (Arjuna, Geja Kertas, Harapan) and hybrid (C1) yellow kernel varieties are currently available that require an additional twenty day planting season. Extensive research and numerous hybrid seed trial plots by the Department of Agriculture with relatively low fertilizer application in fifteen areas of Java have yielded as high as 10.5 tons per hectare with an average of 5.7 tons. Even when compared with the intensified methods of production for the improved Arjuna variety, the hybrid, with Rp. 15,000 increased input costs, produced an average incremental return of Rp. 332,000 per hectare.

Also widely grown and traditionally intercropped in several of the upland areas, peanuts have become a reliable source of income when grown with improved practices and have offered relatively higher returns than other pallawija crops.

High yielding peanut seed is as yet unavailable in nearly all areas of Indonesia, however, its adoption and utilization offers the potential of dramatically increasing peanut yields. Yields for most areas of Java are reported at approximately 700 kgs. per hectare. The Department of Agriculture has recently demonstrated that the two currently promoted varieties (Anoa and Rusa) can more than double average yields (to 1300-1500 kgs/ha).

Farmers generally purchase low quality seed from traders which has a low rate of germination and offers low yields. The seed, due to the crop's limited seasonal compatibility is generally purchased by farmers during periods of high prices and scarcity. At harvest, the farmer will normally contract his harvest and sell through the tebasan system. Prior to threshing, the unshelled nuts are sold to a private trader and the plant is sold locally as an inexpensive livestock forage.

The traders then dry, shell, manually grade and package the nuts for wholesale marketing. Usually, this manual grading will separate a portion of the larger untarnished nuts for eventual seed resale to farmers.

Several varieties of soybeans are grown (often times simultaneously) for resale throughout the project areas. Its relatively high resistance to drought and year-long marketability make soybeans a crop of necessity in several project areas during specific seasonal periods. Early maturing varieties such as Lokon appear to currently offer the best potential for higher yields with good husbandry practices, fertilization and pest control. As with other secondary crop seed, quality certified soybean seed is rarely available. When available, it is often for government related credit programs and usually not sufficiently available to fulfill required quality standards and program input magnitude. Germination is often low due to poor handling methods and the high split, brown, black, moldy and bicolored grain content problems associated with rainy period harvests. The very few seed suppliers involved with soybean seed production conduct sorting and grading operations manually and at the farmer producers' homes where it is frequently mixed with other varieties.

iii. Dairy/Beef Cattle Feeding

As previously mentioned, dairy farming is a principal economic activity of many of the project area's small farmers. A 1983 study conducted by the Faculty of Animal Husbandry of Gajah Mada University entitled "The Impact of Imported Dairy Cattle on Prospects for Development of Animal Production by Small Farmers and Development of Village Dairy Cooperatives in Central Java" put forth the following characteristics of the province's small-

holder dairy farmer:

1. Their main occupation is farming and they have low levels of education and reading and writing skills.

2. They are five-member families, and own small amounts of land.

3. They own 1.6 to 2.7 dairy cows and have less than three years experience in dairy farming.

4. Their knowledge and skills are insufficient and they have never attended any course in animal husbandry.

5. Forage requirements are generally only enough to meet maintenance requirements and concentrate feed amounts are still too low causing low production.

6. Lactating period milk production of less than 6 liters/day was far below the genetic potential of the cows.

The same report provided information on the feeding of the area's dairy cattle and their offspring. In general, the farmers did not provide different types of feed for cows and calves, or even between dry and lactating cows. Forages usually include mixtures of field and planted grasses and were fed together with concentrates and seasonally available crop residues. The current feeding programs and the great difficulty farmers faced in obtaining sufficient forage in the dry seasons were felt to preclude the possibility of ever bringing the animals and their offspring to their productive and income producing potential.

The PUSPETA/Klaten project's Livestock Research, Training and Demonstration Center has in its initial year of operation tested over thirty smallfarmer feeding programs for dairy and beef cattle utilizing offspring of locally available cattle. Through such testing, the Center has identified several programs, which, when combined with better animal husbandry practices, optimize profitability under a variety of production conditions. Some of the Center's programs have increased yields over one hundred percent with marginal feed cost increases and the utilization of over ninety percent locally available secondary crops and their residues.

The Center has also conducted research on feeding programs for the beef fattening of the currently neglected dairy cow bull offspring. A program currently being tried has resulted in an average daily gain of one kilogram and feed costs of less than one third the liveweight price of the animal.

The PUSPETA Klaten Project has adequate feedmill and grain and forage storage facilities to immediately commercially disseminate feeding regimens proven successful through research. Farmer training facilities are also available to train program participants at their initial program utilization.

iv. Marketing

The Uplands Agriculture Conservation Project through its large farming systems research and extension components will introduce new agricultural technology in the project's upper watershed areas. Research results have demonstrated that existing technology (improved seed varieties, fertilizer use, etc.) can substantially increase yields of the current secondary crops grown. The PUSPETA Klaten Project has also demonstrated through its research facility that improved feeding and animal husbandry practices can dramatically improve dairy and beef cattle yields.

As production inputs, credit and extension are made available, a key to farmer willingness to adapt the new technology will be the immediate visible profitability of the innovation. Aside from greatly increasing productivity, the availability of markets and reasonable farmgate commodity prices will greatly determine the rate at which improved practices are adopted.

Maize is an important food item for the rural people. Annual per capita consumption in Java during 1969/70 was 3.9 kgs. in urban and 36.4 kgs. in rural areas. At that time, 13% of the crop was utilized for feed and the remainder for direct human consumption (LPPP, Sudjana). Today, an estimated 20% is fed to livestock.

The commercial market for maize in the project areas in apparently not very well developed as it remains essentially a subsistance crop. There have been years, including the current one, when Indonesia has exported and imported substantial quantities of maize. With the devaluation of the Rupiah, domestic prices may seasonally become low enough so that in some years it could become available for export while retaining an attractive relative income through its production.

Surplus production of maize is mainly sold to local feed mills and a vegetable oil factory located in East Java. The incidence in recent years of great seasonal fluctuations in maize prices and corresponding BULOG supply intervention during very high price periods attests to the surplus production market's growing ability to absorb a continually increasing supply. The continuing high rate of seasonal consumption increases, such as poultry feed utilization, (11% in 81/82 and 29% in 82/83-Attache Report, Indonesia: Quarterly Grain and Feed Update, June 1, 1983) further suggests good market potential for increased domestic maize production.

Soybeans are grown largely as a cash crop with over 75% of the locally grown crop marketed (IPB, 1976). In addition to significant imported quantities of soybeans distributed by BULOG and outer island seasonal shipments to Surabaya, local production is mainly sold through regional centers to soybean processor cooperatives for the production of (1) tahu, a protein precipatate obtained from water extraction of ground soybeans, and (2) tempe, a cooked soybean cake fermented with rhizopus.

Due to an expected continual high demand for soybean products and the substantial room for import substitution, domestic market prospects for soybeans appear strong. In 1981, total domestic production plus imports were estimated at over one million metric tons. Imports constituted 34% of of the utilization. Domestic production has since fallen and imports increased.

All proposed project areas exhibit great potential for utilizing their existing high animal populations as a vehicle for marketing locally grown produce as a high value product. Utilization of maize and rice bran as a seventy percent local on farm addition to poultry layer and meatbird concentrates is currently widespread and weightgain efficient. It is not uncommon, however, that seasonal maize surpluses are shipped from their district of origin during harvest and reimported during non-harvest periods at prices eighty percent higher than originally at farmgate.

Rice bran, a local milling byproduct included in poultry rations at concentrations of up to forty percent and in varying proportions of local dairy and swine feed rations is seasonally in great surplus and at relatively low cost. Because of the high content of unsaturated fatty acids in the bran, it begins to oxidize as soon as the rice is milled. It is estimated that the oxidation takes place and the feeding value reduced at the rate of one-half percent per hour. Within one week, the product is very rancid and is of significantly reduced feeding value. Due to the commodity's perishability and its condition as a byproduct, it frequently varies in price from Rp. 35 during peak harvest periods to Rp. 90 before major harvests. A significant quantity is lost to spoilage and its poor quality or non-availability substantially affects the stabilization of livestock production.

Outside the relatively well-established and frequently smallholder poultry industry, livestock feeding in the project areas and in Indonesia as a whole is well below its technological potential. In all areas of animal feeding, the secondary crop grain farmer to livestock producer commodity marketing chain is characterized by procurement, transport, processing, and storage inefficiencies which both lower grain producer prices and increase consumption prices. In the long run, livestock production enterprises will provide great opportunities for farmers to greatly increase their incomes through marketing their produce as meat, eggs or dairy products. The successful utilization of the already available technology, however, will depend considerably upon great improvement in commodity market and related input supply channel efficiency.

Fresh milk marketing is currently undertaken nearly exclusively by primary cooperatives and mostly sold through the GKSI (Gabungan Koperasi Susu Indonesia-Indonesia Federation of Milk Cooperatives) to the local large processing companies for eventual condensation or evaporation. In the project areas, PT Sari Husada and PT Nestle are the principal processor markets in Central and East Java respectively. Indonesia during 1983

imported approximately eighty percent of its domestic milk consumption requirements, or nearly six hundred million litres. Although currently an inefficient producer of this commodity (domestically subsidized at higher than import prices) for reasons previously discussed, government priorities during the Fourth Replita call for an increase of 250,000 head of dairy cow population and for domestic production fulfilling half of national consumption requirements. In addition to the size of imports, the activity is seen as having great potential to provide additional employment and income opportunity to Java's great number of smallholder or landless farmers.

The market system is thus closely regulated and increased local production is usually quickly responded to with increased milk factory domestic production intake requirement.

Import substitution for premium beef also represents a larger potential demand for secondary crops as feed ingredients. Total imports of deboned beef carcasses amounted to over two thousand tons in 1983. Assuming a deboned beef to live carcass conversion ratio of 1:3, a six thousand ton liveweight or fifteen thousand head production equivalent could substitute premium beef imports and derive an incremental twenty thousand ton demand for maize and other feed ingredients.

B. PROPOSED SUBPROJECT DESCRIPTION

The CAEDP can contribute to the development of secondary crop and livestock production and marketing through four types of subproject assistance. These are: (1) improved seed production and/or distribution; (2) grain commodity marketing, processing, and local storage/price stabilization; (3) the provision of livestock technical support and improved feeding program inputs; and, (4) the provision of guaranteed market facilities for local livestock production. These efforts will be aimed at increasing the role of the cooperative sector in the provision of development assistance to smallholder producers while at the same time making appropriate use of existing cooperative institutions and recent and future technical capabilities.

i. Improved Seed Production and Distribution

The provision of technical and infrastructural support to the project area's small farmers, their primary cooperatives and cooperative service centers is directed towards three objectives: increasing the production and availability of improved secondary crop seeds to smallholder and upland farmers; creating a cooperative based small farmer seed production industry; and, the total integration of small farmer secondary crop production with its marketing and processing under a viable cooperative network.

The CAEDP will focus the implementation of the secondary crop seed production activity within the initially implemented PUSPETA Malang and PUSPETA Klaten and their primary cooperatives. The

model and its operational methodology will be set up similar to that currently utilized with considerable success by the PUSPETA Klaten Project for the production of rice seed. Due to the seed requirements of the Uplands Agricultural Conservation Project, its design of introducing the use of inputs to farmers with little previous experience in their utilization, and the variable seasonal rainfall, the KUDs must have the required supplies on hand in time to best take advantage of the optimum planting period. The supply problems of the secondary crop producers are serious both because of their dispersion and remoteness and their requirement for relatively small input packages. Solution of these potential constraints along with the development of staff capability in both the KUDs and PPKs to handle a full line of production inputs are among the primary objectives of this project component.

Within the seed production operation, the PUSPETAs Malang and Klaten will function as: (1) seed input procurement agencies on behalf of their associated primary cooperatives for seeds produced within or procured outside the districts; (2) supply coordinators, contractors to KUDs and kelompoks, production and harvest supervisors; and, (3) transporters, processors, packagers, and distributors of inputs produced within the district.

The primary cooperatives (KUD) will operate as: (1) organizers of small farmer project participants into seed production kelompok; (2) distributors of seed production inputs to the kelompok on a credit basis; (3) seed harvest contractors, primary processors and payment agencies to the production kelompoks; and, (4) planting material distributor to the consumption crop producer participants.

Cooperative member seed production groups (kelompok) will on their individual landholdings cultivate contiguous four to seven hectare areas utilizing both input packages and methods recommended by the project. The kelompoks will harvest and sell the crop to their primary cooperatives on a contractual basis at higher than consumption grain market prices for eventual processing and certification as seed.

The KUD will procure through the PUSPETA Malang "stock classified" seed plus other recommended production inputs and distribute the inputs to the kelompok on a credit basis. Selected kelompok representatives will before planting undergo a short training course located at the PUSPETA on the systems and technical methodology of commercial cooperative seed production operations. Once trained, production inputs will be consigned from the KUD to the Kelompok through a contractual agreement which stipulates crop price determination methods at harvest. If the crop eventually qualifies as seed, the KUD will guarantee a certain percentage price differential over the higher of either the prevailing floor or market price of consumption grade grain.

The PUSPETA will maintain communication with the Balai Sertifikasi dan Pengawasan Benih (BPSB-Seed Certification and Inspection Center) at the provincial level and arrange for and finance their supervisory visits to the kelompok planting sites during the planting season. The PPK will, through the KUD and Kelompok at each crop maturity, finance the crop's harvest through the "tebasan" system. Upon harvest, the crop will be transportation to the KUD directly from the field for initial storage, quality control and primary processing. Such direct transporting will eliminate potential varietal mixing at the producer level. Prior to primary processing, the seed from all participating KUD will be transported to the PUSPETAs Malang and Klaten warehouses, undergo secondary processing requirements, certification procedures, dormancy period storage and final packaging for eventual distribution.

ii. Grain Commodity Marketing, Processing and Local Storage/Price Stabilization

The purchasing, processing and storage of smallholder secondary crops at peak harvest periods within all project locations and their local marketing during periods of shortage will play an important role in both guaranteeing a financial market incentive for improved production technology adoption and in stabilizing livestock feed pricing and availability on a year-round basis.

In addition to the long run aggregate supply and demand factors previously discussed, farm level secondary crop prices depend substantially upon current prices in final markets less marketing costs. These costs include processing, storage, transportation, and profit margins earned by the middlemen involved.

Within the project area, markets exist for the disposal of surplus production even in its most remote locations. As the production of secondary crops is fairly locationally concentrated due both environmental and socio-economic determinants, a small village trader to final market chain has become well established. The smallholder production will most often pass through a four to five step trader network before reaching the processor or consumer. Initial smallholder sales are often made to village "tonkulat", whose functions are mainly to gather, initially test, and bag the produce for resale to kecamatan (subdistrict) traders or itinerant collectors. The tonkulat procure crops as seasonal harvest employment and usually receive a scale, gunny bags and funds sufficient for a truckload of produce from their buyer.

Depending upon the commodity, the produce will then pass from the collectors or kecamatan sellers to a kabupaten (district) level trader. Then the district trader, depending upon his financial and storage capacities, will store a portion of the crop for several months for speculation, or deliver it directly to the larger regional traders. Once here, it will either undergo further speculative storage, or be sold to its destination consumer, exporter or feed mill. Often times, the final consumer of

the crop, once processed at the regional level or feed mill, will be the small poultry or dairy farmer adjacent to the initial grain producer in the village.

Generally, smallholder secondary crop producers have little market power. As harvests are highly seasonal and financial needs are urgent at harvest, and farm drying and storage facilities are scarce, the farmers are forced to sell at seasonally low price periods.

Due to the established crop orientation of the rural areas and their corresponding area market specialization tendencies, initial adaptors of UACP-recommended croping patterns new to an area may face difficulties in disposing of their surplus production. Also, yield increases through UACP production intensification programs will most likely burden the existing financial, storage and drying capacity of the small trader network.

