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**Case Studies of
Small Farmer-
Processor
Relationships in
Indonesia**

ADP Working Paper No. 4



AGRIBUSINESS DEVELOPMENT PROJECT

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by

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FOREWORD

The Agribusiness Development Project (ADP) seeks to generate broad-based and sustainable increases in employment and incomes by increasing the competitiveness, efficiency and growth of agribusiness in Indonesia. A critical element in achieving this objective is to support the development of an agribusiness sector that builds on the base of small-farmers agriculture that characterizes Indonesian agriculture.

The challenge of creating commercially viable small-farmer processor/trader linkages is high on the list of priorities of both the government and the private agribusiness sector. To date, there have been more failed attempts to integrate small farmers into agribusiness than there have been success. This study was designed to analyze a cross-section of cases in different product lines and in different regions to identify those factors associated with development of successful linkages.

ADP will be involved with the small-farmer/processor linkage issue for the life of the project. This paper is our initial attempt to systematically review success factors and to begin to build an approach that can be applied by businesses and the government to combine growth the agribusiness with a widespread distribution of its benefits.

EXECUTIVE SUMMARY

The following paper presents the findings and analysis related to a series of brief case studies examining a set of agro-processing enterprises, and the methods used to link those enterprises with the small farmers, on whom they rely as the source of their raw materials. Successful and unsuccessful linkages are identified and several factors are isolated which appear to account for that success (or lack of it). Successful linkages are defined as being those in which all parties are able to benefit from the relationship, there is a high degree of mutual dependence between the parties, the relationship is self-sustaining, and all parties have an acknowledged interest in extending the relationship.

The field research involved seven different enterprises and agricultural commodities ranging from palm oil to seaweed. The field team visited West Java, Lombok, Bali and South Sulawesi and interviewed key informants (owners, managers, farmers, extension officers, government officials and cooperative leaders) in each case to gain a quick but comprehensive understanding of the nature and status of each situation. Two of the enterprises were owned by state-owned estate companies, two by a major international company and three others by private local companies, two of which have some ownership participation from the cooperative movement.

Only one of the cases appeared to be very successful, in terms of the relationship between the processor and the farmers according to the criteria listed above. Another case appeared to be somewhat successful and moving in the direction of greater success. All of the others were in need of serious reconsideration, in terms of the purpose and utility of the relationship, as well as its structure.

It is clear from the research that there can be no standard formula for the design of contract farming links. Each situation is unique and each linking mechanism must be based on a comprehensive understanding of the circumstances under which it must operate, including the nature of the crop, the experience of the farmers in the area, the nature and extent of raw material and end product markets, the development period required for the business, the availability of agricultural inputs and the nature of traditional agricultural marketing practices.

Seven general factors of success appear to be common to successful relationships -- and missing from those which are less successful. They include viability (crop and end product), respect (for the farmers' control of the land), commitment (on the part of the processor to do what is necessary), support (for the farmers' production program), control (direct or indirect over the primary factor of production -- land), simplicity (minimal third party involvement and maximum direct

link between farmer and processor), and planning (based on a thorough understanding of markets and production factors). If these seven factors receive due consideration, there is a high likelihood that a successful business will be the result and that all participants will benefit from its operations.

Several issues were illuminated during the course of the field research which ADP might consider undertaking as pilot activities. These all tend to be output-oriented direct action programs aimed at specific commodity groups or enterprises, which this writer feels is a more productive way to encourage change than more general training programs and research. In the author's opinion, when properly planned and followed-up, such direct activities have a direct beneficial effect on the participants in the enterprises involved and also indirectly benefit others in related industries who learn from the demonstration effect.

In the text which follows, the names of specific enterprises were not used. The purpose of the research was to study linkage mechanisms, not to "evaluate" specific businesses. However, it was not possible to avoid identifying the studied firms in the case studies and we trust that any negative comments found in them will be accepted as constructive criticism, in the way that all of the analysis was offered. The research was completed very quickly and it is quite possible that significant factors were missed. We regret that such might have been the case, but feel that the general conclusions of the analysis are quite close to the reality.

CHAPTER ONE INTRODUCTION

This paper is the result of field work undertaken by the USAID-sponsored Agribusiness Development Project (ADP) in Indonesia. The research culminated in a three-week review of seven different cases in which small farmers are the primary, and in most cases only, source of raw material inputs for larger-scale agro-processing firms. The field research was carried out by the author, an independent consultant with many years of experience working on related issues in Indonesia and other countries, assisted by Mr. Yadi Abbas and Mr. Henry Harmon of the ADP core team.

The objective of the study was to examine a number of cases of small farmer - processor linkages, assess the degree to which those linkages might be considered "successful", identify factors which account for that "success" (or lack of it), and consider the lessons to be learned from both "successful" and "unsuccessful" cases. The term "success" is placed in quotations to indicate that it is not entirely clear what constitutes "success" in these relationships. For our purposes, we will consider a small farmer - processor linkage successful if it meets the following simple criteria:

- All parties are able to profit from the relationship;
- There is a high degree of mutual dependence between the parties;
- The relationship is self-sustaining (does not require outside subsidies); and,
- All parties have an acknowledged interest in extending the relationship.

It should be noted that one criteria which does not appear above is replicability. Each linkage is unique and must be designed with the specific aspects of the crop, location, agronomic conditions, participants and markets involved in mind. While there are characteristics which are common to the successful cases studied, and these will be discussed in some detail later, it is important to understand that there cannot be a "cookie-cutter" approach to agribusiness development.

This paper is presented in four parts. After a brief background in Chapter One, which offers some discussion of the status and prospects of agribusiness development in Indonesia and some of the principles of small farmer - processor linkages found in the literature, each of seven case studies is summarized very briefly in Chapter Two. Chapter Three presents a discussion of seven "factors of success" which have been identified in the case studies. The final Chapter of the

paper identifies and discusses several potential pilot project activities which might be undertaken or facilitated by ADP to further understand these linkages and provide assistance in specific cases. The full text of each of the case studies is attached to the body of the paper in the annexes.

BACKGROUND

It is generally acknowledged by the Government of Indonesia (GOI) and international agencies, that agribusiness enterprises will play a major part in the long-term economic and social development of Indonesia. This thinking is based on the country's vast agricultural resource base, the agricultural heritage of its people, and its strategic location with access to Europe and other Asian and Pacific Rim nations. It is assumed that agribusiness development will benefit the economy by generating (and saving) foreign exchange, increasing the productivity of small farmer plots, generating employment opportunities and helping to extend infrastructure services (roads, telephone, electricity, water, etc.) to the rural areas. Our task here is not to debate these issues, with which we generally agree in any case, but to assume their validity and accept that the development of a lively and profitable agribusiness sector is a priority for the Indonesian economy.

The problem faced by the government and the international agencies, is to find effective means of encouraging and facilitating the development of these industries. One problem in finding these mechanisms has to do with the nature of the agribusiness sector itself. Unlike the manufacturing sector, for example, agribusiness enterprise must rely on "Mother Nature", ably assisted by skillful farmers' hands, to provide the raw materials for its production and marketing operations. If the rains don't come at the right time or in the expected amounts or if a harmful insect pest or disease turns up at the wrong time, crops fail, farmers suffer and expensive processing plants stand idle.

Agro-processing (or agro-marketing) enterprises have only two basic choices as to how they will obtain the raw materials required by their operations. Either they will undertake the very large investment required to develop their own plantations of rubber, tobacco or left-handed macadamia nuts, or they will rely on independent farmers (outgrowers) to produce these crops. They may also, of course, mix these two alternatives by developing a nucleus plantation to provide some portion of their annual crop requirements and rely on outgrowers to provide the balance. This blending of the two alternatives offers the twin benefits of reducing their capital expenditure for plantation farming while increasing their certainty of obtaining at least a minimal amount of the product they require.

If the agro-processing firms decide to purchase their raw material from outgrowers, they again have two choices. They can either rely on the "spot" market, purchasing whatever produce they require as they need it at whatever prices prevail in the market at that time or they can develop some sort of contract farming system with local outgrowers. Under the former system they are unable to control the quality or flow of product and are continually at risk of not being able to obtain the material they need.