The secondary crop marketing activity of this subproject is designed to address these small farmer marketing difficulties through an integrated district level program of crop purchasing, processing, and appropriate year-round livestock feed market intervention. This will be accomplished through local cooperative purchasing of secondary crops either from village level traders or directly from members. The crop will then be purchased from the primary cooperatives by the PUSPETA, the primary cooperatives by the PUSPETA, then processed and stored at the kabupaten level.

The project envisions marketing activity in soybeans, maize, peanuts, rice bran and cassava. A portion of the soybeans and the rice bran will be extruded at harvest periods and utilized, together with maize and cassava, for the production of poultry, dairy and beef feed concentrates and complete feeds. The peanuts will mainly be marketed to regional traders for eventual sales as snack food and sauce. Soybeans not extruded for livestock feed concentrates will be sold through the existing primary cooperatives in the project areas.

Local market activity in the above crops will not only insure marketability of increased surplus secondary crop production but also greatly reduce existing costly transport, handling and processing inefficiencies. This will be achieved through the establishment of a livestock feed production, marketing and technical assistance infrastructure close to the source of feed inputs and the major livestock feed markets that abundantly exist in all of the project areas.

Technology for the establishment of viable, competetive cooperative livestock and poultry feed production operations (adaptable to the level of local farmer technology and animal genetic potential) has been developed by the PUSPETA Klaten project. Dairy cattle feed concentrates for regimens including napier grass, corn silage or roadside grass have been developed and are selling and producing well. Cattle fattening concentrates under

research for the past year are proving extremely profitable and have recently been commercially produced. Finally, a complete layer feed under expirimentation for the past sixteen months has proven competitively productive and has been made available for sale during October, 1984.

The project will utilize PUSPETA Klaten as a mother feed mill for the production of essential concentrate premixes. These premixes will include mineral and vitamin additives, and for ruminants, a synthetic protein supplement, called Golden Pro. Golden Pro, a sixty percent protein supplement uses a patented formula of starch, urea and sodium bentonite. When extruded, the urea is melted and absorbed by the bentonite which is then encapsulated in an expanded starch cell. As the starch is digested in the rumen, the nitrogen is released gradually and can be synthesized by the rumen's bacteria into amino acids for digestion into the abomosum (forth stomach). Golden Pro, when fed correctly, greatly reduces the cost of protein in ruminant feeds.

The PUSPETAs Malang and Boyolali will serve as satellite feed mills to the existing Klaten mother mill. Ninety-six cercent of poultry and livestock feed compositions consists of feedstuffs that are grown locally in all the subproject areas. As previously described, considable sums are spent transporting and handling locally produced crops to distant feed mills for processing and often times retransported to their place of origin. Facilities will be installed at the above satellite feed mills to enable the processing and synthesis of locally produced carbohydrate feed ingredients with premixes produced at the PUSPETA Klaten mother mill.

Each satellite feed mill will be equiped with extrusion, grinding and mixing equipment. The satellite mill extruder will mainly be utilized for rice bran stabilazion. As previously detailed, rice bran is widely used as one of the main feed supplements for almost all of the economically important livestock types. Despite its economic importance to the livestock industry, however, rice bran processing/marketing is not highly developed as a commercial activity in Indonesia. Little investment has been made in processing facilities and as a result, substantial price fluctuations correspond with rice harvest seasons, great amounts of the commodity become rancid, and stable small farmer livestock production and profitability is difficult.

The PUSPETAs will purchase their yearly requirement of the commodity at rice harvest and, through an extrusion process, stabilize the bran for storage and eventual sale during short supply periods. PUSPETA Klaten's experience in this activity has proven profitable and has resulted in bran shelf life in excess of five months.

The mixing and grinding equipment will be utilized for concentrate formulation of local secondary crops and PUSPETA Klaten premixes.

Finally, one vertical cement stave silo site will be constructed on an expirmental basis in the initial project area of Malang for the production and distribution of crop forage residues. The silage will be produced for mixing with dairy and beef cattle feed concentrates and molasses. The initial silo site will consist of two 150 ton capacity forage silos and one 15 ton molasses storage silo. PUSPETA Klaten, because of its previous experience, will be engaged to construct the silos from locally made materials.

As is the case with the silos located at the PUSPETA Klaten Project, these silos will be viewed as pilot and innovative in nature, designed to be made available to areas with advanced smallholder livestock farmers and pronounced dry season forage shortages. Experience at PUSPETA Klaten has demonstrated that to achieve viable high production dairy and beef gains, corn silage is necessary as a principal year-round feed ingredient. Experience has shown, however, that the achievement of viable production levels utilizing silage feeding programs also requires animal husbandry practices initially beyond that immediately found with most new livestock farmers.

Prior to a farmer's entry into a complete feed program, a training program of approximately ten days duration will be provided on feed, sanitation, heat detection, etc. As the silos are proven viable to each particular area, expansion will be planned based upon an area's potential demand.

Finally, where necessary, the PUSPETAs will establish through their primary cooperatives market channels for locally produced meat, milk, poultry and eggs. The PUSPETA Klaten project has experience in nearly all of these areas and each would be easily replicable in the newly established PUSPETAs.

iii. Economic Viability and Benefits

The analysis of the operational viability and economic benefits resulting from the Secondary Crop Seed Production, Crop Marketing and Livestock Production and Marketing Subproject can be approached from a number of perspectives. Due the complexity of constructing a reliable and complete project budget for each of the subsectors and participants in the subproject, the approach followed here is focused more on the improved level of business services provided by the cooperatives.

The basic assumption is that the PUSPETA organizations will provide improved services with significant potential for raising smallfarmer incomes. All operational services will be made available to the local farming community within a free market structure and promoted solely on the basis of the economic benefits to those utilizing them.

Given the dramatically increased availability of improved secondary crop seeds and their utilization within a recommended input

package, the guarantee of marketability of secondary crops and livestock, the availability of an advanced livestock feeding and training program, and the existence of a local cooperative organization with the ability to immediately respond to small farmer needs, substantial production increases as a result of the project are expected. The magnitude of this increment depends largely upon adoption rates or, in a larger sense, the organization's business volume as this will be indicative of utilization of the services and their relevance to needs.

The analysis thus utilized will consider both the economic benefits of a farmer participating in a planned subproject and the viability of that subproject standing alone within the total project activity.

The individual farmer return on secondary crops where improved seeds are made available and provided on credit (or SUFS subsidy within the UACP) within a crop input package is listed below. The table only illustrates incremental benefits to the utilization of a recommended crop package where the availability of seeds is a most important factor to the overall package's adoption by the target beneficiaries. It does not attempt to isolate the individual value-added property of the seed in itself.

Table 5: Per Hectare Incremental Secondary Crop Returns

	Maize		Soybeans		Peanuts	
	W.	W.O	W.	W.O	W.	W.O
Revenues:						
Av. Yield Per Ha.-Kgs	2500	1200	900	500	1300	800
Price Per Kg.	110	110	430	430	400	400
Gross Return-Rp.000	275	132	387	215	520	320
Production Costs-Rp.000						
Seed	6	4	35	22.5	70	45
Fertilizer	31.5	-	15.8	-	18	-
Pesticides	4	4	3	3	6	6
Land Preparation	35	35	35	35	35	35
Weeding	16	16	16	16	16	16
Credit at 2%/month	3.3	-	7.7	-	14.5	-
Total Costs	95.8	59	112.5	76.5	159.5	102
Net Return	179.2	73	274.5	138.5	360.5	218
Incremental Return	106.2		136		142.5	
Incremental Production	1300		400		500	

Sources: BAPPEL BIMAS Palliwija, Central Java Province (Packages)

Two scenarios were analyzed over the seven-year life of the Uplands Agricultural Conservation Project and its SUFS (Sustainable Uplands Farming System) Subproject beneficiaries. The total number of participant hectares within the Malang and Boyolali project areas during the seven years of demonstration will amount to 6,015 hectares. The scenarios included a low and high adop-

tion rate of crop package utilization (once the subsidies are removed after their second year) and the incremental yields estimated above.

Table 6: Seed Program Incremental Secondary Crop Production

	Project Year					
	1	2	3	4	5	6
With Project						
UFS New Hectarage (1000's)						
Maize	220	1990	3150	3150	3150	3150
Soybeans	110	995	1575	1575	1575	1575
Peanuts	110	995	1575	1575	1575	1575
Later Slow Adoption (15%)						
Maize		33	331	804	1276	1749
Soybeans		16	165	402	638	874
Peanuts		16	165	402	638	874
Later Fast Adoption (30%)						
Maize		66	662	1608	2552	3498
Soybeans		33	330	804	1276	1749
Peanuts		33	330	804	1276	1749
Incremental Yield/(mton)						
Maize Low	286	2629	4525	5140	5754	6369
Maize High	286	2673	4955	6185	7413	8642
Soybeans Low	44	411	696	791	885	980
Soybeans High	44	424	762	952	1140	1330
Peanuts Low	55	513	870	989	1106	1225
Peanuts High	55	530	952	1190	1425	1662
Incr. Yield Low- $ 000	74	570	1183	1345	1505	1666
Incr. Yield High-$ 000	74	710	1295	1618	1938	2260

The results of these projections suggest that, by the project's end, average annual secondary crop production in the project areas will increase by 8,500 to 12,000 metric tons compared to production utilizing traditional production methods. This assumes an eventual project impact on over 22,000 newly introduced hectares and very low adoption rates.

These assumptions are quite conservative. Assuming only currently available technology, yield per hectare under research and demonstration conditions has greatly exceeded the projections. In addition, the large research and extension components of the UACP are expected to further increase yields and attract farmer adoption far in excess of the low estimates used.

The individual farmer return on participation in a PUSPETA dairy or beef fattening program is further examined in Table 7. Given the year-round availability of balanced lactating and non-lactating feeds for dairy cows and improved feed rations for beef cattle, the adoption of improved feeding programs, and improved

animal husbandry practices received through training programs, the smallholder production of beef and milk is expected to increase substantially in both profitability and volume.

Table 7: Farmer Annualized Yields from Livestock Program

	Beef Cattle		Dairy Cattle	
	W.	W.O	W.	W.O
Revenues				
Production Unit	Kgs. Liveweight		Liters Milk	
Average Yield Per Animal/Year	350	170	3060	1510
Unit Price Rp. 000	2.2	2	.24	.24
Salvage Value Rp. 000	-	-	74	68
Calf Income Rp. 000	-	-	100	95
Gross Return Rp.000	770	340	908	525
Year Production CostsRp. 000				
Calf (Amortized Over Life)	60	60	10	10
Feed	328	122	420	272
Health Care	30	30	40	40
Stable	40	40	20	20
Interest @ 2%/month	38	24	6	4
Total Costs	496	276	496	346
Net Return	274	64	412	179
Incremental Return	210		233	
Incremental Production	430		383	

Two scenarios were also examined to determine increases in production and income over a five-year period for both the dairy and ceef cattle activities. As with the secondary crop seed production program, the magnitude of this increment depends on adoption rates and the assumptions regarding increased productivity as detailed above.

Table 8: Program Incremental Livestock Production

	Project Year 1	2	3	4	5
Without Project					
Yield Per Animal Year					
Dairy Cattle-ltr	1510	1660	1760	1760	1760
Beef Cattle-kgs	170	170	170	170	170
Net Return Per Animal Year					
Dairy Cattle-Rp 000	179	215	239	239	239
Beef Cattle-Rp 000	64	64	64	64	64
With Project					
Yield Per Animal Year					
Dairy Cattle-ltr	3060	3365	3530	3530	3530
Beef Cattle-kgs	350	350	350	350	350
Net Return Per Animal Year					
Dairy Cattle-Rp. 000	412	492	516	516	516
Beef Cattle-Rp. 000	274	274	274	274	274
Animals Affected					
Slow Adoption (60% cap)	420	1470	2730	3150	3150
Fast Adoption (90% cap)	630	2205	4095	4725	4725
Annual Production Increase					
Dairy Cattle Slow ltr 000	325	1253	2416	2772	2772
Dairy Cattle Fast ltr 000	488	1879	3624	4181	4181
Beef Cattle Slow mton	38	132	246	284	284
Beef Cattle Fast mton	57	198	369	426	426
Incremental Income Value $000					
Dairy Cattle Slow	78	300	579	665	665
Dairy Cattle Fast	117	451	870	1003	1003
Beef Cattle Slow	84	290	541	625	625
Beef Cattle Fast	125	436	812	937	937

-Source: Project Design Team
-Assumes Second and Third Laction Increases Under Both With and Without Assumptions
-Assumes 50% of Partipants Under Beef and 50% Under Dairy Program

The economic projections enumerated above illustrate the anticipated effects arising solely from the complete feed program participants utilizing silage. The results of these projections thus illustrate the economic effects of only a portion of the PUSPETAs' feed mill activities, which will also provide other livestock concentrates, poultry concentrates and feed mixing materials such as extruded rice bran.

The results of the projections suggest that the limited experimental complete feed program in all of the proposed districts will increase meat production by 284 to 426 metric tons annually and milk production by 2.7 to 4.2 million liters compared to production without the project using the same number of animals. This assumes an eventual project impact upon 3 to 4 thousand livestock farming families.

The effects of the seed production, secondary crop marketing, and livestock feed production operations upon the viablilty of the proposed PUSPETA organizations are examined in tables eight and nine. Table 8 examines the total effect of the proposed incremental activities upon a projected PUSPETA Profit/Loss Statement. Table 9 discounts the incremental operations' cash flows and calculates their internal rate of return and net present value.

Table 8 utilizes projections for secondary crop production seed requirements, secondary crop marketing, incremental milk and beef production marketing and livestock feed based upon figures from tables four through seven. First year revenues of $760 thousand gradually increase to $4 million under full operations during the sixth year of business. Corresponding incremental income of nearly $21 thousand the first year increases to $189 thousand during the sixth year of operations.

Applying a 12 percent rate on future earnings, the ten year operational figures in table 9 represent a net present value of $145,868 and an internal rate of return of 16.68%.