A contract farming program, when thoughtfully planned and carefully executed, serves as a way to increase the processor's effective control over his purchases of raw material while acting as a stabilizing influence on the market for the product involved and increasing the outgrowers' access to necessary production inputs (and technical knowledge) and a secure market for his produce at previously agreed prices.

Contract farming systems are naturally never as simple as the previous paragraph might lead one to expect. Nicholas Minot, of Michigan State University, presented a thorough discussion of this subject with examples from around the world in 1986.¹ We will not attempt to reproduce that discussion here but rather refer the reader to the earlier work, the validity of which was confirmed by the current field work.

The idea of a relatively large agro-processing firm contracting with small-scale farmers to obtain the raw materials it needs to operate is consistent with certain aspects of Indonesian culture which place a high value on collaborative effort and recognize that various classes of people play distinct but interdependent parts in the overall economic and social fabric.

For more than a decade, the government of Indonesia (primarily through the Department of Industry) has encouraged the development of "Bapak-Angkat" (foster-father) relationships between larger-scale enterprises and smaller ones with whom they do, or might, work, the idea being that the larger firms can provide information, material, training, sub-contracts, and marketing opportunities for the smaller firms which they agree to "look after". Many of these efforts have been ineffective in terms of developing meaningful economic ties between the larger and smaller firms, often because their operations were not complementary and the larger firm was not sincere in its effort to assist the smaller. This model offers a great deal of potential in the agribusiness field, however -- potential which we saw realized in certain cases examined during the field research.

¹ Minot, Nicholas William, "Contract Farming and its Effect on Small Farmers in Less Developed Countries," Michigan State University Development Papers, Department of Agriculture Economics, Michigan State University, East Lansing, Michigan, 1986.

The objective of the current research is a limited one -- to examine the effectiveness of several specific examples of contract farming links between agro-processing firms and small farmers, identify the factors which appear to contribute to the success (or lack of success) of those linkages and suggest several factors which might serve as the basis for designing such linkages in the future. It is to that discussion that we will now turn.

CHAPTER TWO THE CASE STUDIES

Seven different industries served as the case studies which provided the analytical basis for this discussion. The cases studied were selected by the ADP staff to represent a range of different types of industries/commodities, locations, organization types and linking systems. Of the seven examples, three are located in West Java, one in Lombok, one in Bali and two in South Sulawesi. Two of the processing plants are owned by state-owned corporations (PTPs), three are privately-held local companies and two others are held by a major multi-national corporation.

A wide range of products were involved including coconuts, oil palm, pineapple, passion fruit, sea weed, tobacco and vanilla. Linking mechanisms ranged from relatively competitive and uncontrolled free market systems to more "top-down" directive efforts of controlled contract farming than a commercial supply relationship. These seven case studies are summarized briefly below. The full text of each case study is attached as an addendum to this paper.

It is inevitable that these case studies refer to specific companies and that such references cannot be entirely positive in nature. We are grateful to those companies which shared the details of their operations. We trust that the comments which follow will be interpreted as constructive criticism and not taken as negative reflections on the companies examined or those individuals who were so generous in providing the information needed for this analysis. It is our hope that the following analysis will be helpful to them, and to others who are seeking to design and implement effective linkages with their small farmer suppliers.

The entire field study part of this research was carried out in less than three weeks. Given the need to travel and make logistical arrangements in each location, we were effectively left with no more than one or two days to examine each case. This was generally sufficient for the limited purposes we had, but there is considerable variability in the depth of examination of each case.

PINEAPPLE PROCESSING IN SUBANG, WEST JAVA

This is a case of a private company which felt that its raw material requirements could most efficiently be met by forging a tight commercial relationship with the cooperative sector and contracting with the local village cooperatives (KUDs) to purchase fresh pineapple from their small farmer members and coordinate delivery to the factory which produces pineapple juice for export. It is understandable that such a system would look attractive. All farmers are members of a KUD and the KUDs have the nominal "authority" to market farmers' produce. Furthermore, the cooperative department could be in a position to encourage the provision of low cost credit to the scheme and coordinate the provision of agricultural inputs and technical assistance to the farmers.

The program has run into several problems. First, the factory was established in an area where farmers have easy access to the higher prices paid in Jakarta's fresh pineapple market. Juice is the lowest priced product of pineapple processing and must compete with the fresh market for raw materials. Second, the international market price for pineapple juice has fallen far below its level at the time the project was planned and far below the break-even price of the factory if fresh market prices were to be paid for raw materials. A third problem is that the relationship between the factory and the farmers is long and awkward, relying on the KUDs to provide the coordinating role. Although the farmers are members of KUDs they generally do not respect or trust them and they generally seek to avoid them in their commercial transactions. At this point, credit funds have been exhausted, the company is behind on its payments to the KUDs (and thus to farmers), the factory is operating only sporadically, and the entire program is near collapse.

OIL PALM PRODUCTION IN BANTEN, WEST JAVA

This project was established as one of the government's World Bank-financed Nucleus Estate Smallholder (NES) Systems in the early 1980s. More than 4,000 farmers were allocated plots of two hectares each, 1.5 hectares of which had already been developed as oil palm "plantation". The program was managed by one of the government-owned estate companies (PTP), which established its own centrally-managed oil palm plantation and oil mill. The farmers are not permitted to remove their palm oil trees until their original loans are repaid (15 years) and the company is the only outlet for their produce. Prices are established by decree each year by the Director General of Estate Crops.

The system is nominally coordinated by several KUDs, who again stand between the farmers and the company. However, the system is actually controlled by the company, with both the KUDs and the farmers playing increasingly more limited roles. The declining profitability of the crop from the farmers' perspective and the company's strong need for the material, has led to its assuming more control over the crop with the role of many farmers being reduced to little more than land owner (and risk taker). This scheme appears to be rather successful as a mechanism for land distribution. It is clearly not effective from the standpoint of the company, however, which would appear to be better off if all of the land were under its direct control so that management and overhead costs could be reduced.

COCONUT PRODUCTION IN BANTEN, WEST JAVA

This is another of the NES Systems managed by the same estate company. In this case over 2,500 hectares of planted coconut plantation have been allocated to 1,720 local farmers. Again, the farmers are expected to pay the loan which was used for land acquisition over 15 years and to maintain their coconut trees for at least that long while having 30 percent of their gross coconut revenue applied to loan repayment. The company operates a nucleus estate of 700 hectares.

A coconut oil mill was built on the estate, but it has recently closed due to falling coconut oil prices. Coconuts are currently shipped several hours to a desiccated coconut factory owned by the same company. The entire program is experiencing great difficulty due to the low price of coconuts and the high cost of production. The company currently pays Rp 75 for each small farmer coconut. It estimates the cost of producing its own at Rp 125 each. Meanwhile the desiccated coconut factory is only paying Rp 61 each after they are husked and delivered to its gate. Farmers are able to sell their coconuts for higher prices in the fresh market. The linking mechanism between the company and the farmers is fairly straight forward. However, the lack of viability of the crop, and the company's lack of control over it, make the linkage ineffective as a means of securing raw material. It appears that the financial interests of the company would best be served by either diversifying into other, higher-value crops which capitalize on its location near Jakarta, or by selling the land for other uses.

TOBACCO PRODUCTION IN LOMBOK

This major international tobacco company has worked for two decades to develop a reliable small farmer tobacco production program in Lombok. In 1993 the program involved 454 farmers who farmed 1,200 hectares and produced 2,060 tons of flue-cured tobacco for a total value of Rp 5,500 million (US\$2.62 million). The contract farming program used by this company has evolved continuously over its 20-year life to easily become the most productive example of a processor-small farmer linking system we examined.

The linking mechanism is based on a three-party contract among the company, the participating farmers and a commercial bank which provides production credit to the farmers based on company recommendations. This company has developed a high level of loyalty among its farmer group with a turnover of only about 10 percent per year. It insures that farmers have access to the production inputs they need (seed, fertilizer, kerosene, credit) and pays them an attractive price for their flue-cured leaf and promises to buy all of their leaf. In exchange the farmers are obliged to cooperate with company field staff and sell all of their leaf to the company. "Disloyal" farmers are not included in the program the next year.

It is important to note here that this company deals with the farmers and the leaders of small farmer groups directly. There is no direct involvement of KUDs or the government. The office of the Governor plays a constructive role by overseeing price negotiations at the beginning of each buying season and ratifying the agreed prices as "official" for that season thus avoiding endless haggling and price shopping on the part of farmers.

VANILLA PRODUCTION IN BALI

The same tobacco company has been less successful in developing a small farmer vanilla production program in Bali. It purchased approximately 100 tons of fresh vanilla beans from 90 farmers in 1993. It pays Rp 15,000 (US\$7.15) per kilogram for those beans. While it has attempted to develop productive working relationships with a few selected farmers by providing very limited production credit and technical assistance from two qualified field advisors, purchases were really made primarily on the spot market in direct competition with other buyers.

While it has attempted to employ many of the elements of its successful tobacco program, there are several factors which have limited its success:

- Vanilla is a high risk, multi-year crop. Potential profits are high, at least in the short run, but farmers are reluctant to tie up their limited farm land in a single crop. There is some question as to the long-term viability of the crop.
- The cost of establishing a field of vanilla is high and two to three years are required before economic yields can be generated.
- The company is not prepared to guarantee to purchase all of a farmer's crop, focussing instead on only the best grades.
- The company has not established a comprehensive contract (including credit) to be used with vanilla farmers.
- Perhaps most importantly, the company does not have the same level of commitment to the program that it does with tobacco. The company's continued existence does not depend on vanilla.

PASSION FRUIT PRODUCTION IN MALINO, SOUTH SULAWESI

The program was established by a private company which is owned in part (20 percent) by the cooperative movement (PUSKUD/KUDs). The company has established a 220 hectare nucleus estate but must rely on small farmers to supply the bulk of its raw materials. As was the case in the pineapple project presented earlier, the KUDs (five, in this case) were assigned the task of promoting small-holder passion fruit production and coordinating the flow of that fruit to the factory. Direct links between the company and the small farmers are scant, limited to a certain amount of technical assistance provided by company field advisors.

The farmers' enthusiasm for working with the KUDs is again limited (if not negative) and they do have access to alternative markets for at least a portion of their output. The company has agreed to a price structure which will stabilize the normally volatile seasonal prices and has tried to stimulate increased production via outside loans from the cooperative bank and material assistance from the Department of Agriculture. Neither program appears to have been effective, however, and the company is operating far below its breakeven point with few clear prospects for substantial improvement in the near-term. It may be

possible for this situation to be saved but a radical restructuring (simplification) of the program will be required and much farmer confidence was lost when the company failed to buy all of the offered produce in 1993, due to a lack of capital.

SEAWEED PRODUCTION IN UJUNG PANDANG, SOUTH SULAWESI

This is by far the simplest of the cases examined. It is effective in that the local collector/traders are able to work directly with local farmers to purchase their pond-produced seaweed for onward sale to the Jakarta processing company via contracts with the farmers. The trader studied is able to supply 80 tons of dried seaweed per month working with a group of 20 farmers in Ujung Pandang and another group in Barru District, some four hours away.

This trader works directly with the farmers, purchasing some of his product on the spot market but working to establish longer-term relationships with others carefully selected by him. He provides selected farmers with planting material, small loans for pond maintenance, drying nets, living costs and often purchases a farmer's crop on the "ijon" system prior to harvest. He is beginning to provide larger and longer-term loans for pond development in new areas. There is no involvement of KUDs or government agencies in this program, which appears to suit all the parties. Prices for the seaweed are attractive, which is insured by the presence of other buyers in the area and each of the two parties recognize the key role performed by the other. There are some issues regarding testing and quality control which might be addressed by ADP to the benefit of both the farmers and the trader.

CHAPTER THREE THE FACTORS OF SUCCESS

After examining the seven case studies briefly profiled above (and presented in more detail in the annexes to this paper), it is clear that there is no universal success formula in designing mechanisms for linking small-scale farmers with the larger-scale agro-processors who depend upon them to supply the raw materials for the production processes. Each situation is unique and each

linking mechanism must be based on a comprehensive understanding of the circumstances under which it must operate, including:

- the nature of the crop (including establishment and production costs) and the agronomic conditions of the area;
- the experience of the small farmers in the area and their cash crop alternatives;
- the extent and nature of the markets in which the project must operate including alternative markets for raw materials and final product;
- the length of time likely to be required to achieve a viable level of crop production for raw materials;
- the availability of required agricultural inputs including credit; and,
- the nature of traditional agricultural marketing activities.

There are, however, at least seven general factors which should be considered in the design of any small farmer - processor linking mechanism: viability, respect, commitment, support, control, simplicity, and planning. The paragraphs below will offer a brief discussion of each of these factors, drawing from the case studies as required. The order in which they are presented should not be confused with their order of importance, as they must all be satisfied if a program is to have a reasonable assurance of success.

VIABILITY

The need for viability (financial and economic) applies to the operations of the farmers, as well as to the processor. If the farmers' crops are not viable and, perhaps just as important, if the crops are not perceived by the farmer as being viable, the processor will not succeed in convincing him to plant the crops required for operation. The concept of viability here includes not only the magnitude of profits which might be earned from a crop, but also the likelihood that profits will be earned. Some estimation of risk must be built into the concept. The cases of oil palm and coconut illustrated the limitations placed on a project when a crop is basically not very profitable to the farmers. In such cases, the farmers will simply not make the investment of their time or financial resources to maximize production of the crop. In both cases, the front-end investment was made by the estate company using government (World Bank)

funds. While the farmers will take out whatever they are able during their pay back period, when loan payments are related to income in any case, they are unlikely to make additional investments or to continue with the original crop once their obligation is fulfilled.

One factor influencing the farmer's perception of risk, and thus crop viability, is his confidence (trust) that the processor will be there to follow through on his promises of support and his assurances regarding prices and purchasing. In the case of the passion fruit project, it is fairly clear that the farmers can make a good profit growing passion fruit for the company. They are largely dependent on the company to purchase the fruit, however, and recent disappointments (the company's failure to purchase the entire crop in 1993) will make them reluctant to commit their limited acreage to passion fruit on a monoculture basis as the company would like them to do.

It is equally important that the operations of the processor be viable and based on reasonable assumptions regarding the cost and availability of raw materials and the size, specifications, prices and accessibility of markets for their products. In the case of the pineapple juice project, it is clear that the entire project is jeopardized by the fact that the estimated breakeven price for the company's output is approximately 60 percent higher than current world market prices. Additionally, the cost of their raw material inputs is supported by competition for the farmers' produce from the fresh market. The pineapple farmers can make money, but the company cannot.

In the case of the coconut project, the company is losing money on every nut it buys from small farmers for resale to the processing plant. However, it loses even more on the nuts produced on its own estate. It is very difficult to see how either of these two operations are ever going to overcome these fundamental problems in the absence of a drastic restructuring of the market for their final product. Fine tuning of raw material prices or better use of bi-products is not likely to be enough to accomplish the required adjustments.

The analysis of long-term international markets is made especially difficult by the highly volatile nature of the markets for many tropical commodities which are subject to the "band wagon" investment phenomenon on an international scale. When one, or a few, investors make money on a given product (such as palm oil in the early 1980s), others in tropical countries around the world rush in to capitalize on the opportunity. Many of these markets are quite small (passion fruit and vanilla, for example) and subject to rapidly falling prices as production increases beyond the demand point. More than good current market information is required to avoid this problem. Good information about plantings around the world is needed, if unprofitable investments in permanent crops are to be avoided.

RESPECT

One factor that became increasingly clear in the course of the field research is that, for once, the leverage is in the hands of the small farmer. The farmer controls the land and makes the decisions regarding how it will be used. Unless the processor wishes to invest in the establishment of a large scale estate to produce the crops it needs, it must deal with the small farmers in one way or another, and convince them that it will be in their best interests to participate in the processor's program. Efforts to "mandate" this participation by involving the cooperatives have not been successful in the pineapple and passion fruit cases examined. Building it in by making participation a condition of land acquisition might be effective, in terms of land area dedicated to a crop but it hardly insures enthusiastic participation on the part of the farmers (for example, coconut and oil palm).