TABLE 9: FINANCIAL VIABILITY EFFECTS OF PROJECT ACTIVITIES UPON PUSPETA ($)

Description	PROJECT YEAR 1	2	3	4	5	6
INCREMENTAL REVENUES						
SALES OF SEEDS	$16,940.00	$155,704.00	$267,970.00	$304,458.00	$340,802.00	$377,156.00
SALES OF FERTILIZERS	$10,642.00	$97,845.00	$168,376.00	$191,274.00	$214,107.00	$236,972.00
SALES OF PESTICIDES	$1,760.00	$16,184.00	$27,848.00	$31,632.00	$35,408.00	$39,192.00
SALES OF COMPLETE FEED	$157,060.00	$549,760.00	$1,021,020.00	$1,178,100.00	$1,178,100.00	$1,178,100.00
SALES OF CONCENTRATES	$96,000.00	$192,000.00	$288,000.00	$288,000.00	$288,000.00	$288,000.00
SALES OF EXTRUDED R BRAN	$96,000.00	$96,000.00	$96,000.00	$96,000.00	$96,000.00	$96,000.00
SALES OF MILK	$78,000.00	$300,720.00	$579,840.00	$665,280.00	$665,280.00	$665,280.00
SALES OF BEEF	$83,600.00	$290,400.00	$541,200.00	$624,800.00	$624,800.00	$624,800.00
SALES OF SECONDARY CROPS	$220,000.00	$300,000.00	$400,000.00	$540,000.00	$680,000.00	$840,000.00
TOTAL INCREMENTAL SALES	$760,022.00	$1,998,633.00	$3,390,254.00	$3,919,544.00	$4,122,497.00	$4,345,500.00
COST OF GOODS SOLD	$641,264.24	$1,697,549.64	$2,895,458.40	$3,353,668.40	$3,523,306.12	$3,710,586.96
AMORTIZED INCREMENTAL EXPENSES						
PERSONNEL	$33,840.00	$44,340.00	$48,880.00	$48,880.00	$48,880.00	$48,880.00
OPERATIONAL	$33,389.28	$96,739.16	$163,152.88	$187,891.00	$200,238.24	$213,388.40
MARKETING	$13,150.42	$38,968.73	$67,449.40	$77,097.62	$80,198.59	$83,500.32
ADMINISTRATIVE	$11,400.33	$29,979.50	$50,853.81	$58,793.16	$61,837.46	$65,182.50
FINANCIAL	$6,080.18	$15,989.06	$27,122.03	$31,356.35	$32,979.98	$34,764.00
TOTAL INCREMENTAL EXPS	$97,860.21	$226,016.45	$357,458.12	$404,018.13	$424,134.26	$445,715.22
INCREMENTAL INCOME	$20,897.55	$75,066.91	$137,337.48	$161,857.47	$175,056.62	$189,197.82

Source: Project Design Team
-Utilizes Operational Margins Similar tto Those Currerently at PUSPSPETA/Klaten

TABLE 10: ORGANIZATIONAL IRR AND NPV FOR ONE PUSPETA

	CAPITAL OUTLAY	REVENUES	EXPENDITURES	NET INCOME	ACCUMULATED SURPLUS/(DEFICIT)
YEAR 0	$487,000.00			($487,000.00)	($487,000.00)
YEAR 1	$55,200.00	$760,022.00	$739,124.00	($34,302.00)	($521,302.00)
YEAR 2	$55,200.00	$1,998,633.00	$1,923,565.00	$19,868.00	($501,434.00)
YEAR 3	$55,200.00	$3,390,254.00	$3,252,916.00	$82,138.00	($419,296.00)
YEAR 4		$3,919,544.00	$3,757,686.00	$161,858.00	($257,438.00)
YEAR 5		$4,122,497.00	$3,947,440.00	$175,057.00	($82,381.00)
YEAR 6		$4,345,500.00	$4,156,301.00	$189,199.00	$106,818.00
YEAR 7		$4,345,500.00	$4,156,301.00	$189,199.00	$296,017.00
YEAR 8		$4,345,500.00	$4,156,301.00	$189,199.00	$485,216.00
YEAR 9		$4,345,500.00	$4,156,301.00	$189,199.00	$674,415.00
YEAR 10		$4,345,500.00	$4,156,301.00	$189,199.00	$863,614.00

NPV @ 12% = $ 145,868
IRR = 16.68%

VIII. TIGER PRAWN FRY PRODUCTION, PRAWN PRODUCTION CREDIT AND MARKETING SUBPROJECT

A. BACKGROUND

i. Current Production/Policy

Brackish water aquaculture in Indonesia is undertaken in over 180,000 hectares of ponds constructed on other lands located within the tidal influenced coastal zone. These tidal lands in Indonesia are variously estimated to include an area of 5 to 7 million hectares. Generally, the land is unsuitable for agriculture and is exploited mainly for timber resources and used for fishpond production.

It is estimated that there are about 50,000 hectares of brackish-water fish and shrimp ponds already in existence in South Sulawesi [1]. Kabupaten Luwu, the proposed project area, contains nearly 5,000 hectares of completely constructed shrimp and fish ponds and has the potential for up to 20,000 additional hectares [2].

The GOI has placed considerable priority upon substantially increasing brackish water pond (tambak) productivity. It is seen as a way to significantly expand employment opportunities, increase food production and incomes, increase non-oil exports and equitably spread development benefits to the numerous small-scale tambak farmers. These farmers, through lack of accessibility to newer technology and management methods, currently achieve production levels which are only a fraction of what is possible at appropriate intensification levels.

Increased assistance for small farmer tambak development with emphasis on crustacean production has been actively initiated by the GOI. In addition to the above reasons, such assistance has also attempted to partially offset catch declines resulting from recent trawler bans, and in recognition of the increasing fishing pressure in Indonesian waters, and the further potential importance of shrimp in generating foreign exchange.

Intensification programs have made credit available to the smallholder tambak farmers of Kabupaten Luwu. During 1983, government programs made credit available to two hectare tambaks. The credit package included provisions for pond improvement, fertilizer, pesticides, feed and fry. Although numerous farmers applied for the program, the fry supplied from East Java was only sufficient for approximately fifty hectares and was of low quality.

Increased tambak production will also assist in increasing fish consumption, which at 11.2 kilograms per capita per annum nationwide is far short of the 29.5 kilograms desired. "According to the National Food Conference held in 1968, an Indonesian needs 55 grams of protein per day to meet minimum nutritional requirements. Of this total, 15 grams would come from animal protein

and consist of 10 grams from fish and five grams from livestock. Ten grams of fish proteins equals 60 grams of fish flesh per day (82 grams of whole fish per day), or 29.5 kilograms of whole fish per year" [3]. Just as the production of exportable shrimp generates income, low value shrimp and production of fish in polyculture with shrimp for direct home consumption or sale on the local market contributes to increased fish consumption.

Finally, a viable brackishwater shrimp production industry will provide off-farm employment opportunities in the marketing, processing and supply sectors. Many jobs were lost in this sector through the trawler ban, and it is felt that increased tambak production could at least restore many of these jobs.

Rearing of shrimp is widespread within the project area. Existing practices range from simple, traditional trapping-growing-holding ponds to modern sophisticated techniques. Traditional methods are used extensively because they are simple, easy to practice, and well known. Modern techniques of complete shrimp husbandry, rare in the oroject area for several reasons, have a history of less than twenty years, but are advancing rapidly where not constrained by input factors.

The production of Penaeus Monodom, one of the most important shrimp in Southeast Asia, will be the focus of the project. It grows rapidly to a large size, feeds on both plant and animal material, and does not require a clean sandy bottom. It can tolerate the presence of some organic substances on muddy bottoms, thrive in a wide range of water salinities, survive in ponds between rainy and dry seasons, and can withstand water temperatures ranging from 20 to 35 degrees Centigrade. It is the most important of Indonesia's shrimp exports and has a readily available marketing infrastructure from within the project area to the exporters located in Ujung Pandang, the provincial capital 400 kilometers away.

Penaed culture within the project area may be grouped into three production categories according to how the shrimp are stocked. Natural stocking (shrimp enter naturally with water inflow) is by far the most prevalent by necessity. Ponds are constructed a short distance from the seacoast in coastal mangrove swampland along tidal canals. Mangrove trees are first removed, then strong bunds are constructed around the cleared area to create an enclosure, with water gates leading into a tidal canal. Each gate has a strong sluice in which wire net screens are inserted. During high tide the water gates are opened and ater flows freely into the pond. When the tide is at its height, the gate is closed and all that has entered the pond, usually a mixture of prawns and young fish, is trapped inside. This procedure is repeated for several days; then the screeh is lowered permanently, allowing the water to pass freely but keeping the trapped organisms within. The young shrimp usually reach market size within three to four months after entry into the pond.

Since stocking is accomplished naturally and a certain amount of food is naturally present in the pond, no cost is involved in stocking or feeding the shrimp. Principal expenses are in construction and subsequent preparation and repair of the pond. This simple, traditional form of shrimp culture in Luwu is estimated to yield from 50 to 200 kilograms of shrimp/hectare/year; and, with its low cost operational costs, is enough to provide a low level of support for a small family.

There are several disadvantages to the traditional system of shrimp culture owing to the lack of control over the stocking process. Larval and young shrimp populations fluctuate unpredictably under natural conditions and their kinds and numbers cannot be predicted or regulated. The uncontrolled entry of predatory or competitive species with the young shrimp also keeps production down.

During the infrequent times in the project area when limited Penaeus Monodom post larvae are available from either natural habitats or distant hatcheries, controlled stocking is effected. When collected from natural habitats, professional seed collectors utilize either simple hand nets from shallow tidal canals or mangrove areas or use small bamboo tow nets from canoes in deeper estuarine areas. After separation from other species, penaeid seed, worth from Rp. 20 to 35 each, are sold in areas proximate with their capture.

Shrimp seed collecting, never very successful within the project area, is becoming more and more difficult. Some coastal waters have become polluted and many tidal canals are being modified for irrigation and navigation. Clearing and destruction of mangrove forests suitable for larval development, and depletion of coastal shrimp supplies by traditional fishermen further reduce availability from natural habitat. The few experienced local fry collectors have, for the most part, abandoned their occupation citing diminishing supply as the major factor.

Seasonal seed collection however has become a much more significant industry off the island's western coast, however, traditional collection, along with that area's hatchery fry production, have yet to come anywhere near to supplying even the current local post larvae demand. When limited quantities were able to be procured in that area's off season, the high mortality associated with transporting the fry several hundred kilometers to the project area, and later lengthy water adaptation requirements, made the activity's future expansion as a potential method of supply unfeasible.

Due to the difficulty of fry supply and several other constraints to be discussed in a later section, Indonesian brackishwater pond production systems are perhaps one of the least intensive found anywhere aquaculture is practiced. Average annual production found within the project area is approximately 150 kilograms per hectare. This compares with estimates of 300 to 1,600 in India, 250 to 900 in the Philippines, 750 to 1,500 in Taiwan and 2,000

to 5,000 in Japan [4].

It is estimated, however, that with a local entity to guarantee fry availability and only minor changes in farming practices, average yields could easily surpass 400 kilograms per hectare per crop. With further intensification, more substantial changes in farming practices and up to two and one half crops per year, three to four tons per hectare per year (twenty times current production levels) is not an unreasonable goal.

ii. Production Constraints

Supply of Fry-The shortage of high quality fry available for stocking Kabupaten Luwu ponds is probably the most fundamental among the several factors responsible for the poor performance of producers. Notwithstanding the several other production constraints, intensification of shrimp culture initially depends upon the existence of a reliable supply of high quality post-larvae. Currently, no such supplies are available to the tambak farmers of Luwu.

The only alternative to the currently inadequate sources for stocking is the production of post-larvae in hatcheries. In realization of the urgency of this need, the GOI has been directly investing in hatcheries and encouraging private sector investment through credit on liberal terms. Current regulations also stipulate that no processing plant may be established without simultaneously establishing a hatchery.

With the estimated existing 5,000 hectares of shrimp ponds in Luwu and with an assumed very low stocking density of 10,000 post-larvae per hectare/year, the total required supply of fry for the district is approximately fifty million per year. Under improved stocking densities of 50,000 fry per hectare and with two and one-half crops per year, the total requirement will exceed six hundred million post-larvae per year in Kabupaten Luwu alone. In addition, this figure assumes no further extension of shrimp culture within the remaining several thousand undeveloped yet potential tambak hectares in Luwu.

There currently exist one government and three private hatcheries in South Sulawesi. The government hatchery, with a 500,000 per month fry production capacity, is the closest but located 250 kilometers from the project site. The hatchery, even under optimal production conditions would be unable to supply any more than the requirements of its local farmers. Moreover, it has effectively ceased production due to a lack of mechanical parts and the stringent capital expenditure procedures associated with government budget dependence.

The remaining three hatcheries are located even farther from the project site. The largest and only currently productive one, operated by PT Bonecom and located in Kabupaten Barru, has an eventual annual production target of about forty million fry.

Again, even if ever achieved, it would remain well below that area's current local demand and not affect supply in the project area.

This deficit in fry availability affects tambak farmer production and income in a number of ways. First, the extremely low densities associated with traditional stocking methods are directly related to this shortage. In addition, farmers utilizing traditional stocking methods must introduce fry during limited seasonal breeding periods and therefore are prevented from more intensive shrimp cultivation over the course of the year. Third, small farmers who desire to shift to shrimp culture to enhance incomes are unable to do so. Lastly, production value is decreased because much of the naturally stocked shrimp is of mixed species and very low quality. The higher growth rates and much higher value of Penaeus Monodon through cultivation under controlled stocking conditions would greatly increase the productive efficiency and income potential of the operation.

Pond Water Management-Shrimps cultured in ponds are very sensitive to sudden changes in water conditions such as oxygen depletion, increase in water pollutants, or the presence of decaying organic material on the pond bottom, especially when the population density is high. Given the general lack of knowledge with water control techniques on the part of the Luwu producers, traditional low intensity stocking does provide a survival rate of the shrimp would usually be much higher under current conditions.

Once intensified production is adopted, water quality control frequently becomes a much more important productivity determinant. The most important control factors relate to the regulation of salinity, adequate circulation and aeration. The existence of abundant water resources and the lack of a pronounced local dry season should make salinity control easily within the reach of the trained Luwu shrimp farmer. Inadequate circulation could cause oxygen depletion during daytime hours due to thermal and oxygen stratification. Nighttime shortages of available oxygen are also common in high density shrimp culture ponds. Thermal and oxygen stratification can dramatically affect shrimp mortality in a pond. Through the use of appropriately designed and recently available pedal-powered aerators and circulators, oxygen levels can be improved to allow for increased stocking densities. These aerators and circulators can be produced by existing metal shops within the Luwu area through minimal project assistance.

Credit-The adoption of shrimp production intensification techniques requires a relatively large amount of capital for the typical Luwu tambak producer familiar with traditional production systems. Fry procurement, alone, under a stocking intensity of 20,000 fry per hectare would require approximately Rp. 500,000. Although sufficient funds are available within the Indonesian rural banking system (Bank Rakyat Indonesia) under BIMAS Tambak and RCP programs, farmers frequently have trouble coordinating

credit access with the supply of inputs requiring financing. This makes fry procurement on a credit basis almost impossible.

The CAEDP through the Luwu FCC organization will attempt to rectify this situation through the integration of credit, input supply and marketing operations. Operational methodologies will be discussed in a later section.

Marketing-Nearly all of Luwu's current Penaeid production is sold to one of the three processing/export companies in Ujung Pandang. Once processed, most of the shrimp are exported to Japan.

If the harvest is coordinated, producers usually have little difficulty finding available buyers for their production in Palopo, the district capital. Once in Palopo, the shrimp are inspected, packed in ice, and transported overland to the Ujung Pandang exporters 400 kilometers away. Frequently, due to ice inavailability in many rural production areas, significant quantities of farmer production are rejected due to decomposition. In addition, shrimp are frequently left in the ponds past optimal harvest periods due marketing coordination requirements. The project, by making more efficient use of existing cold storage facilities and ice distribution, will decrease market rejection through handling inefficiencies.

B. PROPOSED SUBPROJECT DESCRIPTION

The CAEDP will contribute to the development of shrimp production and marketing in Kabupaten Luwu through the integration of four types of assistance: (1) establishment of hatchery operations (2) supply of production inputs (3) provision of credit for fry procurement; and, (4) marketing assistance.

1. Establishing Cooperative Hatcheries

The project will construct, and provide on-site technical assistance to, an intensive and semi-continuous system shrimp hatchery within Kabupaten Luwu. The system, recently designed through USAID technical assistance with the Indonesian Dian Desa Foundation, will have a production capacity of one million *Penaeus Monodom* post-larvae per month based upon an anticipated survival rate of 40%.

The hatchery will be operated by the Farm Cooperative Center (FCC) organization described earlier within this proposal. The FCCs will, in addition to production of the shrimp through the hatchery's operation, also provide the fry and other production inputs, initially on a credit basis. Additionally, the FCC will provide training to farmers new to high stocking method technology and assist in the marketing of the final product.

The hatchery business is a complex and technologically multifaceted industry. It often takes considerable time and resources before even experienced operators can expect to make a profit

with a new facility. Indicative of such complexity are the existing South Sulawesi hatcheries, the poor performance of which is primarily due to the stringent requirements for precision control and regulation of the production system. During each step of the production process, from broodstock care to harvest, there is a requirement for precision that current hatchery operators are only begining to understand.

The project will initially utilize available short term technical assistance from the International Center for Aquaculture of Auburn University to evaluate the hatchery system proposed, to perform tests on the environmental appropriateness of proposed locations, and to design farmer credit and production packages. In addition, the Heifer Project International Foundation of Little Rock, Arkansas, has tentatively agreed to provide funding for a three year program of aquacultural research, demonstration and training together with the FCC Luwu project and the ICA.

The project will provide long-term on-site technical assistance to the hatchery facility. It is planned that one experienced expatriate hatchery specialist will be stationed at the project site for a period of two years. In addition to the provision of technical assistance to fry production, the advisor will also assist with the preparation of training programs for the FCC staff in fry distribution, marketing, handling and quality control. Finally, the hatchery specialist will provide assistance in the design of farmer training programs that will primarily deal with shrimp nutrition, pond construction and pond quality management.

The hatchery will operate completely on a business basis and be considered organizationally as a subsidiary operation of the FCC. The subsidiary's sole occupation will be the production of penaeus monodom post-larvae, while the FCCs will operate simultaneous fry credit, training and supply operations. The operation is budgeted for sufficient working capital to enable adequate equipment availability, sufficient maintenance, and sales facilities.

Indonesian hatchery management staff and counterparts will be recruited from post graduate degree holders in the appropriate disciplines and trained at the hatchery site strictly on an on-the-job basis. The staff will be provided sufficient salaries and bonus incentives based upon the hatchery's productivity to insure their long-term commitment to the project.

A preliminary survey for a potential hatchery site within Kabupaten Luwu was undertaken in early April, 1984 by Dr. James McVey, a USAID shrimp hatchery specialist and he identified several appropriate locations for the construction of a hatchery. Dr. McVey's report is attarhed to this proposal as appendix B.

The Dian Desa Foundation has been actively involved with Dr. McVay and USAID's other aquaculture advisor, Mr. Howard Deese, in the design and maintenance of shrimp production systems. In

addition, Mr. Joe Fox of Texas A & M University has worked with Dian Desa and a Central Java hatchery in designing and operating an appropriate and cost effective hatchery system. It is anticipated that the project and its ICA advisors will further study this newly designed system, examine its approiateness for the Luwu area, redesign where necessary, and work with the Dian Desa Foundation in the supervision of its hatchery construction in Luwu. An illustrative enumeration of equipment and construction requirements for the hatchery as completed by the Dian Desa Foundation are included within the project budget outlined in this proposal.

ii. Post-Larvae/Production, Input Distribution, and Credit

The Farm Cooperative Centers will be responsible for the sale and distribution of the fry produced by the hatchery. According to current market preferences, it is envisioned that two types of supply will be undertaken. Some farmers prefer to buy twenty-day old post-larvae and directly stock them into their ponds at a lower per fry cost. For those preferring the more expensive thirty-day old post-larvae, the twenty-day old fry will be transferred to an adjacent nursery pond before being introduced to the grow-out pond. When ready, the fry will then be packed in oxygenated plastic bags and delivered to farmers at their subcooperative unit locations.

Priority will be initially directed to filling cash sales and existing BIMAS and RCP government credit program requirements. These alone will most likely exceed the unit's production capacity. Given the possibility of problems with the government credit program, the project will be able to utilize, when necessary, budgeted funds to finance the supply of fry to qualifying cooperative members. Fry provided on a credit basis will be channeled through the existing producer primary cooperatives in the project area at competitive interest rates on the four month production cycle period. Credit program participants will then be provided with the opportunity to repay their loans through the project's marketing activities or on a cash basis.

The FCC organization will also be in a strong position to provide the other production inputs to Luwu farmers through their primary cooperatives. The FCCs are already the largest district level fertilizer and pesticide suppliers in Luwu and currently have the capacity to supply these inputs to the Luwu tambak farmers. In addition, the project has (through its link with the district's poultry producer cooperative) a steady source of manure to be used as pond feed. Finally, the project's poultry feed store in the Palopo area could easily expand to supply the tambak farmer's grain and concentrate feed requirements.

iii. Training

The project will primarily use field demonstrations at pond sites for dissemination of appropriate shrimp production techniques. Utilizing small cooperative groups of tambak farmers, the project will produce shrimp in a demonstration pond to illustrate the effects of utilizing advanced production techniques. The objective of this training is to provide hands-on experience to groups of farmers, to test and demonstrate the profitability of different technological developments (eg., monoculture/polyculture, fertilization, aerator use, stocking density, etc.) and to encourage the spread of the most efficient and profitable techniques.

iv. Marketing

The objectives of FCC shrimp marketing intervention will be to: (1) provide a vehicle for loan repayment to small farmers receiving post-larvae on a credit basis; (2) insure timely market availability to farmers at optimal harvest periods; (3) enlarge the capacity of the local shrimp marketing industry to accomodate cgreatly increased production; and, (4) attempt to improve local handling methods to substantially decrease rejection due to poor handling and decomposition.

The FCC has recently constructed small capacity cold storage and primary processing facilities within the Palopo central market, and a program to process and market offshore seafood is currently being initiated and appears to offer great promise for reducing fish decomposition. The facilities could be utilized for transit storage for daily shrimp harvests or, eventually, for deveining and quickfreezing of the prawns in a joint arrangement with an Ujung Pandang exporter. Through coordinated fry distribution and harvest, the FCCs will be in a position to regulate harvesting according to local handling capacities. This should enable adequate and timely utilization of ice and transport facilities to the Ujung Pandang markets.

v. Economic Viability and Benefits

Analysis of the operational viability and the economic benefits of tiger prawn fry production will be approached from the perspective of benefits provided the tambak farmer through the provision of services and of the level of business operations provided by the cooperative organization. The basic assumption is that the FCC organization will provide services either already available to tambak farmers on less attractive economic terms, or technologically not yet utilized but having a significant potential for increasing tambak farmer incomes. All operational services will be made available to the tambak farming community within a free market structure and promoted solely on the economic benefits to those utilizing them.

Given the dramatically increased availability of post-larvae *penaeus monodom* and their utilization within an intensified

production program, (the guarantee of their marketability, the availability of credit for input purchases, and the programming of training courses in intensified production), substantial production increases are anticipated as a result of the project. It is felt that the FCC's business volume will directly reflect the efficiency with which its services are provided and their relevance to local economic needs. The analysis will view illustrations of both the economic benefits to farmer participation in a subproject and the viability of that subproject within the FCC organization.

The individual farmer's return on monocultured shrimp production utilizing intensified stocking techniques is indicated below. Table 11 illustrates the values of increased production associated with the stocking of shrimp as opposed to the traditional system of natural stocking. In addition, increased production associated with shrimp feeding and improved water quality management through circulator and aerator utilization is also examined. The yields and costs utilized were gained through conservations with Luwu tambak farmers and through a survey conducted in the district's Walenrang and Malangke Kecamatans in the spring of 1984.

Table 11: Per Hectare Shrimp Production Returns Rp000

Per Crop	Traditional System	Stocking/ Polyculture	Stocking/ Monoculture
Revenues:			
Av. Yield Per Ha.-kgs.			
-Shrimp	40	200	500
-Fish	300	500	
Price Per kg.			
-Shrimp (1)	3000	6,000	6,000
-Fish	250	250	
Gross Return-Rp 000	195	1,325	3,000
Production Costs			
Fry			
-Shrimp		200	500
-Fish		15	
Fertilizer		18	27
Feeds		95	216
Manure		30	30
Pesticides		20	20
Equipment (3yrs.)			33
Credit		30	82
Total Costs	0	408	1,734
Net Return	195	917	1,266
Incremental Return-Shrimp		722	1,071
Incremental Production-Shrimp		160	460

(1) Assumes 50% monoceros, 50% monodom in natural stocking.

Two scenarios were analyzed over the initial five-year hatchery operation period showing low and high estimates of productivity increases. Survival rates of twenty and thirty percent over operational years one and two were utilized and a stabilized survival rate of 40% was assumed for the third year. Returns from the utilization of intensified stocking with those of traditional stocking were compared to calculate incremental production. The complete analysis is presented below in Table 12.

These projections suggest that by the project's completion, the intensified stocking of 600 hectares will produce an annual production increase of between 540 to 660 metric tons over production methods utilizing traditional natural stocking. At current producer prices, this would amount to a production value of between $ 3.2 and $ 3.9 million annually.

Both the high and low estimate assumptions utilized are quite conservative. Even the high estimate, after five years of program involvement, includes a single crop yield of only an approximate 450 kgs per hectare, far below what is currently being done elsewhere under current conditions. Many experts believe that cmuch higher yields are reasonable to achieve and returns could be well in excess of those indicated below as being economically sufficient.

Table 12: Post-Larvae Program Incremental Shrimp Production

	Project Year				
	1	2	3	4	5
With Project					
New Hectarage Cultivated With Intensified Stocking	300	450	600	600	600
Number of Crops Per Year	2	2	2	2.5	2.5
Annual Incremental Shrimp Yield Per Hectare (kg)					
-Low Estimate	420	500	580	800	900
-High Estimate	660	720	780	1030	1100
Annual Production Increase					
-Low Estimate (ton)	126	225	348	480	540
-High Estimate (ton)	198	324	468	618	660
Incremental Production Value					
-Low Estimate ($000)	756	1,350	2,088	2,880	3,240
-High Estimate ($000)	1,188	1,944	2,808	3,708	3,960

Tables 13 and 14 present the effects of fry production, input supply and marketing operations upon the viability of the FCC organization. Table 13 examines the total effect of the proposed incremental activities upon a projected profit and loss statement, whereas Table 14 discounts the cash flows and calculates their incremental rate of return and net present value. It is projected through Table 13 that, based upon a forty percent survival rate and fry production of one million per month, annual incremental revenues of $ 350 thousand will be realized by the third year of operation. For an eight year operational life, the activity's net present value is $453,970 while its internal rate of return is sixty percent.

TABLE 13: FINANCIAL EFFECTS OF HATCHERY OPERATIONS ON VIABILITY OF ($)

Description	PROJECT YEAR 1	2	3	4	5	6
INCREMENTAL REVENUES						
SALES OF POST LARVAE	$120,000.00	$180,000.00	$240,000.00	$240,000.00	$240,000.00	$240,000.00
SALES OF FERTILIZERS	$5,400.00	$8,100.00	$10,800.00	$10,800.00	$10,800.00	$10,800.00
SALES OF PESTICIDES	$6,000.00	$9,000.00	$12,000.00	$12,000.00	$12,000.00	$12,000.00
SALES OF CONCENTRATES	$30,000.00	$45,000.00	$60,000.00	$60,000.00	$60,000.00	$60,000.00
SALES OF EQUIPMENT	$5,000.00	$7,500.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00
INTEREST INCOME	$8,200.00	$12,300.00	$16,400.00	$16,400.00	$16,400.00	$16,400.00
TOTAL INCREMENTAL SALES	$174,600.00	$261,900.00	$349,200.00	$349,200.00	$349,200.00	$349,200.00
COST OF GOODS SOLD	$40,680.00	$61,020.00	$81,360.00	$81,360.00	$81,360.00	$81,360.00
AMORTIZED INCREMENTAL EXPENSES						
PERSONNEL	$20,100.00	$20,100.00	$20,100.00	$20,100.00	$20,100.00	$20,100.00
OPERATIONAL	$28,800.00	$28,800.00	$28,800.00	$28,800.00	$28,800.00	$28,800.00
MARKETING	$30,000.00	$45,000.00	$60,000.00	$60,000.00	$60,000.00	$60,000.00
ADMINISTRATIVE	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$2,400.00
FINANCIAL	$6,000.00	$6,000.00	$6,000.00	$6,000.00	$6,000.00	$6,000.00
TOTAL INCREMENTAL EXPS	$87,300.00	$102,300.00	$117,300.00	$117,300.00	$117,300.00	$117,300.00
INCREMENTAL INCOME	$46,620.00	$98,580.00	$150,540.00	$150,540.00	$150,540.00	$150,540.00

TABLE 14: IRR AND NPV FOR FCC HATCHERY OPERATION

	CAPITAL OUTLAY	REVENUES	EXPENDITURES	NET INCOME	ACCUMULATED SURPLUS/(DEFICIT)
YEAR 0	$159,650.00			($159,650.00)	($159,650.00)
YEAR 1		$174,600.00	$127,980.00	$46,620.00	($113,030.00)
YEAR 2		$261,900.00	$163,320.00	$98,580.00	($14,450.00)
YEAR 3		$349,200.00	$198,660.00	$150,540.00	$136,090.00
YEAR 4		$349,200.00	$198,660.00	$150,540.00	$286,630.00
YEAR 5		$349,200.00	$198,660.00	$150,540.00	$437,170.00
YEAR 6		$349,500.00	$198,660.00	$150,840.00	$588,010.00
YEAR 7		$349,500.00	$198,660.00	$150,840.00	$738,850.00
YEAR 8		$349,500.00	$198,660.00	$150,840.00	$889,690.00

NPV @ 12% = $453,970
IRR = 60.05%

NOTES

[1] Provincial Office of Fisheries, South Sulawesi.

[2] District Fisheries Office, Kabupaten Luwu.

[3] The Development of Small Scale Fisheries in Indonesia, by A. Sidarto, March, 1977.

[4] Aquaculture: The Farming and Husbandry of Freshwater and Marine Organisms, Wiley, Interscience USA.

IX. COOPERATIVE ENTERPRISE INNOVATION DEVELOPMENT FUND

Financing will be budgeted from the Title I allocation to create the above Cooperative Enterprise Innovation Development Fund. The fund will be utilized as regenerative "seed capital" for financing cooperative or joint cooperative-private sector ventures that are precluded from obtaining capital from traditional lending sources. The funds will be provided on both a medium and a long term repayment basis at competetive interest rates and include grace periods according to the nature of the venture financed.

Priority in loan disbursement will be place upon the proposed venture's compatibility with the objectives of the CAEDP and the DCRD's Comprehensive Plan, the USAID CDSS, and the GOI's Replita IV development plans, its relationship with the organizations involved in the project and its potential viability. Included in these criteria will be:

1. Beneficiary Impact:

   -employment generation potential;

   -cooperative instutition building nature;

   -condition of target beneficiaries;

   -export generation or import substitution capability;

2. Venture Feasibility:

   -input and market linkage availability;

   -positive return on invested capital and repayment ability;

   -perpetuality of entity and venture implemented;

   -availability of appropriate outside resources;

   -complementarity with other CAEDP programs;

3. Nature of Venture:

   -consistency with CAEDP objectives;

   -consistency with USAID CDSS;

   -consistency with Department of Cooperatives Replita IV guidelines;

   -consistency with the structure and implementation of the National Cooperative Comprehensive Plan.

The funds will be deposited within an interest bearing local banl account and placed under the supervision and management of the

CAEDF's Project Management Unit (PMU) board for their disbursement authority. The PMU, as described within Chapter V of this proposal will serve as the entity entrusted with the fund's utilization, management, supervision and regeneration.

It is preliminarily budgeted that the fund will amount to approximately $ 1,030,000. Proposals and feasibility studies for the utilization of these funds will be prepared at the district level by the PUSPETA management teams and their technical advisors. The proposals will then be submitted to the respective PUSPETA's Temporary Advisory Boards (TAB) for approval and eventual submission to the PMU. If approved by the PMU, the funds will be disbursed through the PUSPETA to the applicable enterprise. Provision will also be made for investment in expirimental cooperative ventures within the areas of the National Cooperative Comprehensive Planning Project's first implementation plan.

During the latter phases of implementation, a trasnsition will take place transfering the PMU's CREDF to the individual PUSPETAs, who will then in turn assume responsibility for the fund's management, administration, supervision and disbursement.

X. TECHNICAL ASSISTANCE

Implementation of the program will require the general upgrading of the ability of the current PPKs and KUDs to provide supply and credit services through organizations not significantly involved in business service operations. In addition to the upgrading of current staff, the project will entail the recruitment and training of many new and largely inexperienced personnel. Particularly important to the success of the services required for small farmer support will be the ability of the PPKs and their affiliated KUDs to conduct their operations in a business-like manner. This will require staff with skills in bookkeeping, cooperative accounting methods and business administration.

In addition, it is anticipated that the project will provide several types of agrobusiness services technically innovative to Indonesia. These services, particularly those involving shrimp, crop seed, and livestock feed production and perishable commodity handling, involve activities not currently practiced in Indonesia.

To assist in meeting these needs, the project will assign a long-term advisor to the Luwu, Malang and Boyolali PPKs. The timing of their services, illustrated in Exhibit 2 below, will correspond to the stages of project implementation. The advisors will have educational backgrounds in business administration and agrobusiness and have experience in the operation of cooperative organizations in developing countries. The Klaten PUSPETA, due to its more advanced stage of implementation and management will not require a full time technical advisor but will be administered by the CLUSA representative. The functions of the long term advisors will include, but not be limited to, the following:

1. Assisting PPK and KUD management and administrative personnel in the establishment of standardized accounting and administration systems.