The most successful case examined (tobacco in Lombok) is based on the development of a high level of mutual respect between the company and the farmers. The company recognizes that farmers control the land and that they must be encouraged to make decisions which are in the interest of the company. Their right to make those decisions is respected, and the company seeks to give them the encouragement they need in terms of purchasing and price guarantees (which are honored), farmer support packages (material, credit, advice), and a long-term commitment to "loyal" farmer/participants.

COMMITMENT

Small farmer - processor linkages are not forged overnight. The tobacco company studied started its production program in Bali in 1970 with two farmers. This number increased to four in 1971 and 13 in 1972. It took five years and substantial investment in technical personnel and material before a sustainable level of operations was achieved. The company followed a similar development path in Lombok, three years later. This required a very high level of commitment on the part of the company which realized that the development of a reliable contract farming program was essential for its long-term success.

The company has not shown the same level of commitment to developing its vanilla supply system -- and its efforts have been less successful as a result. One gets the impression that the company would like to use a modified version of its tobacco purchasing system to purchase vanilla but that the level of commitment is not sufficient (at least at this time) to make it work.

On another level, it could be said that the estate company showed a high level of commitment by its investment in the development of small-holder coconut and palm oil plantations to support its processing facilities. These have also been successful in generating a steady flow of raw materials into its plants.

The two weakest cases examined (pineapple and passion fruit) demonstrated a high level of commitment to their processing activities by the level of their investment in plant and equipment. Much less emphasis was placed on the development of a viable small farmer supplier network, however, and both operations are suffering as a result.

SUPPORT

All over the world, successful contract farming systems are based on the provision of appropriate farmer support packages by the processor to the farmers. The broiler (chicken) industry in the United States is a good example of this. The farmers are provided with chicks, feed, medications, technical assistance and even barn designs in exchange for a promise to follow the processor's production instructions and sell the mature birds back to the processor at a guaranteed price. Other examples are perhaps less comprehensive than this but it is important that there be a package to link the farmer to the processor and provide the inputs required to meet the processor's quality specification. Again, there can be no "standard" list of the items any package should include but each should be developed in conversation with participating farmers. These packages commonly include some or all of the following: planting material, fertilizer, pesticides/herbicides, technical assistance, specialized material (drying racks, etc), and credit.

The estate company working in the palm oil industry has gone so far as to assume virtual management responsibility for 70 percent of the small farms which supply it -- in many cases even providing the labor necessary to maintain each plot. The cost of all its assistance is deducted from the price of palm fruit purchases before payment is made.

In the tobacco business, the processor has developed a comprehensive package of services designed to insure the development and maintenance of a stable group of "loyal" farmers capable of producing the quality and quantity of tobacco the company needs each year. Interviews with several of these farmers indicates that their "loyalty" is directly related to their perception of the benefits they will gain from such "loyalty". Their general attitude might be paraphrased as, "the company takes care of us and we take care of them."

One innovative aspect of this program is the inclusion of a credit component provided by a third party (a commercial bank) on the basis of processor recommendations. Even though the company must bear the cost of managing the loan disbursement and repayment process, its capital costs and risks are moderated somewhat by the participation of the bank.

The seaweed case has developed largely without a significant farmer assistance package but such a package is evolving as the trader interviewed seeks to "tie-in" his suppliers and insure a steady flow of high quality raw materials. The vanilla, pineapple and passion fruit processing companies have done little directly by way of developing a viable small farmer assistance package. All have hired a small staff of field officers to advise participating farmers but none have developed much in terms of material or credit assistance, preferring to rely on cooperative and public sector entities to do this. The results have been poor in all three cases.

CONTROL

It is clearly essential for any agro-processing enterprise to have some means of controlling its access to the raw materials it needs to operate. This translates to the need to control the use of the primary factor of agricultural production -- land. This control can be developed by the company obtaining its own land and developing large-scale plantations of whatever crop it needs. Alternatively, it can be achieved by establishing an outgrower contract farming program which gives local farmers enough support and incentives to convince them to participate reliably -- to dedicate a part of their land to the crop the company needs. Some companies may find their risk lowered by combining the two methods and developing a nucleus farm to supply some desirable portion of their total raw material requirements and relying on an outgrower network to provide the rest.

In the cases studied, it is clear that the palm oil and coconut processors have gained control over their raw material supplies in a highly directive way: the farmers are required to grow only the desired crops on 75 percent of their allocated land until their loans are repaid. This is a very capital intensive system, however, and not really very efficient. In the palm oil case, the company is the only buyer of palm fruit in the area but it would probably be better off if it farmed all of the land on a unified plantation basis.

This is less clear in the case of the coconut processor because of the low price of coconuts and the alternative markets for farmers' produce. The tobacco

company has developed a high degree of control over its raw material base, even though there are competitive buyers in the area, by developing a program which is highly valued by the participating farmers and has a waiting list of farmers who wish to join. This company has a high degree of "effective" control over its raw material base even though it does not have monopsonistic purchasing power.

SIMPLICITY

From examination of the seven cases, and the accompanying purchasing/marketing maps, it is clear that those which have been most successful are those which are the most simple in terms of the number of participants and those which maximize the direct relationship of the processors to individual farmers. The involvement of outside parties (i.e. KUDs) as intermediaries to "organize" the small farmers and coordinate their production has not been successful (pineapple, passion fruit).

It appears to be important that the commercial (buy/sell) relationship be established directly between the buyer (processor) and the supplier (farmer) or his traditional representative (group leader/collector/trader). Other aspects of the relationship (technical assistance, material support, etc.) should follow the same pattern except that it does appear both feasible and desirable to involve a third-party bank in the provision of production credit when such involvement can be built into the production contract.

The tobacco and seaweed projects have both been rather successful based on their adherence to those principles. The pineapple and passion fruit projects have developed very complex purchasing schemes involving outside parties and have been much less successful. The case of the vanilla project is not as clear, in that, while the system used by the processor is very simple, it resembles more of a free market purchasing system than a contract farming scheme.

PLANNING

From the examination of all of the above, it is evident that any successful program must be based on careful and detailed on-the-ground planning. One extra day of planning can avoid many weeks or months of later corrective action and, at times, the need for major new capital infusions to forestall the failure of the company.

Good planning must be based on comprehensive data from all levels. It is no less important to understand the thinking and productive capacity of the small farmers who will be the supply base of the company than it is to have a thorough knowledge of the international market for the products the company intends to produce. The "office-based" planning on which some of the studied businesses appear to have been based is almost guaranteed to lead to excessive capital investment and a high incidence of failure.

Equally important to careful front-end planning is the need to be sensitive to changes in the environment of the market or supply-side. Successful companies remain flexible and are able to respond to such changes on a continuing basis. Again, the tobacco program studied is a good example of this as it continues to evolve in response to changing circumstances and farmer suggestions. The pineapple processor, on the other hand, appears to be "locked in to" a program which has not been successful to date and is unlikely to improve without rather drastic modification. The passion fruit company might still be able to make the adjustments required to develop a strong small farmer supply network but it will require a high level of creativity and commitment on the company's part for these adjustments to be successful.

CHAPTER FOUR

POTENTIAL PILOT PROJECT ACTIVITIES FOR ADP

During the course of field research, several possible areas were suggested where ADP involvement on a practical level might serve both to advance a particular situation, and add to the practical experience of the project team and sponsoring agencies in the techniques of effectively promoting and facilitating agribusiness development. These activities may be divided into two groups. The first group is related to the development of agribusiness associations. The second deals with the problems of individual agribusiness enterprises.

AGRIBUSINESS ASSOCIATION DEVELOPMENT

Three of the surveyed commodity groups would appear to benefit from the development of an active agribusiness association, each of which would be of a distinctly different type.

There is reported to be a vanilla growers association. However, our team could find no sign of it on Bali. ADP might facilitate the development of such a group, comprised of vanilla farmers in the northern Bali area. The association might address a number of problems facing the industry including marketing (prices, grades, quality control, terms), input supply (seedlings, fertilizers, credit), modern agricultural production techniques and the possibility of adding first stage processing nearer to the farm gate on a collective basis.

A Passion Fruit Producers Association does exist. The membership includes most of the small-scale, as well as the single larger-scale, passion fruit processors in South Sulawesi. However, it currently has no active program. Among the areas in which it might become active would be the development of a common farmer support "package" to encourage increased plantings, carrying out market research to gain a better understanding of the future of the international market for passion fruit products, the establishment of a common aseptic packaging facility for the joint use of small producers and consideration of alternative ways of increasing local value-added to the members' products.

There appears to be a growing market for pond-grown seaweed (*Gracilaria*) in South Sulawesi. This market is currently funnelled through a limited number of independent traders who collect the crop locally, clean it, re-package it, and ship it off to processors on Java or overseas. An association of these traders could serve their common needs by developing a common farmer support package, establishing a simple common testing facility, identifying new markets, providing technical assistance to farmers and buyers on quality control and grading and seeking opportunities to gain local value-added to the product by carrying out first stage processing.

DIRECT ENTERPRISE ASSISTANCE ACTIVITIES

Three of the enterprises studied might also benefit by some direct assistance, which ADP could offer.

The pineapple project needs to completely restructure its fruit collection and payment system in order to maximize its direct dealings with the farmers and increase the flow of raw materials to the plant if it is to survive. A very high degree of commitment from the company would be required and it may already be too late for such a strategy to have the desired effect, but it might be very useful for ADP to become directly involved in a limited number of these cases as demonstrations of how successful farmer-processor relationships can be structured. This activity should not be undertaken until it is very clear that the

company is committed to doing what is required to turn itself around and that there is a high probability that such a program can be successful.

A similar program, with a somewhat higher likelihood of success, might be undertaken with the passion fruit processing company. Again, it would be necessary for the company to commit itself strongly to overcoming current problems and for there to be some solid indication of a bright international market for passion fruit products in the future.

On a totally different level, it would be useful and instructive for the project to work with the coconut estate company to transform itself to the production of crops more consistent with its proximity to the Jakarta market and to privatizing parts of the estate. Such a program must also involve the provision of assistance to NES farmers as they identify and initiate production of more profitable cash crops on their land.

While any of these activities, or others of a comparable nature, should be beneficial in their own right in terms of employment, exports and increasing farm incomes, they also serve as demonstrations of how to assist agribusiness firms. Successful demonstrations are probably more useful with respect to these kinds of structural questions than would be numerous training programs, which are unlikely to attract the level of management personnel needed to make decisions and which would find it difficult to address the wide disparity of conditions which agro-processing firms must face.

Annex A - Case Study #1

P.T. Induk Agrindo Perkasa (AGRINDO)

The following brief case study is based on interviews with key informants from all levels of the production-processing-marketing chain. Interview subjects included: the Vice Chairman and CEO of AGRINDO; the factory manager; the production manager; two members of the field staff; one of the major produce traders (and a farmer himself) who provides the marketing link between farmers and the factory; another farmer who supplies the factory as well as the fresh market; and, the head of the local office of the Cooperative Department. It was not possible to meet with the head of the local KUD (village cooperative society) due to his absence from the office.

These interviews, together with material prepared by the ADP Bridging Project Team, enabled the researchers to gain a general understanding of the business being studied and the characteristics of the linkages between the business and the small-scale farmer-suppliers of the raw material it requires to operate. Much more detailed field research is needed to verify the conclusions of this research and prescribe any firm recommendations for overcoming the current operating problems.

Interviews undertaken as the basis of this research were aimed at understanding the supply system as it was intended to work, and identifying possible weaknesses in that system. The findings which follow should be considered as illustrative rather than diagnostic or prescriptive, as the time and resources devoted to this case study were far from sufficient to suggest a high level of confidence for the specific findings. However, the team is confident in its general conclusions, and recommends that more intensive follow-up analysis be carried out to determine the validity of the preliminary recommendations.

The Business:

P.T. Induk Agrindo Perkasa (AGRINDO) is a Jakarta-based agribusiness company which includes among its operations a modern pineapple juice processing plant in Subang about 75 miles southeast of Jakarta. The plant is a joint-venture between its management (44 percent), INKUD (Indo Koperasi Unit Desa -- an umbrella organization for the village level cooperatives) (44 percent), and PTP XI (one of the government-owned agricultural estate companies) (12 percent). The factory was built and initiated operations in 1992, on the basis of a tri-partite

supply agreement between the company, the Department of Cooperatives and Bank Muamalat (a private Islamic bank). The agreement called for the bank to advance funds to six KUDs with which to purchase fresh pineapple from small-scale farmers and deliver it to the AGRINDO plant for processing. AGRINDO was to pay the KUDs for the fruit within 7 days. AGRINDO has no nucleus estate to provide the minimum input requirements for its operation or to stabilize the cost of raw materials.

The Farmer Participants:

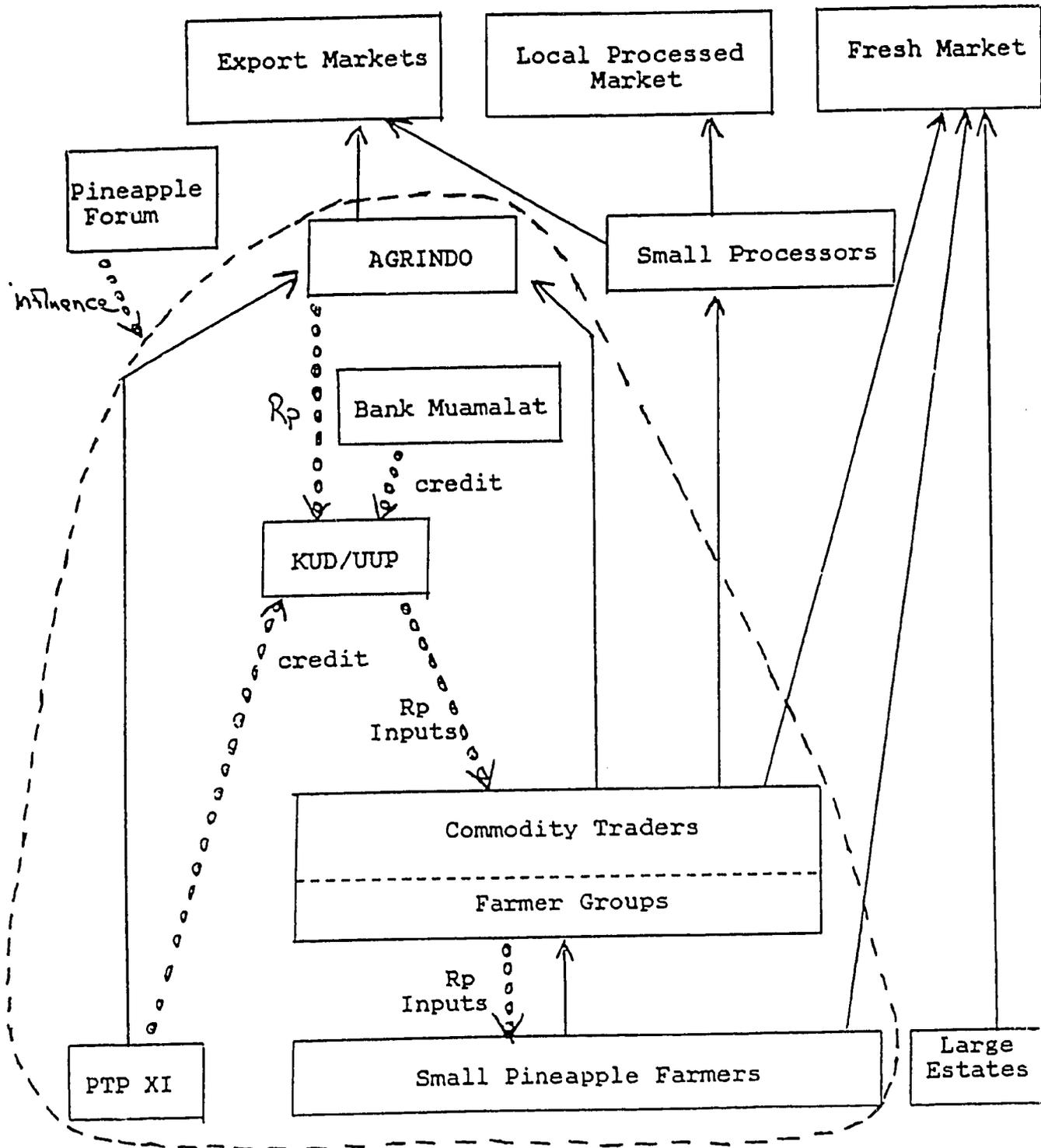
The small farmers of the Subang area who are the intended participants in this pineapple production/processing scheme generally own and farm less than one hectare of land. They generally mix crops on their land as a means of reducing financial risk and insuring production of necessary food crops (rice/vegetables). Most farmers reportedly do use hormones to control the ripening of their pineapple crop but casual observation suggests that pineapple yields are far less than they might be if more modern husbandry practices were used. While farmers are not pleased with the operation of the AGRINDO operation, they do profess satisfaction with their choice of pineapple as a long-term cash crop and are confident that the market will continue to develop. It is not likely that they will be easily convinced to dedicate their very limited farmland to pineapple on a monoculture basis, however, no matter what incentives are offered short of absolute crop guarantees.