2. Assisting the project area PPK and KUD management in instituting sound business practices in handling the production or purchase and sale of supplies, purchase and sale of farm produce, and the record keeping for the credit systems.

3. Training Indonesian cooperative personnel in the skills required to assume full responsibility for all management and operational tasks.

4. Assisting the PPK management in the identification of and feasibility study preparation for elligible operational participants of the Rural Enterprise Development Fund.

In addition, two long-term technical advisors will be utilized in the initial implementation phases of the livestock and shrimp hatchery activities. The shrimp advisor will be positioned at the hatchery site in Kabupaten Luwu and provide the technical assistance and training as described in section VIII-B. The

livestock advisor, in addition to continuing limited livestock feed research and development activities at the PUSPETA Klaten project site, will be temporarily positioned at the PPKs Malang and Boyolali to establish the necessary staff and farmer training, feed production, and animal husbandry activities during their initial phases of implementation. Additionally, short term externally funded technical assistance will be provided where necessary through the Volunteers in Overseas Cooperative Assistance (VOCA) organization for livestock and seed technology and through the International Center for Aquaculture (ICA) for the shrimp production subproject.

The Title II or Section 416 portion of the project's budget provides funding for the provision of technical assistance and its required support costs. All technical assistance and supervision costs are detailed within the project budget as Section V.

EXHIBIT 21: TIMING OF TECHNICAL ASSISTANCE PROVISION

POSITION	IMPLEMENTATION YEAR 1	2	3	4	5
A. LONG TERM CORE STAFF					
1. CHIEF OF PARTY	==========	==========	==========	==========	==========
2. PUSPETA MALANG ADVISOR	==========	==========	==========	==========	==========
3. FCC LUWU ADVISOR	==========	==========	==========	==========	==========>
4. PUSPETA BOYOLALI ADVISOR		==========	==========	==========	==========>
B. LONG TERM TECHNICIANS					
1. HATCHERY ADVISOR	==========	==========	==========>		
2. LIVESTOCK ADVISOR	==========	==========	==========	==========	==========>
C. LOCAL CONSULTANTS					
1. BASELINE SURVEY	==========				
2. EVALUATORS		====			
3. SHORT TERM LOCAL	==========	==========	==========	==	==
	==========	==========	==========	==========	==========>

XI. EVALUATION PLAN

1. DESIGN OF PROJECT

The starting point of the evaluation plan should be a precise understanding of what the activity is supposed to accomplish, through which agents and over what time period. The Cooperative Agrobusiness Enterprise Development Project (CAEDP) is a complex undertaking involving not only personnel of the Ministry of Cooperatives, but also the principal organizations of the national cooperative movement (including over 130 primary cooperatives and four district-level pre-secondary cooperative federations), and the small farmer beneficiaries. The success of the project depends upon the development of an effective and efficient system for the delivery of technical assistance, inputs, credit, and marketing services.

A. THE PROJECTS

A preliminary project flow chart was prepared in order to identify all significant project elements and their interrelationships. This chart, included as Exhibit 1, shows the principal nodes of each component of the program and how they relate to each other in successive steps or parallel actions. Using this diagram, it was possible to identify seven essentially discrete activities that contribute to the development of the complete delivery system:

1. Cooperative Development Activities

   (i) Improved Cooperative Management. The project is supported by CLUSA and the Department of Cooperatives to assist selected PPKs and KUDs in performing important services. Salary subsidies are provided for PPK staff to assure the continued availability of professional management.

   (ii) Production Credit System. The project provides technical assistance for the development of a system for the delivery of production credit to small farmers. It also provides working capital funds both from foreign and domestic sources that will enable cooperative organizations to respond to the most urgent production credit requirements of the project beneficiaries.

   (iii) Productive Input Delivery System. To increase crop yields, The project provides fertilizer, seeds, pesticides, livestock feeds and shrimp post-larvae to small farmers participating in the program. Development of the delivery system will require the construction or expansion of PPK warehouses, the procurement of certain processing equipment, delivery of externally produced inputs to the PPKs, expansion of PPK clerical and logistical staff, and arrangements for transport services.

(iv) Crop Marketing Services. The project will expand the crop market orientation of the existing primary cooperatives well beyond the current emphasis upon rice. The development of crop marketing services will require expansion of the storage and processing facilities, adoption of efficient storage and processing systems, transport availability, and good management that can ensure the highest possible benefits to the producers.

2. Agriculture Technical Assistance Activities

(v) Small farmer Training Program. All small farmers entering the aquaculture or livestock production programs will undergo a one-week training program in production technology, cooperative principles and project operations. CLUSA, the Department of Agriculture Directorates General of Livestock and Fisheries will prepare the courses and train the participants.

(vi) Technical Assistance Delivery System. The project includes the adaption of a technical production package to local use and the provision of technical assistance to insure the proper utilization of the recommended practices.

3. Project Management

(vi) Project Management and Coordination. The overall project will function under existing line authorities, but will be guided by a Coordinating Committee involving representatives of the Directors General of Business Affairs, Cooperative Organizations, and Research and Development. This committee will be served by a Project Management Unit consisting of the CLUSA Representative, the DOC Foreign Project Coordinator, and the Project Development Officer. Most essential, however, will be the Temporary Advisory Board (TAB) located within each project district. The TAB's management authority over PPK operations will ensure the relevance of services to local needs.

B. EVALUATION DATA REQUIREMENTS

The data required to evaluate this program at various levels and at different times will be of two types: (1) information that can be routinely gathered and reported by the PPKs for continuous analysis in a Management Information System (MIS); and, (2) information that must be gathered by surveys of project participants. The evaluation will seek to determine (1) progress towards the development of an effective institutional mechanism for providing services to small farmers; (2) the efficacy of that mechanism as a self-sustaining delivery system; and, (3) the efficacy of that mechanism in altering farming practices, economic returns, and family welfare. These three different objectives will require different types of data:

(1) Program Management Data will provide program management and evaluators with information on what is happening in the program in regard to its inputs, outputs and problem areas. This data will include such items as assignment of staff, resource flows, construction and equipment procurement progress, inputs delivered and outputs marketed.

This information will be acquired through a regular system of reporting by the PPKs to the PMU. The reports will be compiled and submitted on a quarterly basis under a simple standard quantitative reporting format.

(2) Institutional Development Data will provide the PMU and the evaluator with information on the developing characteristics of the system being created, i.e., a small farmer modernization delivery system and its components. Information will be sought concerning the health of the institutions involved and whether strengthened or weakened by the program. The data required deals with the effectiveness and efficiency of the processes employed and will be mostly reflected in the growth trends of PPK/KUD membership and volume of business. This type of data can also be gathered on a routinely prepared and standardized MIS format. As it will be primarily concerned with longer term trends, it will be less useful for immediate program guidance than the first type of data.

(3) Farm Based Data will be essential for determining the impact of the institutional development program on the target group and will be gathered through periodic surveys. Because some changes, such as the use of new practices, will show up early in the program, while others, such as income changes may be longer in coming, one initial and one repeat baseline data survey will be conducted during the first two years of the project.

The Project Management Unit will design and operate the MIS. As it is the only operating agency with sole responsibility for this single program, it will require data from all implementing agencies and will have the responsibility of verifying, analyzing and condensing the data for reporting on the project.

The basic inputs to the MIS will be reports from each of the operating organizations:

Koperasi Unit Desa (Quarterly)

Pusat Pelayanan Koperasi (Quarterly)

District Cooperative Officer (Quarterly)

These reports will be analyzed and consolidated at the end of each quarter, data verified, and a consolidated summary distributed. Each six months a report will be prepared, indicating important trends charted and with a narrative summary explaining their significance.

Baseline data will be derived through questionnaires designed to determine the ultimate measure of the impact of the program upon its intended beneficiaries. The questionnaires will be administered to a sample of the participating small farmers by a trained interviewer. This survey will serve two purposes (1) to provide information about the characteristics of the target population to be used in designing programs to reach them; and, (2) to establish data on the capitalization of the farm enterprise, income flows and expenses, and net return from farm and non-farm income.

To minimize the administrative burden upon project and cooperative management in the compilation of MIS and the baseline surveys, the PMU will hire full-time experienced staff to carry out these functions in all four project kabupatens.

The program will be evaluated during its third and fourth years by external evaluators contracted for this purpose by CLUSA. The evaluators will work closely with the PMU in establishing the guidelines and basis for the evaluation, and will rely heavily on the PMU/MIS for data in performing the evaluation. CLUSA will provide logistical support for the evaluation team.

The team will prepare a draft report of the evaluation and will provide a briefing for the PMU and USAID on its principal findings before departure.

FIRST EVALUATION

The first evaluation should be performed early in the third year of the project, once the four district operations are in place, construction completed and equipment procurred. This evaluation will focus on project inputs, the organization and management of the program and the progress made towards establishment of a delivery system. In particular, it should focus on any problems encountered and means for their correction.

This first evaluation should review subproject design and assumptions in light of the first two years of operations, verify their continuing validity or recommend appropriate modification. It should review the progress of the four delivery systems (technical assistance, credit, input supply and marketing) to determine progress, identify any problems, and make recommendations for any modification. Finally, it should review the operations of the Inter-Directorate General Coordinating Committee and the Project Management Unit and suggest any changes which might be needed.

SECOND EVALUATION

The second evaluation, to take place in the fourth year of the project, should concentrate on project outputs, specifically, the technical assistance provided, loans made, inputs delivered and crops marketed. It should also review the progress being made

towards establishment of a permanent delivery system, paying particular attention to the effect of the program on the continuing viability of the participating PPKs and KUDs.

Like the first evaluation, it should test project design, assumptions and management, and the operation of the delivery systems. However, it should go deeper into the institutionalization of these delivery systems and their apparent efficiencies and effectiveness, suggesting ways that the business operations can be improved. It should also review the impact of the program on the characteristics of the small farmer clients, and their material well being.

Finally, the information should be consolidated into a report that can serve as the basic blueprint for expanding the system, providing the results warrant such expansion.

XII. PROJECT BUDGET

Table 15 provides an illustrative yearly budget for all categories of project expenditure. It will be further refined as the specifics of equipment procurement, land costs, construction tenders and technical assistance are further assessed. More specific details on the financing methodology can be found in section IV-C of this proposal.

Total project financial requirements will be $ 8.691 million of which $ 6 million will be provided through FY 85 Title I funding. The concurrence of the Department of Cooperatives to utilize Title I funding for the project's implementation is included as Appendix 6.

As described earlier within this document, key to the project's success will be its ability to flexibly respond to its areas' business environment for the duration of its implementation in a timely and relevent manner. As that environment will change due macro-market conditions, technological advancements, and several other factors, the specifics of the budget enumerated will also require regular revision. Capital budgeting for the project will thus be conducted on a year to year basis and entail revision corresponding to prevailing business and management conditions. For this reason the attached budget, albeit specific, will through this process potentially undergo substantial year to year revision in the areas of equipment procurred, personnel supported and facilities constructed. Prior to an activity's replication in more than one project area, it will be researched on a limited expirimental basis and evaluated for expansion on the basis of its viability and adherance to the project's objectives.

Table 15: Comprehensive Project Budget ($000)

Type of Expenditure	Type Unit	Qty by Project Year 1	2	3	4	5	Total Units	Unit Cost	Base Cost by Project Year 1	2	3	4	5	Total Cost	TIT. II AA 416	TIT. I
I. INVESTMENT COSTS																
A. CONSTRUCTION																
MALANG:																
1. GRAIN WAREHOUSE 1400/T	BLDG	1					1	56	56	0	0	0	0	56		56
2. TRAINING CENTER	BLDG	1					1	12	12	0	0	0	0	12		12
3. SILO COMPLEX	SITES	2	1	1	1		5	20	40	20	20	20	0	100		100
4. DRYING FLOOR	FLOOR	1					1	7.5	7.5	0	0	0	0	7.5		7.5
5. INPUT STORAGE 300/TON	BLDG	1					1	19.5	19.5	0	0	0	0	19.5		19.5
BOYOLALI:																0
1. GRAIN WAREHOUSE 1000/T	BLDG	1					1	40	40	0	0	0	0	40		40
2. TRAINING CENTER	BLDG	1					1	12	12	0	0	0	0	12		12
3. SILO COMPLEX	SITES	2	1	1	1		5	20	40	20	20	20	0	100		100
4. DRYING FLOOR	FLOOR	1					1	5	5	0	0	0	0	5		5
5. INPUT STORAGE 300/TON	BLDG	1					1	19.5	19.5	0	0	0	0	19.5		19.5
KLATEN:																0
1. INPUT WAREHOUSE 500T	BLDG	1					1	25	25	0	0	0	0	25		25
2. DRYING FLOOR	FLOOR	1					1	5	5	0	0	0	0	5		5
LUWU HATCHERY COMPLEX																0
1. BUILDING	BLDG	1					1	52	52	0	0	0	0	52		52
2. LRT	BLDG	5					5	0.3	1.5	0	0	0	0	1.5		1.5
3. SPWNG/ALGAE TANKS	BLDG	12					12	0.045	0.54	0	0	0	0	0.54		0.54
4. MATURATION TANK	BLDG	3					3	0.375	1.125	0	0	0	0	1.125		1.125
5. POWER HOUSE	BLDG	1					1	2.4	2.4	0	0	0	0	2.4		2.4
6. ELECTRICAL SYS	BLDG	1					1	3	3	0	0	0	0	3		3
7. WORKSHOP	BLDG	1					1	4.5	4.5	0	0	0	0	4.5		4.5
8. FRSH/SEA/AIR WATER PIP	BLDG	1					1	2.55	2.55	0	0	0	0	2.55		2.55
9. FR WTR SOURCES DEV	BLDG	1					1	0.75	0.75	0	0	0	0	0.75		0.75
10. FR WATER PUMP/PIPING	BLDG	1					1	0.6	0.6	0	0	0	0	0.6		0.6
11. RES/PRES TANK	BLDG	1					1	0.3	0.3	0	0	0	0	0.3		0.3
12. OFFICE/HOUSING	BLDG	1					1	48	48	0	0	0	0	48		48
13. ROADS/FENCES	BLDG	1					1	6	6	0	0	0	0	6		6
TOTAL CONST. COSTS									404.8	40	40	40	0	524.77	0	524.77
B. LAND																
1. BOYOLALI	HECTARE	0.7	0.1	0.1	0.1		1	75	52.5	7.5	7.5	7.5	0	75		75
2. MALANG	HECTARE	0.8	0.1	0.1	0.1		1.1	100	80	10	10	10	0	110		110
3. KLATEN	HECTARE	0.2					0.2	30	6	0	0	0	0	6		6
4. LUWU	HECTARE	2					2	5	10	0	0	0	0	10		10
TOTAL LAND COSTS									148.5	17.5	17.5	17.5	0	201	0	201
C. EQUIPMENT																
MALANG																
1. EXTRUDER	MACHINE	1					1	65	65	0	0	0	0	65		65
2. GRINDER/MIXER/AGR/ELV	MACHINE	1					1	14	14	0	0	0	0	14		14
3. MIXER WAGON	MACHINE	3	1	1	1		6	15	45	15	15	15	0	90		90
4. TRACTOR	MACHINE	3	1	1	1		6	19	57	19	19	19	0	114		114
5. FORAGE CHOPPER	MACHINE	3					3	2.5	7.5	0	0	0	0	7.5		7.5
6. FORAGE BLOWER	MACHINE	2					2	2.5	5	0	0	0	0	5		5
7. MOLASSES PUMP	MACHINE	2					2	3.5	7	0	0	0	0	7		7
8. PICKUP TRUCKS	VEHICLE	2					2	8	16	0	0	0	0	16		16
9. HANGING SCALES	EQUIPMENT	6					6	0.05	0.3	0	0	0	0	0.3		0.3
10. PLATFORM SCALES	EQUIPMENT	4	4	4			12	0.3	1.2	1.2	1.2	0	0	3.6		3.6
11. PALLETS	EQUIPMENT	1					1	2	2	0	0	0	0	2		2
12. MOISTURE TESTERS	EQUIPMENT	4					4	0.35	1.4	0	0	0	0	1.4		1.4
13. GENERATORS	EQUIPMENT	3					3	4.5	13.5	0	0	0	0	13.5		13.5

14. TOOL SETS	EQUIPMENT	2				2	0.5	1	0	0	0	0	1	1
15. RICE THRESHERS	MACHINE	1				1	1.5	1.5	0	0	0	0	1.5	1.5
16. RICE SEED CLEANERS	MACHINE	1				1	1.3	1.3	0	0	0	0	1.3	1.3
17. FUMIGATION COVERS	EQUIPMENT	1				1	0.8	0.8	0	0	0	0	0.8	0.8
18. BAG SEALERS	EQUIPMENT	1				1	0.1	0.1	0	0	0	0	0.1	0.1
19. MAIZE SHELLERS	MACHINE	1				1	2.5	2.5	0	0	0	0	2.5	2.5
20. BIN DRYERS	MACHINE	2				2	3.5	7	0	0	0	0	7	7
21. SOYBN/GRNUT THRESHERS	MACHINE	1				1	2	2	0	0	0	0	2	2
22. MZE/SYBN SEED CLNRS	MACHINE	1				1	2.2	2.2	0	0	0	0	2.2	2.2
23. SYBN SPIRAL SPRATRS	MACHINE	1				1	1.5	1.5	0	0	0	0	1.5	1.5
24. PEANUT HUSKER	MACHINE	1				1	2.5	2.5	0	0	0	0	2.5	2.5
25. PEANUT GRADER	MACHINE	1				1	7	7	0	0	0	0	7	7
26. LARGE TRUCKS	VEHICLE	3				3	18	54	0	0	0	0	54	54
27. JEEPS	VEHICLE	1				1	13	13	0	0	0	0	13	13
28. MOTORCYCLES	VEHICLE	10				10	1.3	13	0	0	0	0	13	13
29. COMPUTER	SYSTEM	1				1	18	18	0	0	0	0	18	18
30. RADIOS	SYSTEM	1				1	2	2	0	0	0	0	2	2
BOYOLALI														0
1. EXTRUDER	MACHINE	1				1	65	65	0	0	0	0	65	65
2. GRINDER/MIXER	MACHINE	1				1	14	14	0	0	0	0	14	14
3. MIXER WAGON	MACHINE	3	1	1	1	6	15	45	15	15	15	0	90	90
4. TRACTOR	MACHINE	3	1	1	1	6	19	57	19	19	19	0	114	114
5. FORAGE CHOPPER	MACHINE	3				3	2.5	7.5	0	0	0	0	7.5	7.5
6. FORAGE BLOWER	MACHINE	2				2	2.5	5	0	0	0	0	5	5
7. MOLASSES PUMP	MACHINE	2				2	3.5	7	0	0	0	0	7	7
8. RADIO	EQUIPMENT	1				1	2	2	0	0	0	0	2	2
9. HANGING SCALES	EQUIPMENT	4				4	0.05	0.2	0	0	0	0	0.2	0.2
10. PLATFORM SCALES	EQUIPMENT	3	3	3		9	0.3	0.9	0.9	0.9	0	0	2.7	2.7
11. PALLETS	EQUIPMENT	1				1	2	2	0	0	0	0	2	2
12. MOISTURE TESTERS	EQUIPMENT	4				4	0.35	1.4	0	0	0	0	1.4	1.4
13. GENERATORS	EQUIPMENT	2				2	4.5	9	0	0	0	0	9	9
14. TOOL SETS	EQUIPMENT	2				2	0.5	1	0	0	0	0	1	1
15. FUMIGATION COVERS	EQUIPMENT	1				1	0.8	0.8	0	0	0	0	0.8	0.8
16. COMPUTER	SYSTEM					1	18	18	0	0	0	0	18	18
17. PICKUP TRUCKS	VEHICLE	2				2	8	16	0	0	0	0	16	16
18. LARGE TRUCKS	VEHICLE	2				2	18	36	0	0	0	0	36	36
19. JEEPS	VEHICLE	1				1	13	13	0	0	0	0	13	13
20. MOTORCYCLES	VEHICLE	6				6	1.3	7.8	0	0	0	0	7.8	7.8
KLATEN:														0
1. EXTRUDER	MACHINE	1				1	65	65	0	0	0	0	65	65
2. PICKUP TRUCKS	VEHICLE	2				2	8	16	0	0	0	0	16	16
3. LABORATORY EQUIPMNT	SET	1				1	4	4	0	0	0	0	4	4
4. LIVESTOCK SCALE	EQUIPMENT	1				1	3.5	3.5	0	0	0	0	3.5	3.5
5. PALLETS	EQUIPMENT	1				1	2	2	0	0	0	0	2	2
6. CONVEYORS	SYSTEM	1				1	8	8	0	0	0	0	8	8
7. CHILLING TANK	EQUIPMENT	1				1	16	16	0	0	0	0	16	16
8. TRANSPORT TANK	EQUIPMENT	1				1	9	9	0	0	0	0	9	9
9. FURNITURE EQUIPMENT	MACHINES	1				1	32	32	0	0	0	0	32	32
10. WOOD DRYING KILN	EQUIPMENT	1				1	17	17	0	0	0	0	17	17
11. LARGE TRUCKS	VEHICLE	2				2	18	36	0	0	0	0	36	36
12. JEEP	VEHICLE	1				1	13	13	0	0	0	0	13	13
13. MOTORCYCLES	VEHICLE	4				4	1.3	5.2	0	0	0	0	5.2	5.2
LUWU														0
1. LIGHT BANK	EQUIPMENT	13				13	0.045	0.585	0	0	0	0	0.585	0.585
2. VORTEX BLOWER	EQUIPMENT	4				4	0.3	1.2	0	0	0	0	1.2	1.2
3. PUMP	EQUIPMENT	4				4	0.675	2.7	0	0	0	0	2.7	2.7
4. FILTRATION/CARTRIDGES	EQUIPMENT	1				1	0.75	0.75	0	0	0	0	0.75	0.75
5. DIESEL GENERATOR	EQUIPMENT	4				4	4.5	18	0	0	0	0	18	18
6. AC ALGAE ROOM	EQUIPMENT	2				2	0.45	0.9	0	0	0	0	0.9	0.9
7. FREEZER	EQUIPMENT	1				1	0.8	0.8	0	0	0	0	0.8	0.8

8. REFRIGERATOR	EQUIPMENT	1					1	0.5	0.5	0	0	0	0	0.5			
9. TEMP CONTROL LRT/MT	EQUIPMENT	1					1	2.25	2.25	0	0	0	0	2.25			2
10. TEMP CNTRL RACEWAYS	EQUIPMENT	1					1	3.7	3.7	0	0	0	0	3.7			
11. LABORATORY EQUIP	EQUIPMENT	1					1	3	3	0	0	0	0	3			
12. REDUNDANCY	EQUIPMENT	1					1	6	6	0	0	0	0	6			
13. CONTNRS	EQUIPMENT	40					40	0.15	6	0	0	0	0	6			
TOTAL EQUIPMENT COSTS									946	70.1	70.1	68	0	1154.2		0	115
II. WORKING CAPITAL																	
1. COOP ENTPRS INNVTN FD	CAPITAL	20	10	10	1.2		41.2	25	500	250	250	30	0	1030			1
2. PUSPETA MALANG	CAPITAL	10	12	10			32	25	250	300	250	0	0	800			8
3. FCC LUWU	CAPITAL	10	8	6			24	25	250	200	150	0	0	600			6
4. PUSPETA BOYOLALI	CAPITAL	8	8	8			24	25	200	200	200	0	0	600			6
5. PUSPETA KLATEN	CAPITAL	8	8	8			24	25	200	200	200	0	0	600			6
TOTAL WORKING CAPITAL									1400	1150	1050	30	0	3630		0	36
III. RECURRENT COSTS																	
A. SALARIES-MALANG																	
1. MANAGERS	MANMONTHS	12	12	8	4		36	0.35	4.2	4.2	2.8	1.4	0	12.6	6.3	6	
2. ASSISTANT MANAGER	MANMONTHS	12	12	8	4		36	0.275	3.3	3.3	2.2	1.1	0	9.9	4.95	4.	
3. DIVISION MANAGERS	MANMONTHS	36	48	32	16		132	0.15	5.4	7.2	4.8	2.4	0	19.8	9.9	9	
4. ADMINISTRATORS	MANMONTHS	72	120	80	40		312	0.065	4.68	7.8	5.2	2.6	0	20.28	10.14	10.	
5. FORMEN	MANMONTHS	48	72	48	24		192	0.065	3.12	4.68	3.12	1.56	0	12.48	6.24	6.	
6. TECHNICIANS	MANMONTHS	36	48	32	16		132	0.125	4.5	6	4	2	0	16.5	8.25	8.	
7. SALES	MANMONTHS	24	36	24	12		96	0.05	1.2	1.8	1.2	0.6	0	4.8	2.4	2.	
8. EXTENSION	MANMONTHS	36	36	36	36	36	180	0.05	1.8	1.8	1.8	1.8	1.8	9	4.5	4.	
9. LABORERS	MANMONTHS	72	120	80	40		312	0.04	2.88	4.8	3.2	1.6	0	12.48	6.24	6.2	
10. MECHANICS	MANMONTHS	24	24	16	8		72	0.075	1.8	1.8	1.2	0.6	0	5.4	2.7	2.	
11. DRIVERS	MANMONTHS	24	24	16	8		72	0.04	0.96	0.96	0.64	0.32	0	2.88	1.44	1.4	
B. SALARIES-LUWU																	
1. GENERAL MANAGER	MANMONTHS	12	12	8	4		36	0.35	4.2	4.2	2.8	1.4	0	12.6	6.3	6.	
2. FCC MANAGERS	MANMONTHS	48	48	32	16		144	0.15	7.2	7.2	4.8	2.4	0	21.6	10.8	10.	
3. HATCHERY MANAGER	MANMONTHS	6	12	10	6		34	0.3	1.8	3.6	3	1.8	0	10.2	5.1	5.	
4. TRACTOR UNIT MANAGER	MANMONTHS	12	12	8	4		36	0.125	1.5	1.5	1	0.5	0	4.5	2.25	2.2	
5. DIVISION MANAGERS	MANMONTHS	36	36	24	12		108	0.15	5.4	5.4	3.6	1.8	0	16.2	8.1	8.	
6. DIVISION MGRS.-FIELD	MANMONTHS	168	168	112	56		504	0.1	16.8	16.8	11.2	5.6	0	50.4	25.2	25.	
7. ADMINISTRATORS	MANMONTHS	192	192	128	64		576	0.065	12.48	12.48	8.32	4.16	0	37.44	18.72	18.72	
8. FORMEN	MANMONTHS	72	72	48	24		216	0.065	4.68	4.68	3.12	1.56	0	14.04	7.02	7.02	
9. TECHNICIANS	MANMONTHS	24	36	24	12		96	0.125	3	4.5	3	1.5	0	12	6	6	
10. PRODUCTION	MANMONTHS	96	96	64	32		288	0.06	5.76	5.76	3.84	1.92	0	17.28	8.64	8.64	
11. MECHANICS	MANMONTHS	96	96	64	32		288	0.075	7.2	7.2	4.8	2.4	0	21.6	10.8	10.8	
12. SALES	MANMONTHS	96	96	64	32		288	0.05	4.8	4.8	3.2	1.6	0	14.4	7.2	7.2	
13. OPERATIONS	MANMONTHS	72	72	48	24		216	0.05	3.6	3.6	2.4	1.2	0	10.8	5.4	5.4	
14. EXTENSION	MANMONTHS	48	48	48	48	48	240	0.05	2.4	2.4	2.4	2.4	2.4	12	6	6	
15. LABORERS	MANMONTHS	120	120	80	40		360	0.035	4.2	4.2	2.8	1.4	0	12.6	6.3	6.3	
16. DRIVERS	MANMONTHS	72	72	48	24		216	0.04	2.88	2.88	1.92	0.96	0	8.64	4.32	4.32	
C. SALARIES-BOYOLALI																	
1. GENERAL MANAGER	MANMONTHS	6	12	10	6	2	36	0.35	2.1	4.2	3.5	2.1	0.7	12.6	6.3	6.3	
2. ASSISTANT MANAGER	MANMONTHS	6	12	10	6	2	36	0.275	1.65	3.3	2.75	1.65	0.55	9.9	4.95	4.95	
3. DIVISION MANAGERS	MANMONTHS	18	48	40	24	8	138	0.15	2.7	7.2	6	3.6	1.2	20.7	10.35	10.35	
4. ADMINISTRATORS	MANMONTHS	36	96	80	48	16	276	0.065	2.34	6.24	5.2	3.12	1.04	17.94	8.97	8.97	
5. FORMEN	MANMONTHS	18	48	40	24	8	138	0.065	1.17	3.12	2.6	1.56	0.52	8.97	4.485	4.485	
6. TECHNICIANS	MANMONTHS	12	24	20	12	4	72	0.125	1.5	3	2.5	1.5	0.5	9	4.5	4.5	
7. SALES	MANMONTHS	12	36	30	18	6	102	0.05	0.6	1.8	1.5	0.9	0.3	5.1	2.55	2.55	
8. EXTENSION	MANMONTHS	18	36	36	36	36	162	0.05	0.9	1.8	1.8	1.8	1.8	8.1	4.05	4.05	
9. LABORERS	MANMONTHS	36	72	60	36	12	216	0.04	1.44	2.88	2.4	1.44	0.48	8.64	4.32	4.32	
10. MECHANICS	MANMONTHS	12	24	20	12	4	72	0.075	0.9	1.8	1.5	0.9	0.3	5.4	2.7	2.7	
11. DRIVERS	MANMONTHS	12	24	20	12	4	72	0.04	0.48	0.96	0.8	0.48	0.16	2.88	1.44	1.44	
D. SALARIES-KLATEN																	
1. EXTENSION	MANMONTHS	36	36	24	12	6	114	0.1	3.6	3.6	2.4	1.2	0.6	11.4	5.7	5.7	