The Small Farmer - Processor Linkage:

The following marketing map illustrates the various marketing chains used by small-scale pineapple growers in the Subang area. The chain on the left represents the system to be used for supplying raw materials to AGRINDO as it was designed. The right side of the diagram shows the flow of fresh pineapple to other markets. The map is largely self-explanatory but there are a few additional comments which will help to explain the situation.

It is clear from the map that the farmers have alternative markets for their produce. Farmers have traditionally marketed the bulk of their pineapples through the local commodity traders (who are often recognized as the local "ketua kelompok" or group leader) who purchase their produce, often in advance on the "ijon" system, then consolidate their purchases and carry them to distant markets for sale. The trader interviewed formerly had a direct bank credit to finance these purchases. This has been forfeited, however, since he joined the AGRINDO/KUD system.

Subang Pineapple Marketing Map



—————> = product flow
 ooooooooooooo> = other flow
 Rp = raw material payments

The AGRINDO system calls for Bank Muamalat to make credit available to the KUDs to purchase fruit from the farmers/traders on a cash basis. The KUDs then resell the fruit to AGRINDO offering 7 days free credit. The traders transport the fruit to AGRINDO deducting approximately Rp 10 per kg to cover the cost.

The KUD deducts Rp 5 per kilogram from the price paid by AGRINDO to cover the costs of administration and technical assistance. PTP XI was to offer additional credit to the KUDs to finance supplies of agricultural inputs to the pineapple farmers. At least theoretically, a total of Rp 15 per kg would be deducted from the price offered by AGRINDO before the payment was passed to the farmer/traders. This appears to be quite reasonable though it was not possible to determine how much might have been retained by the trader as his operating margin.

The loan from Bank Muamalat was to operate as a revolving fund (line of credit) which would be replenished as AGRINDO paid the KUDs for produce it had received.

The entire operation was to be overseen by a "Pineapple Forum" which included representatives of all the parties to the agreement and was to meet every three months under the leadership of the "Bupati" (district government head). Members of this forum include representatives of the local office of the Agriculture Department, the Cooperative Department, the district government, AGRINDO, participating farmers, Bank Muamalat and PTP XI. The Forum considers questions of quality, pricing, delivery and payment but has little effective authority to influence the behavior of participants.

Current Status:

At the present time the plant is operating far below its break-even point of 50 tons of raw material input per day and appears to be in danger of closing, as investment and working capital funds are exhausted. Fingers point in all possible directions in assigning blame for the current problems depending on the perspective of the interview subject. Among the problems which appear to weaken the program at the moment are the following:

1. Traders do not have access to the capital required to make advance purchases of fruit as has traditionally been done to provide farmers with cash in advance of the harvest. Farmers sell to whatever buyer offers the best price and payment terms.

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2. AGRINDO is behind on its payments to the KUDs for fruit delivered earlier and the KUDs have exhausted their credit available for financing these purchases. The local director of cooperatives has refused to authorize the extension of additional credit to AGRINDO.
3. For much of the year, farmers are able to sell their pineapples for cash at somewhat higher prices in the "fresh" markets of Jakarta and Bandung. Prices as high as Rp 170/kg were quoted at a time that AGRINDO was paying Rp 125. AGRINDO has reduced its price to Rp 80/kg during the peak production season, though it is not clear that fresh market prices will decline accordingly. Another, larger, processing plant in the area recently closed due to its inability to purchase sufficient raw materials to operate profitably. Farmers interviewed did not feel that this closure had made much difference in their own ability to market their pineapple crop profitably.
4. PTP XI is located far from Subang and is not in a position to supply pineapple to the plant until the plantation it has established begins to bear fruit. Even then, the three-hour transportation time is likely to make the crop only marginally profitable.
5. The financial links between AGRINDO and the farmers are unnecessarily long and cumbersome, which minimizes the direct contact between the processing plant and its most important constituency, and maximizes the points of potential operating inefficiencies. Financing passes through the KUDs, organizations in which the farmers possess little confidence.
6. The planned role of the KUDs to provide the farmers with technical assistance and agricultural inputs is operating at a very low level, if at all, while it is fairly clear that major yield increases could be realized by the farmers if modern production practices were adopted. Farmers noted that most inputs could be purchased at lower prices from suppliers other than the KUD.
7. The entire system appears to have been planned and managed in a top-down manner with a high level of government involvement and little involvement of those who are most important to its success -- the farmers and local traders.
8. Current world market prices for pineapple juice (about US\$600/ton) are far below the historically high levels which prevailed (more than US\$1500/ton) at the time the project was planned and which is the

factory's breakeven price. Thus, the ability of AGRINDO to significantly increase the price it pays for raw materials is severely limited.

Perhaps the two most critical factors limiting the success of the operation, and those most difficult and expensive to rectify, are not related to the smallholder purchasing program at all. The plant was established in an area where it would be difficult to obtain effective control over the crop. The presence of lucrative and substantial alternative markets makes it very difficult for AGRINDO to attract the fruit it needs to produce a relatively low value product which is often produced as a byproduct of other processing operations. AGRINDO, the company was also established without a nucleus estate at least large enough to provide a major portion (perhaps 80 percent) of its breakeven raw material requirements throughout the year. Even if AGRINDO had such an estate, it appears that current profits would be maximized by selling the fruit on the fresh market.

On a more positive note, it is apparent that the total acreage planted to pineapple by small holders in the region is increasing and they continue to feel positively about the potential of the crop. It is possible that a redesigned, and well-capitalized, production assistance program would result in the production of sufficient pineapple to satisfy the local market and leave enough surplus and lower grade fruit to feed the AGRINDO processing plant.

Tentative Recommendations for Further Investigation:

1. Any reconsideration of the AGRINDO supply system should be based on a rigorous assessment of the total potential for pineapple production in the Subang area, both in terms of cultivated area and productivity. The results of this assessment should be examined against the total demand in the area from other users of the fresh fruit, both current and projected.
2. It is apparent that there is considerable scope for increasing total pineapple production from the existing acreage by the application of more modern agronomic practices. Such an increase might have the twin positive impacts of increasing small farmer income while increasing the amount of fruit available to AGRINDO. AGRINDO, the KUDs and the Agriculture Department might more productively consider ways to cooperate in increasing yield than being so involved in the marketing system. One component of such a program might involve AGRINDO in the establishment of a limited number of small farmer-owned demonstration farms in various parts of its operating area.

3. AGRINDO might consider the cost and value of establishing a nucleus plantation to provide a significant portion (70 to 100 percent) of its break-even raw material requirements. Not only would such a farm reduce AGRINDO's dependence on small-farmer produce and help to reduce the magnitude of seasonal price fluctuations, it could also serve as a useful demonstration farm using production technologies to be transferred to small farmers. PTP XII, which operates in the Subang area, is reported to have already approved the allocation of a parcel of land to be used for this purpose.
4. AGRINDO might explore the possibility of establishing direct purchasing links with small farmers and traders, providing the capital required for crops to be purchased, perhaps in advance of the harvest. Such a program might still involve the KUD as the coordinating agency and it might still be paid the Rp 5 per kilo as at present for the services it renders. The fundamental financial relationship would be forged between the suppliers (small farmers) and the processor (AGRINDO) thus conforming more closely to traditional commercial practice and minimizing the danger of bureaucratic inefficiencies or financial leakages.