2. ADD SERVICES	MANMONTHS	36	36	24	12	6	114	0.15	5.4	5.4	3.6	1.8	0.9	17.1	8.55	8.55
3. TRAINERS	MANMONTHS	24	24	18	6		72	0.1	2.4	2.4	1.8	0.6	0	7.2	7.2	
4. PUBLIC RELATIONS	MANMONTHS	12	12	12	12		48	0.15	1.8	1.8	1.8	1.8	0	7.2	7.2	
TOTAL PERSONNEL COSTS									150.7	185	132.5	73.03	13.25	554.55	284.48	270.08
IV. TRAINING																
1. MALANG	LUMPSUM	1.5	0.5	0.5	0.5		3	20	30	10	10	10	0	60		60
2. LUWU	LUMPSUM	1.5	1	0.5			3	20	30	20	10	0	0	60		60
3. BOYOLALI	LUMPSUM	1.5	0.5	0.5	0.5		3	20	30	10	10	10	0	60		60
4. KLATEN	LUMPSUM	1	0.5	0.5			2	20	20	10	10	0	0	40		40
TOTAL TRAINING COSTS									110	50	40	20	0	220	0	220
V. TECH ASSISTANCE/ADMIN																
A. LONG TERM CORE STAFF																
1. CHIEF OF PARTY	MANMONTHS	12	12	12	12	12	60	5.8	69.6	69.6	69.6	69.6	69.6	348	348	
2. MALANG ADVISOR	MANMONTHS	12	12	12			36	5.4	64.8	64.8	64.8	0	0	194.4	194.4	
3. LUWU ADVISOR	MANMONTHS	12	12	6			30	4.5	54	54	27	0	0	135	135	
4. BOYOLALI ADVISOR	MANMONTHS	6	12	12	6		36	4.5	27	54	54	27	0	162	162	
B. LONG TERM TECHNICIANS																
1. HATCHERY ADVISOR	MANMONTHS	12	12				24	4.5	54	54	0	0	0	108	108	
2. LIVESTOCK ADVISOR	MANMONTHS	12	12	12			36	3	36	36	36	0	0	108	108	
C. LOCAL CONSULTANTS	MANMONTHS	12	12	12	12		48	1	12	12	12	12	0	48	48	
D LONG TERM STAFF SUPPORT																
1. HOUSING/UTILITIES	RENTMONTHS	66	72	54	18	12	222	0.9	59.4	64.8	48.6	16.2	10.8	199.8	199.8	
2. INT TRAVEL/PER DIEM	TRIPS/FM M	10	0	10	6	2	28	1.8	18	0	18	10.8	3.6	50.4	50.4	
3. LOCAL TRAVEL/PER DIEM	MANMONTHS	66	72	54	18	12	222	0.45	29.7	32.4	24.3	8.1	5.4	99.9	99.9	
4. REST AND RELAXATION	TRIPS	10	8	2	2	2	24	1.2	12	9.6	2.4	2.4	2.4	28.8	28.8	
5. VHCLE OPRTNS/MNTNCE	LUMPSUM	5.5	6	4.5	1.5	1	18.5	2.25	12.38	13.5	10.13	3.375	2.25	41.625	41.625	
6. OFFICE FURN/EQUIPMT	LUMPSUM	2	2				4	7	14	14	0	0	0	28	28	
7. OFFICE SUPPL/UTLTS	LUMPSUM	2	2	1	1	1	7	3	6	6	3	3	3	21	21	
8. OFFICE OPERATIONS	LUMPSUM	2	2.5	2	1	1	8.5	3	6	7.5	6	3	3	25.5	25.5	
9. COMMUNICATIONS	LUMPSUM	2.5	3.5	3.5	2.5	2	14	1.5	3.75	5.25	5.25	3.75	3	21	21	
10. PERSONAL EFF/AIRFRT	TRIPS	6	0	2	2	1	11	3	18	0	6	6	3	33	33	
11. ADMIN STAFF/DRIVERS	MANMONTHS	156	180	120	96	72	624	0.12	18.72	21.6	14.4	11.52	8.64	74.88	74.88	
TOTAL TECH ASST/SUPPORT									515.3	519.1	401.5	176.7	114.7	1727.3	1727.3	0
TOTAL PROJECT SUPPORT COSTS									515.3	519.1	401.5	176.7	114.7	1727.3	1727.3	0
TOTAL OVERHEAD @ 39.32% PROJECT SUPPORT COSTS									202.6	204.1	157.9	69.5	45.1	679.18	679.18	0
TOTAL TITLE II/416 STAFF, SUPPORT, CAPITAL, OVERHEAD COSTS									795.4	817.8	627.4	284	166.4	2691	2691	0
TOTAL TITLE I/601 LAND, CONST, TRAINING, CAPITAL COSTS									3083	1418	1282	210.8	6.625	6000	0	6000
TOTAL PROJECT COSTS									3878	2236	1909	494.8	173	8691	2691	6000

Appendix 1

Daily Energy, Protein and Fat Consumption per Capita by Income Groups And Area For Indonesia

	Income Groups (Rupiah/month)	Population as % of Region	Population as % of Nation	Energy Intake (a) kcal	Protein Intake (a) Animal g.	Protein Intake (a) Vegetable g.	Protein Intake (a) Total g.	Fat Intake g.	Protein Calories %	Fat Calories %
INDONESIA										
Rural	< 300 - 1,000	46.40	38.52	1,440	4.0	30.0	34.0	13.0	9.5	8.1
	1,001 - 2,000	38.19	31.70	2,030	9.5	36.5	46.0	24.5	9.2	10.9
	2,000 - 3,000	10.05	8.34	2,610	16.0	44.5	60.5	41.0	9.3	14.1
	> 3,000	5.37	4.46	3,350	28.0	55.0	83.0	66.0	9.9	17.7
			83.02	1,890	8.0	37.0	44.0	23.0	9.4	11.5
Urban	< 300 - 1,000	23.37	3.97	1,120	3.0	20.0	23.0	11.0	8.3	8.6
	1,001 - 2,000	44.37	7.53	1,560	7.0	26.0	33.0	21.0	8.5	12.4
	2,001 - 3,000	19.15	3.25	1,910	13.0	30.0	43.0	35.0	8.9	16.4
	> 3,000	13.11	2.23	2,400	20.5	37.5	58.0	53.5	9.6	20.1
			16.98	1,600	9.0	27.0	36.0	26.0	8.8	14.2
Rural - Urban	< 300 - 1,000	42.49		1,400	3.5	29.5	33.0	13.0	9.4	8.2
	1,001 - 2,000	39.23		1,950	8.5	35.5	44.0	24.0	9.0	11.1
	2,001 - 3,000	11.59		2,450	15.0	41.0	56.0	39.0	9.2	14.6
	> 3,000	6.69		3,050	26.0	49.0	75.0	62.0	9.8	18.3
			100.0	1,850	8.5	34.5	43.0	23.5	9.3	11.6

Note : (a) Mean energy and protein and fat intakes weighed by numbers of population in each income at regional and national level.

Source : Central Bureau of Statistics - 1969/1970 National Social Economic Survey (U.S.$ 1 = Rupiah 415)

APPENDIX 2

TRIP REPORT

TO: SOUTH SULAWESI
DATES OF TRAVEL: MARCH 30-APRIL 5, 1984
PURPOSE OF TRIP: TO SURVEY PROBLEMS AND POTENTIALS FOR SHRIMP CULTURE ON SULAWESI.

I left for Sulawesi by way of Bali on March 30 and arrived in Ujung Pandang about 8:30 in the morning on the morning of March 31. I was supposed to be met at the airport with the AID car but there was a mixup and I missed the connection. I took a taxi in to the town and went to the office of Dinas Perikanan where I met A Syahran Aidid the Chief of the Fishing Development Unit. He helped me get to the hotel Pondok Delta where AID people usually stay and I was able to contact Mrs. Sonya Marikar Sahib the AID liaison person and link up with the AID car from there.

While I was at the Dinas Perikanan Office I was able to discuss fish and shrimp farming and I told them that I hoped to do a survey of the Sulawesi area for a possible project in shrimp culture. According to Mr. Aidid, South Sulawesi estimates that it needs one billion shrimp seed stock per year and the present supply is only about 200 million from natural stocks. He estimated that there were 50,000 hectares of brackishwater fish and shrimp ponds already in existence on S. Sulawesi. In addition there are large numbers of freshwater fishponds that are presently used for milkfish production where freshwater shrimp could be cultured. I was able to see many of these freshwater ponds on the way in to town and they looked much better than the ponds I have seen on Java. There are four Kabupatans(districts) that presently have large numbers of brackishwater ponds. The Office of Dinas Perikanan appeared to be happy that I stopped by as they like to know what is happening in their region. I was particularly careful to stress that I was only doing a preliminary survey of potentials in their area.

After obtaining the use of the AID car we left Ujung Pandang about 1:30 pm in the hopes of visiting two shrimp hatcheries on the western coast of S. Sulawesi. Because of the late start we did not get to the first hatchery until about 3:30 pm and therefore we only had time to interview at one hatchery, at Barru, operated by P.T. Bonecom. I was able to talk to the manager of the hatchery, a Mr. Y. Nukiyama, who is a Japanese biologist hired by the company. I went through a questionaire

that I had prepared for hatcheries and he was very helpful in sharing his information with me. I will present the data from the questionaire in a later report when I get additional information from other hatcheries. However, a general summary of our discussion is presented here. The Bonecom hatchery is a typical Japanese style hatchery with large production tanks that are fertillized and innoculated with algae, rotifers and Artemia as food for the shrimp larvae. The hatchery has been in operation for about 2 years and they produced about 1.6 million shrimp(P. monodon) last year. The survival has been very low, 5-10%, and the results have been unpredictable. The production target for the hatchery is 40 million. He feels that one of his biggest problems is trained manpower and he is providing on-the-job training to his personnel in order to upgrade their skills. He is able to obtain Artemia through importation but would be very happy if he could get a supply from within country. He does have a supply of an algae I have not seen yet in Indonesia, Chaetoceros speritorium, which could be useful to some of the other hatcheries in operation as it should be the right size for early larval stages. I told him of the project on Java and that we had another species of Chaetoceros and he would like to get a culture of that species. There appears to be enough wild brood stock at this time but if addtional hatcheries are built captive maturation of spawners may have to carried out to obtain the requisite number of broodstock. Mr. Nukiyama felt that the following areas needed the most support:

1. Broodstock survey
2. Improved algae culture techniques and species.
3. Better fishpond design
4. Larval food development as well as a good pond food.

I spent 2 hours talking with Mr. Nukiyama and I felt that he was very knowledgeable concerning the problems of shrimp hatchery culture in Indonesia. His hatchery is very well designed and should be able to produce more shrimp after he works the bugs out of his system.

We then tried to stop at the Cooperative Office in Parepare to see what work they were doing in shrimp culture but they were closed. We decided not to try to go to the small shrimp hatchery at Suppa because of the late hour. We went on to Rantepao where we spent the next day, Sunday, before we went down the mountains to Palopo.

On Monday we arrived at Palopo about 10:30 am where we met with Mr. Jim Tembrink, who is working at the farmers cooperative. We immediately went over to the office of Dinas Perikanan and discussed the needs and problems of shrimp

farmers in the area. There are approximately 5,000 hectares of shrimp and fish ponds all ready complete in the Palopo area. Dinas Perikana thinks that there is a potential for 10,000 to 20,000 hectares more. The shrimp seed stock demand for Palopo is about 100 million and the supply is only about 500 thousand. Obviously they are interested in having a shrimp hatchery.

We discussed possible sites for shrimp hatcheries with the Dinas Perikanan staff and then we went out into the field to look at several sites. We looked at 4 locations and two of them appeared acceptable for shrimp hatcheries. The first was at Songka, about 5 km. south of Palopo. The salinity was a little low at 22 ppt (30 ppt being optimal) and the inshore water temperature was a little high at 36 degrees C. The land area would have to filled in order to construct any building and there is not electricity to the site. If the water farther off-shore was of higher salinity and better temperature the site might be passable for a small hatchery. The second site was at Karang Karangan next to the new Pertamina depot about 20 km. south of Palopo. This site is a much better site and in fact was probably the best site we looked at if the Pertamina facility does not pollute the area. Theoretically a oil storage area should not pollute the surrounding area. The salinity at this site was 30 ppt and the water temperature was 35 degrees C. A second investigation the next day about 200 meters offshore showed a water temperature of 32 degrees and salinity stabile at 30 ppt. There is adequate land right on the shoreline and electricity will soon be brought in to the area. There is already a small rock jetty that could be used to carry a pipe out in to the ocean. In addition there is a small freshwater stream that can be used to control salinity in any nursery ponds that might be constructed. The site should be monitored for water quality parameters, ie. salinity, pH, temperature and turbidity, and if these indicators appear satifactory the site could be considered for construction of a shrimp hatchery.

After eating lunch we drove 100 km. to the north beyond Bone Bone to the small village of Lemo. Lemo is about 3 kms. off the main road and four wheel drive is necessary to get there. The area appears to be suitable as a hatchery site except for the poor access. The salinity was 29.5 ppt in the surf and the temperature was 33 degrees C. There is also a small river flowing in to the ocean and the salinity at low tide was 5 ppt. There is adequate high land to build on but there is no electricity to the area. However, if the road were improved the site could be quite good if adequate electrical supply was provided.

The next day we used the Bupati's boat for an ocean survey. There was nothing suitable for 10 kms. north of Palopo so we turned south and observed the Pertamina site from the sea and also a high rise of land 5 kms. to the south of the Pertamina site. The rise of land was not suitable for a hatchery site because of the steep slope of the land and lack of access.

We left for Ujung Pandang at 1:30 pm after discussing our findings with the Kepala Dinas for the Fisheries Office. I left a questionaire to be filled out by local fishpond owners. I also left a Hatchery Questionaire with Jim Tembrink that he will take to the Suppa hatchery site. When these two questionaires have been returned to me I will summarize the information in a final report to AID.

On the way back to Ujung Pandang we stopped at a small beach 70 kms. south of Palopo called Bone Puti that had excellent sea water conditions, easy access and adequate land area for a hatchery. The population density is a little high and there is no electricity but the site could be developed for a hatchery.

In conclusion, we were able to identify four possible hatchery sites with the Pertamina site appearing to have the best immediate potential.

The next day in Ujung Pandang we visited P.T. Bonecom offices but were not able to have an audience with the manager. We then went to P.T. Serdid and had an excellent meeting with the Director, Mr. Sjamsylbachri Sjamsudwin, and the Managing Director Mr. Sjamsul Bachri S. (Tel. no. 22107-7178). According to them there are approximately 45,000 ha. of ponds presently in production in S. Sulawesi and that number could be tripled. The average yield of shrimp is below 100 kg. per hectare because of poor pond conditions and lack of seed stock. They are presently paying 7000 Rp. per kg. for headless shrimp with a size of 1-20 per kg. and 6,000 Rp. per kg. for 21-35 per kg. and 5,000 Rp. per kg. of size 36-50. They were very interested in Macrobrachium and will pay 4,500 per kg. for headless freshwater prawns of all standard large sizes. They also said they would like to deal in larger quantities but would buy small amounts of freshwater shrimp to promote their culture and help the small farmer. I told them of the seed stock available for freshwater shrimp on Java and they wanted to order 150,000 seed stock from the Prigi hatchery for some freshwater ponds that they operate. They have just finished their own saltwater shrimp hatchery but are having no production success. I told them about the hatchery training program at Jepara and they would like to send one man to observe that program. I was very pleased with the enthusiasm of this company and they were very helpful in

providing insights into the Sulawesi situation.

My overall impression was that Sulawesi has excellent potential for both freshwater and saltwater shrimp culture. There are many rivers in the Palopo area with excellent water quality that could be used as water supplies for freshwater shrimp ponds. A freshwater shrimp hatchery is needed to support pond culture efforts. The saltwater shrimp ponds would benefit from the construction of some hatcheries and we identified several areas that are adequate hatchery sites. There is also room for expansion of the ponds dedicated to brackish water production. Trained manpower and lack of physical infrastructure will be problems in the area for many years but this can all be upgraded. The greatest needs are to help improve production in those hatcheries that are all ready in existence, upgrade the technical level of personnel, build one or two new hatcheries on the eastern coast, provide extension to pond owners and help to improve their ponds.

The economic impact of a development program for shrimp culture could be immense. Technical improvements in shrimp pond culture could increase shrimp production by several hundred percent. This translated over 40-50 thousand hectares of ponds would be a substantial boost to the economy. This is particularly important as the area around Palopo is a transmigration area and anything that can create higher income and more jobs should be encouraged.

If additional hatcheries are constructed it would be a good idea to have a program for the production of brine shrimp within country so that hatcheries would not have to be dependent upon imported brine shrimp stocks. This technology is available and some potential sites have been identified in Madura and northern Java.

I would be happy to have further input into the planning process for any proposed projects on Sulawesi.

APPENDIX 3

FINAL REPORT

Luwu Area and Transmigration Development
Project
(Final Evaluation, Phase I)
Under Contract No. PDC-1406-I-05-1096-00
Work Order No. 5

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September 1983

CHAPTER I

THE KEY ISSUES: CONCLUSIONS AND RECOMMENDATIONS

Donald C. Taylor and Russell H. Betts

Indonesia is among those developing nations which still have an opportunity to choose among several possible development alternatives. Area development with irrigated agriculture designed to utilize abundant land and water resources, to settle people in sparsely populated areas, to increase food production, and generally to improve regional economies, is one such alternative which has been attempted. The Luwu Area and Transmigration Development Project (Project Luwu, or PROLU) constitutes one of the first such attempts in Indonesia, and the anticipated termination in December 1983 of USAID's donor agency support to the effort therefore provides an unusual opportunity to examine the strategy of area development as a means to achieve national objectives.

More specifically, termination of AID funding provides an opportunity to learn from the PROLU experience how area development projects actually work and to assess whatever there may be in the development process that does not work and why. Knowing how something works is more important than cataloging specific achievements, especially if the process for development is to be tried again.

It was planned that this examination would be undertaken in two phases, with the first phase looking at selected specific project components and the second phase examining broader issues relating to overall strategies for integrated development. An experienced multidisciplinary team was given the task of undertaking the first phase of this assessment, not to evaluate quantitatively or qualitatively the project, but to try and determine from that experience what guidelines or lessons could be identified that might be applied elsewhere in future area development projects. The findings and recommendations that follow reflect this learning process as identified by the Team.