One way in which this might be organized would be for AGRINDO to guarantee (or preferably partially guarantee) a series of working capital loans from commercial banks to traders who could use the funds to purchase fruit in the traditional way. The trader would then be responsible for delivering the fruit to AGRINDO which would, in turn make payment to the bank for credit to the trader's account. Loans to the traders would either be collateralized by the traders or begin at a low level on the premise that successful performance would lead to larger credit levels in the future -- and thus expanding business opportunities for the traders.

The formation of an effective association of local traders and participating farmers to represent themselves in discussions with AGRINDO would probably be crucial to the success of such a plan. For such an association to be effective it should be organized by the members to represent the members with little or no outside "assistance" or interference.

It may well be that the situation at AGRINDO has deteriorated to the point that further work on the supply side is meaningless; substantial additional capital commitments from investors would be required to implement any of the above ideas.

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Annex B - Case Study #2

PTP XI - Palm Oil Project

The following case study is based on interviews with key informants from all levels of the production-processing-marketing chain. Interview subjects included: the general manager of the estate; the processing manager; the production manager; one farmer/participant; and the head of the local KUD (cooperative), who is also a farmer/participant and the local village head.

These interviews enabled the researchers to gain a general understanding of the business being studied and the characteristics of the linkages between the processing plant and the small-scale farmers who supply it with raw materials. More field research is required to verify the conclusions of this research and prescribe any firm recommendations for overcoming operating problems.

The interviews undertaken as the basis of this research were aimed at understanding the supply system as it was intended to work and identifying strengths and weaknesses in that system. The findings which follow should be considered as illustrative rather than diagnostic or prescriptive, as the time and resources devoted to this case were far from sufficient to suggest a high level of confidence for the specific findings. The team is confident in its general conclusions, however, and recommends that more intensive follow-up analysis be carried out to determine the validity of the preliminary recommendations.

The Business:

PTP XI is one of the state-owned agricultural estate companies which have traditionally been the most prominent actors in vertically-integrated agribusiness in Indonesia. PTP XI operates several estates on Java including rubber, coconut, teak and cacao. Each estate operates independently on the basis of centrally-approved budgets and operating plans. Many of these estates pre-date Indonesian independence, having been originally established by the Dutch.

PTP XI currently runs a nucleus estate ("inti") of 1,500 acres which is supplemented by 2,500 hectares on another PTP XI estate and 6,000 hectares of small holder production ("plasma"). It does not purchase fruit from private farmers outside the Nucleus Estate Smallholder System (NESS).

This estate is currently operating below capacity and at a loss although it was reported that 1992 operations resulted in a profit. Less than capacity operations are the result of inadequate raw material supplies. Small farmer yields average just over half of what is achieved on the nucleus estate. The estate produces crude palm oil for sale to the domestic market and palm kernels which are sold whole to private domestic processors.

The Nucleus Estate Scheme:

The Oil Palm NES System in South Banten was begun in 1981 with all of the land (7,500 hectares) being developed by PTP XI and allocated to 4,190 farmers and landless laborers from the area, under the direction of the local government (Bupati). Participating farmers are given title to their two-hectare plots and assume a loan obligation of Rp 4.2 million (US\$2,000) each which is to be repaid by the deduction of 30 percent of their gross oil palm revenues over 15 years. They are required to produce only oil palm on 1.5 hectares of their land until the loan is repaid. The balance of .5 hectare can be used as a homesite and a plot for growing food or cash crops as the farmers wish. The estate was established on marginal land which was previously under forest. Rice is not a viable food or cash crop in the area.

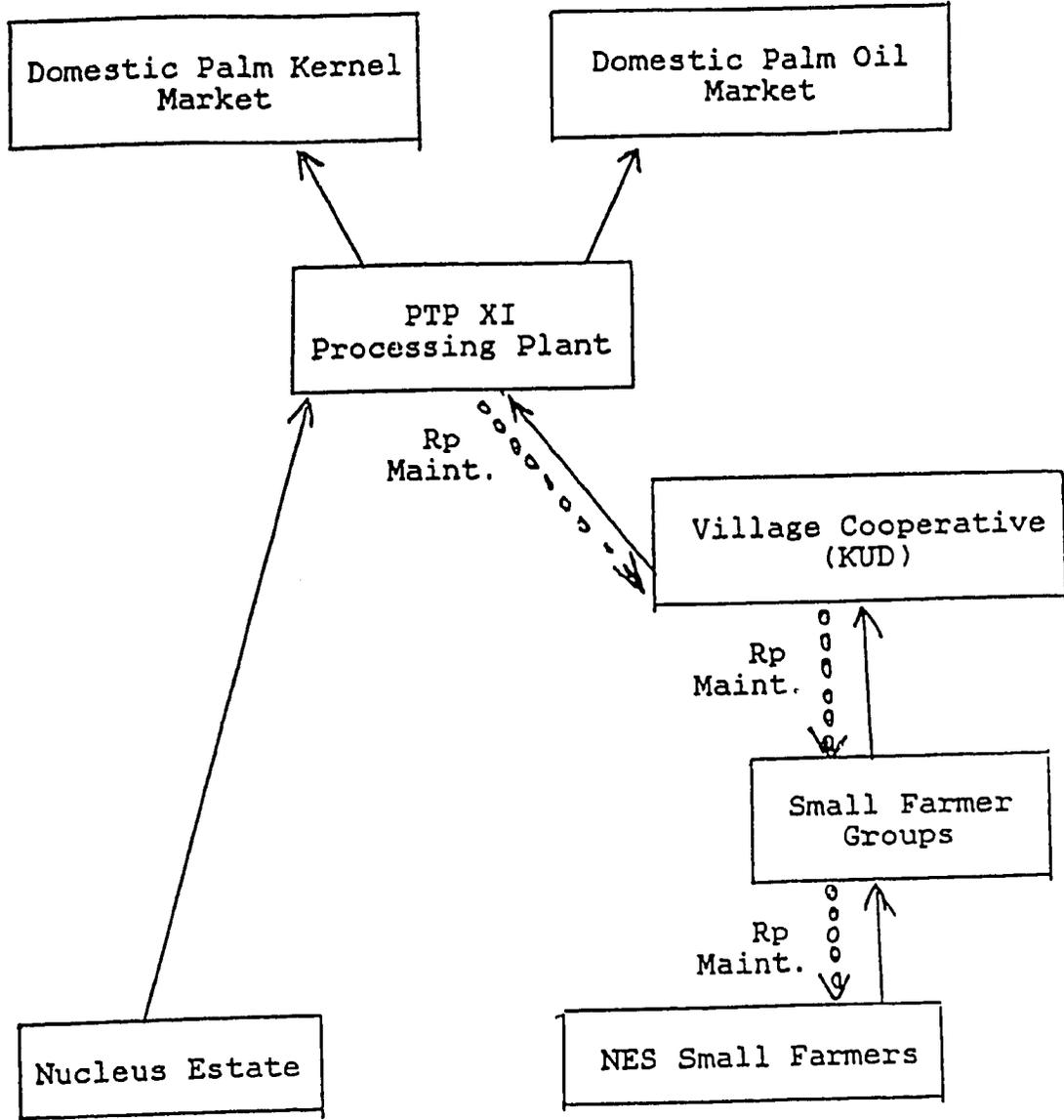
The Farmer/Participants:

Participants in the NES System were selected from among local residents, many of whom had no land of their own to farm previously. No individual is allowed to hold title to more than one plot under the scheme but several members of the same family may have plots. It was reported that there are few absentee owners though the leasing of plots to other farmers is rather common.

One of the farmers interviewed controls 11 plots (22 hectares - 54 acres) which are technically owned by various family members. His average yields, using hired labor, appear to be in the range of 8-9 tons per hectare. While the total of this would apparently generate a rather attractive family income for the area, it is not clear how much net cash return is generated after deduction of labor costs, rents, etc. or how many people this land must actually support.

Another interview subject previously worked as a "coolie" laborer and had no farm land of his own. He reported that he had been selected for the program in 1982, was allocated a site which was being developed and planted by PTP XI in 1985 and actually got title to the land in 1992. He is a good, active farmer who maintains his own fields (working with a small informal group) and achieves yields averaging 16 T/ha, nearly equal to yields realized on the nucleus estate.