In accordance with the Team's Scope of Work, as modified and expanded and as described in the Foreword to this report, this chapter both addresses project-specific issues and, when appropriate, generalizations concerning "lessons learned" which may have broader applicability. Conclusions and recommendations are grouped to reflect what the Team considers its most important findings relevant to the three separate project components which it was specifically charged with investigating. Additionally, a fourth grouping addresses other project-specific matters which lie somewhat outside the Team's Scope of Work, but which merit mention nonetheless. This fourth grouping also tentatively addresses some of the broader, generic issues concerned with overall strategies for integrated rural development which originally were expected to be the focus of the second phase of this final evaluation of PROLU.

Much of the data and background material upon which these observations are based is contained in the subsequent chapters of this report and, therefore, for the sake of brevity, is not repeated here. Also for the sake of brevity, the Team has not included in this chapter an all-inclusive itemization of its conclusions and recommendations. Instead, it has attempted to aggregate findings and consolidate recommendations in order to focus only on what it has come to consider to be the key issues, the major problems, the most impressive examples of positive aspects, and/or the basic "lessons learned." Those readers who are concerned with greater specificity are also encouraged to refer to the remaining chapters of the report.

The PROLU Study Team's key conclusions and recommendations are detailed on the following pages.

A. <u>The Farmers Cooperative Center Project Component</u> (PPK Luwu)

The activities of PPK Luwu have served effectively to strengthen the capacity of village-unit cooperatives (KUDs) in Luwu to provide input and marketing services to their members. Within the short time-space of four years since Luwu's FCCs were first established, the FCCs have come

to account for over 90 percent of the agricultural inputs sold in the primary project area. The FCCs' paddy purchasing activities have brought direct benefits to KUDs and their members. Further, the FCCs have been directly instrumental in strengthening the capacity of KUDs to perform effectively and efficiently the services that they provide to their farmer members.

While certain "free enterprise" elements are inherent in the PPK Luwu structure, it is clear that until now these elements have been overshadowed by the contribution of GOI (USAID) financial support to PPK Luwu.

A study of PPK Luwu's financial statements shows that it is a fast-growth enterprise, and that there is a definite upward trend over time in the "surpluses" ("operating profits") that have been realized from FCC operations. It is also true, however, that over one billion rupiah of non-interest and low-interest bearing "loans" have been provided by the GOI (and USAID) to help establish and operate Luwu's FCCs. One reflection of the magnitude of this support is that PPK Luwu's total "retained earnings" until now represent less than 10 percent of its overall equity capital.

Five key analytic issues underlie the considerations of policy-makers as they seek over the next several months to redesign and refine Indonesia's policies toward farmers cooperatives. These issues concern:

- Whether FCCs will come to be interim or permanent features in the structure;
- The nature of relationships between Provincial PUSKUDs and kabupaten-level PUSKUDs;
- The nature of relationships between kabupaten-level PUSKUDs and KUDs;
- The extent and nature of Government involvement in FCCs and;
- Who will reap the benefits of economic power from the FCCs.

These important issues are elaborated upon in Chapter II.

Recommendations of the Team are described below.

1. There is a definite need for kabupaten-level PUSKUDs to bridge the gap between Provincial PUSKUDs and individual KUDs. Therefore legal sanction should be granted to kabupaten-level PUSKUDs.

The justification for kabupaten-level PUSKUDs arises from two standpoints -- to mitigate the logistical burdens of long-distance administrative and business communications and to take advantage of economies-to-scale in the provision of services to KUDs and their members.

2. The option of having more than one FCC per kabupaten should be left open.

The physical size, state of economic and institutional development, and intensity of agricultural economic activity vary much from one kabupaten to another within Indonesia. In some kabupatens, the rationale for having more than one FCC is weak. In others, it is not. A rigid policy of one FCC per kabupaten is, therefore, not well-advised.

3. Serious consideration should be given to granting business autonomy to kabupaten-level PUSKUDs.

We recognize the need for administrative ties between kabupaten-level PUSKUDs and Provincial and National PUSKUDs. From the standpoints of simplified logistics and improved incentives for economic efficiency, however, we believe that kabupaten-level PUSKUDs should be granted business autonomy. Such autonomy is not only in the best interest of KUDs and their members, but also is in the best interest of the country's regional economic growth and development.

4. Caution needs to be exercised in not prematurely by withdrawing government financial support from PPK Luwu.

Creating viable economic institutions in primative economic environments such as that in Luwu before PROLU takes time. While Luwu's

FCCs show definite signs of "economic health," they are not yet at the point where they can stand on their own economically. We therefore recommend that the GOI carefully study those aspects of future FCC development and operations that require further financial nurturing, and that they provide continued financial support in accordance with the results of such study.

5. Considerable care needs to be exercised to keep national policies from encumbering the effective operation of individual kabupaten-level PUSKUDs.

Critical elements in the technical, institutional, and economic environment within which various kabupaten-level PUSKUDs operate differ greatly from one region to another. In formulating national cooperative policies, much discretion needs to be exercised so that the policies will indeed facilitate, and not inadvertently impede, the development of strong local cooperative activities.

6. Considerable care needs to be exercised to keep the rural elite from capturing for themselves "the lion's share" of economic benefits from farm cooperative activities.

As PPKs grow in their economic viability, the interests of people in trying to tap some of the economic power for themselves are bound to arise. While dealing effectively with this issue is inherently problematic, we believe certain actions could be undertaken to help insure as wide as possible a diffusion among the farming community of the fruits of economic power generated by the cooperatives. Principles of institutional design that we believe might offer prospect for helping to ensure a wide distribution of the economic power are included in Chapter II.[1/]

1/ See also pp. 377-381 of the Bromley, et. al. Article on, "Water Reform and Economic Development", cited in Appendix C.

APPENDIX 4

EXECUTIVE SUMMARY

In July, 1981 AID issued a Transfer Authority for the transfer of PL 480 Wheat to CLUSA for use in Indonesia. CLUSA had been working with Indonesian cooperatives since 1976 under an Operational Program Grant Agreement. One of its activities had been to work with the Directorate General of Cooperatives in Kabupaten Klaten in Central Java to study and plan conditions and supporting assistance necessary for making this a successful example of local cooperative development. From this emerged the concept of the PUSPETA (acronym for PUSAT PELAYANAN PETANI meaning Farmers' Service Center).

PUSPETA Klaten was established on January 1, 1980 as a pre-secondary cooperative society operating as a special government project. CLUSA personnel began working with Indonesian counterparts to organize farmers' groups, develop improved management systems and identify agribusiness opportunities. However, resources were inadequate to follow through successfully with planned programs. CLUSA submitted a proposal to USAID in October 1980 for funding. The July, 1981 Transfer Authorization granted CLUSA 5,785 tons of wheat, which CLUSA sold to BULOG for a net revenue of $1,313,090.12. The funds were deposited in a special account to be used in support of the PUSPETA Klaten Project. Interest from undisbursed deposits had accumulated to $160,915 by December 31, 1983, providing a total of $1,402,813 available for the project.

The stated objectives of the project are "to strengthen, reorganize and revitalize village cooperatives by use of a cooperative federation in Kabupaten Klaten. The aim of the project is to improve the rural food systems and incomes by encouraging farm leaders to develop existing cooperatives into growth orien-

ted agribusinesses from the "bottom up" by improving cooperative management and thereby increasing agricultural production, diversifying crops cultivated, building cooperative capital, providing production credit, processing and marketing rural products and initiating activities in new agricultural business areas."

CLUSA, in addition to the financial and commodity support it provides from the PL 480 Title II wheat sales, acts as consultant and advisor to the project. CLUSA personnel costs for support of the project, including the CLUSA representative and a dairy advisor, are provided under an OPG.

The purpose of this evaluation is to assess the development of PUSPETA Klaten, the degree to which the project purposes have been achieved and the impact of PUSPETA and its activities on farmer benefeciaries.

The evaluation was carried out by a four member team from January 19th to February 15th, 1984. The team held discussions with GOI officials in Jakarta before going to the field to study project operations. The following three weeks were spent in the Klaten area interviewing PUSPETA staff, examining PUSPETA's various business activities and holding discussions with KUD board members, managers and cooperative members as well as local government and cooperative officials and drafting the evaluation report.

Major Findings

The Project Document is unrealistic in its expectations that the very ambitious objectives could be achieved within the three year life of the project. This is an "institution building" project involving important social and organizational changes which can not be accomplished quickly. But the team concludes that the project has made substantial progress, particularly in the last year toward meeting these objectives.

The Project Document made overly optimistic assumptions concerning the success already achieved in reorganizing KUDs in Klaten Kabupaten. Legal, cultural and social factors are constraints that make it difficult to create the kind of "bottom up" democratic local organization envisioned. Nevertheless, PUSPETA has been successful in organizing farmers and laborers into groups for a variety of business activities and through these activities achieved participation of a large number of members in cooperative activites.

The Project Document identified the livestock feed industry as one of the most promising of the agribusiness activities around which PUSPETA should begin its services and funds were committed early to investments in a feed mill complex and silos and equipment for silage making. At the same time over one thousand imported dairy cattle were distributed through the KUDs to farmers in Klaten Kabupaten, dictating that the feed program focus largely on dairy cows and that milk marketing become another major business activity of PUSPETA.

Unfortunately, the practical difficulties of establishing a dairy industry based on modern feed technology and dairy manage-

ment in an area where farmers had little or no previous experience in dairying was underestimated. Whereas yields of 20 liters per cow per day were expected, the initial production averaged a little better than 6 liters. The initial formulae for concentrates for the dairy rations depended on expensive imported materials and were not competitive with feeds from local sources. The initial experience with silage making, while producing a good quality feed, proved more costly than expected. This venture absorbed much of the time and effort of the management staff in 1982 and 1983. A research program to identify and solve the dairy management problems and to lower the costs of feed was initiated. In the latter part of 1983, a grant from Heifer Projects International was made through ELUSA for financing a comprehensive dairy management training program and feed research program. These activities are beginning to show promising results. PUSPETA management is introducing a new feed formula this month that substantially reduces the cost of dairy feed. The training program is expected to have an important impact on production per lactating cow and shortly increase the percentage of cows in lactation.

The milk marketing activity has become a major activity, representing 10% of PUSPETA's total volume of business. Farmers are now receiving 20% more per liter of milk than they were before PUSPETA began the milk marketing operation last May.

The feed mill unit has been used to produce concentrate feed for cattle and extruded bran for the poultry industry. Development of a concentrate feed formula that reduces the costs per kg by 30% is going into production this month and the management projects a large increase in its sales this year.

PUSPETA Klaten began an egg marketing activity last September and in November made arrangement with a wholesaler in Jakarta to deliver 12 tons of eggs a week. Eggs are picked up at the KUDs every other day and paid for on the basis of the wholesale market price in Jakarta.

In 1983 PUSPETA introduced a credit program for farmers who grow cloves. In the past, because of a lack of credit, most farmers marketed their cloves individually to private traders, selling the crop before maturity at well below market prices. The PUSPETA program provided pre-harvest credit so participaing farmers could hold their crops until harvest time. The farmers received about Rp.1,000 per kg more for their crop under the program. While the program has generally been very successful some of the very small clove producers did not participate.

Another activity initiated by PUSPETA was a program for production of certified rice seed. Farmers' groups were organized in selected areas to produce certified seed according to instructions and under supervision of PUSPETA staff and BPSB (the seed certification and control organization). The program provided a profitable incentive to the participating farmers and produced 643,455 kg of high quality rice seed to help fill the large provincial deficit in available improved seeds.

PUSPETA has also found opportunities to provide business services to low income laborers and small or landless farmers. One such activity is a program of providing working capital to groups of families making tiles. These are very small scale, labor intensive operations requiring working capital for materials and fuel.

Recently PUSPETA arranged with a manufacturer and exporter to produce embroidered garments. Under this arrangement 30 young women between the ages of 14 - 22 were selected and trained for embroidering. They are paid on piece-work basis, with income depending on how much they produce. Each girl is provided with a sewing machine on a credit basis which she buys by small payments deducted from her earnings. This activity has been very popular and the number of girls employed in this business is now 90.

The business activities along with extension and training described above are some of the incremental and locally planned services performed by PUSPETA Klaten for the KUDs in addition to supporting them in conducting the government programs that all KUDs are expected to do such as procurement of rice, agro-input distribution, the TRI (sugarcane intensification program), etc.....

The Team observed the functioning of a neighboring Kabupaten, where the regular national system operates, with a PPK office at the Kabupaten level working as an arm of the provincial level secondary cooperative (PUSKUD). The inability of the PPK staff, though obviously competent, to initiate new business activities was clear. The PPK officers had no working capital, had no autonomy and were unable to respond effectively to requests from KUDs for help in developing economic opportunities.

PUSPETA is a pilot project to test a concept similar in purpose to the PPK system adopted by Indonesia in 1980 to act as intermediaries between the KUDs and the provincial level secondary societies (PUSKUD). PUSPETA Klaten is in fact a PPK, but a PPK with a difference. It is, technically PPK-PUSPETA Klaten, with a mandate to serve as a laboratory, to, as the Chief of Research and Development in the Ministry of Cooperatives says

"be a step ahead of the PPKs in finding better ways to provide services to the KUDs."

The Team concludes that PUSPETA Klaten has demonstrated the validity of the concept of an autonomous secondary cooperative at the Kabupaten level, the importance of organizing groups with common interests for productive business activities and the importance of good management and working capital to provide the marketing and credit support required for those business ventures to succeed. The project is an unusual and valuable laboratory for the practical testing of organizational and management concepts as well as improved agricultural production, processing and marketing technology.

The Team does not believe that PUSPETA Klaten is yet well enough established to serve as a model to be replicated. In any case, any model would need modification and adaptation to the particular condition in which it is applied. But it should have CLUSA and GOI support until it can refine its management structure and have a more secure financial position. In the mean time it should continue to explore and test better ways to serve the KUDs and members and establish a system for documenting how these services are organized and operated so that the successful ventures and methods can be replicated.

The project has not been as successful as planned in organizing the KUDs to provide broad, democratic participation for a "bottom up" development. The legal and cultural constraints may [illegible] limits on how much can be done and how quickly but the Team believes PUSPTA can do more than it is doing within these limitations. In particular, the Team feels there is insufficient communication from the KUDs to keep management informed of the economic opportunities, the problems of various economic groups and their priority needs so that PUSPETA can plan appropriate programs to meet the priority needs.

APPENDIX 5

There are no activities currently planned for inclusion into the Cooperative Agrobusiness Enterprise Development Project that will involve any significant alteration of the natural environment.

APPENDIX 6

REPUBLIK INDONESIA

DEPARTEMEN KOPERASI

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JAKARTA – PUSAT

Jakarta, 30 Nopember 1984

mor :567/DK/XI/1984
mpiran : 1 (satu) Project Document
rihal : Tambahan usulan proyek yang akan dibiayai dari dana PL-480 Tahun 1985.

Kepada Yth. :
Sdr. Deputi Bidang Ekonomi
BAPPENAS
UP
Kepala Biro K E L N

Menyusul surat kami terdahulu nomor 558/DK/XI/1984, tanggal 24 Nopember 1984 perihal usulan proyek yang akan dibiayai dari dana-PL 480 Tahun 1985, dengan ini kami sampaikan satu usulan proyek sebagai tambahan yaitu :

Cooperative Agrobusiness Enterprise Development Project.

Demikian kami sampaikan dan atas bantuan dan kerjasamanya di ucapkan terima kasih.

SEKRETARIS JENDERAL

DEPARTEMEN KOPERASI REPUBLIK INDONESIA

DAOED GADE

nbusan Yth. :

Bapak Menteri Koperasi
(Sbg. Laporan)
Waka BULOG/Ketua Team PL 480
Dirjen Binus
Dirjen BLK.
Kabalitbang Koperasi
Direktur USAID di JAkarta
Kepala Biro KTLN Sek. Kabinet
A r s i p.-