PTP XI Oil Palm Marketing Map



_____> = product flow
 ooooooooooooo> = other flow
 Rp = raw material payments

The Small Farmer - Processor Linkage:

The preceding diagram is largely self-explanatory but there are a few additional comments which will help to illustrate the marketing relationship and the position of the various participants.

PTP XI provides the farmers with fertilizer and technical assistance with costs being deducted from payments for palm fruit purchases. In most cases (70 percent), the PTP even takes care of field maintenance on behalf of the farmers using its own work crews to clear the groves and take care of the trees. The PTP has gradually increased the amount of management responsibility it takes on for NES System farmer crops in order to insure the quality and quantity of fruit it needs to operate its factory efficiently.

Relations with individual small farmers (payments, technical assistance, maintenance, harvest/transport coordination, etc.) are channeled through seven local village cooperatives (KUD) and several small farmer groups ("kelompok petani", made up of 20 - 25 farmers) each who coordinate services to the farmers, the delivery of fruit to the processing plant and payment to the farmers. The KUDs are quite large involving up to 1000 members or more, not all of whom are participants in the NES System. The KUDs may also have other activities such as stone quarry management, farm input supply, motorbike taxi service ("ojek"), road maintenance, etc. The small farmer groups act as sub-groups to the KUD.

Current Status:

The processing facility is currently operating below capacity and at a loss. This is partially a result of the current low prices for palm oil on the local and international markets. It is also partially the result of small farmers achieving, on average, only slightly more than half the yield to which they might reasonably aspire. The Cooperative Department is reported to have set up a program for encouraging an additional 2000 hectares of small holder, through non-NES System palm fruit production, but the details and results of this effort were not available at the time this research was conducted.

The price paid to farmers for fresh palm fruit is established each year by the Director General of Estate Crops (Dirjen Perkebunan). This year the price is Rp 104/kg of fresh fruit. The factory manager calculates that the maximum price he can pay to break even on operations is Rp 102/kg. This is at least partially a result of the high overhead costs of PTP operations and operating inefficiencies in the factory as well as low market prices for the output of the operations. An extensive factory rehabilitation is currently being planned which will lower factory operating costs.

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Participating small farmers are paid Rp 104/kg by PTP XI. From this, Rp 31 (30 percent of the gross price) is deducted for loan repayment, Rp 18 for fertilizer and maintenance, Rp 1 for administrative costs of the KUD and an average of Rp 15 for transport. This leaves a net value of Rp 39/kg. before the farmer pays harvest costs. An "average" farmer with total production of 9 tons per hectare can thus earn approximately Rp 351,000 per hectare per year or Rp 526,500 (US\$250) on his total oil palm area. While loan payments would total Rp 6.28 million over 15 years -- probably sufficient to cover the Rp 4.2 million loan plus 10.5 percent interest.

The PTP XI estate farm averages 17 tons per hectare, partially as a result of applying a full dosage of fertilizer. Small farmers are provided with only 60 percent dosage due to budget limitations. If small farmers were able to achieve the same yield levels, their net income could increase to around US\$400 per year. In addition to the cash income, the farmers benefit to the extent that they are able to pay off their property loan and gain access to the value of the land as collateral for other borrowing.

A good farmer, working to achieve the best possible results from his farm, can achieve a much higher income than the average. One case in point is the farmer interviewed who averages 16 tons of palm fruit per hectare per year. He does the farm maintenance work himself and receives an average net cash income of Rp 120,000 per month after deductions for loan repayment, fertilizer, transport, etc. In addition to this, he realizes cash income of Rp 25,000 per month from the sale of other crops (rambutan, mango) grown on the .3 hectare of his land dedicated to food and other cash crops. The result is a total cash income of approximately US\$70 per month from his two-hectare plot. This may not appear to be very attractive but it is at least twice as much as he would receive as a laborer, more than three times as much as the "average" farmer in the area, and he has the added benefit of land ownership.

However, it appears that this farmer, and others like him, is being "penalized" for being a good farmer, in that his loan payment is calculated as a percentage of total palm fruit sales for 15 years rather than a total amount which must be repaid. At his current level of production and price, he should be able to repay the principle of his Rp 4.2 million loan in about six years (exclusive of interest). It is not clear that he will be able to stop the 30 percent deduction at that time however. If not, he will, in the end, be subsidizing the loans of those farmers who are less productive.

While the farmers interviewed expressed their great satisfaction with the NES System, and it is reported that many others would like to join the program, this satisfaction appeared to be more related to their gaining access to land and the secondary benefits related to the infrastructure development which accompanied the

project than to the profits they can generate by palm oil farming. The PTP has gradually assumed more and more responsibility for the maintenance of small farm production areas. It is probably safe to assume that farmers would be more active in working on their own land if they saw a greater financial return from their efforts.

As the system now operates, because all payments are based on gross production, the farmers do not see any greater profitability on a unit basis from increasing their yield. They generate a profit of Rp 39 per kilogram of fresh fruit bunch on the first kilogram they harvest and on the last. Revenues to the PTP increase as yields go up but it is not clear at what point the PTP is able to break even on the inputs and maintenance they provide or what level of production is required to make a "full" monthly loan payment.

The farmers showed little understanding that the loan payment was related to a total amount to be repaid. In their minds, it seems to have more the nature of a tax which they must pay for 15 years. One could easily assume that at the end of the 15 years, when loan repayments have been completed, they will become much more interested in maximizing yields from their land whether from oil palm or other crops.

Conclusions and Recommendations:

It appears that the NES System is probably a reasonably effective means of giving landless workers access to land for which they can hold title. The principles are correct in that they are given land which has already been developed with a crop for which there is an assured market plus the technical assistance and inputs required to achieve reasonable yields. The processing facility does have a high degree of control over the crop, as there is no alternative market for the palm fruit. The farmers risk is limited by the dependence of the factory on palm fruit produced by the small holders to achieve viable operating levels.

From the standpoint of the PTP, however, it would probably be in a better position if all of the land were under its direct control so that it could maximize its control over management of the crop and minimize administrative costs. The production cost for fruit on the nucleus estate was not determined, however, and this would have a major influence on the relative attractiveness of small holder production from the standpoint of PTP XI.

It is difficult to evaluate the efficacy of this farmer-processor linkage due to the limited profitability of the crop at this time. The heavy involvement of PTP XI at the farm level, minimizes small farmer autonomy, however. This system primarily uses the farmer's land, and a certain limited amount of labor, to produce

the raw material PTP XI needs to operate the processing facility. There remains considerable flexibility for motivated farmers to control their own fields, however, and thus maximize their returns from the limited amount of land they control. Approximately 30 percent of the participating farmers are reported to take this initiative.

One suggestion to be considered is that farmer repayments (fertilizer and loan payments in particular) be placed on an actual cost or areal basis, rather than a yield basis, which would give the farmer the incentive of a higher net return per unit if he put in the extra investment of materials and labor to maximize his yields. This scheme has only limited replicability, however, due to the high cost of land acquisition, preparation and allocation.

Annex C - Case Study #3

PTP XI Coconut Estate and Nucleus Estate Project

The following brief case study is based on interviews with participants in the above named project. Interview subjects included: the general manager of the estate; the area development officer responsible for the Nucleus Estate Scheme (NES System) program from the Estate Crops Service (Dinas Perkebunan); extension staff from the PTP XI head office; and, one farmer.

These interviews enabled the researchers to gain a general understanding of the business being studied and the characteristics of the linkages between the processing plant and the small-scale farmers who supply it with raw materials. Much more field research is required to verify the conclusions of this research and prescribe any firm recommendations for overcoming operating difficulties.

The Business:

PTP XI is one of the state-owned agricultural estate companies which have traditionally been the most prominent actors in the vertically-integrated agribusiness sector in Indonesia. PTP XI operates several estates in West Java and North Sumatra including rubber, coconut, oil palm, tea and cacao. Each estate operates independently on the basis of centrally-approved budgets and operating plans. Many of these estates pre-date Indonesian independence, having been originally established by the Dutch.

The coconut project is part of the NES System V South Banten project managed by PTP XI. This project was financed by the World Bank beginning in 1981. To date, approximately 2541.5 hectares of coconut have been planted on land allocated to 1,720 farmers. In addition, the PTP maintains a nucleus plantation of 700 hectares.

The original intention of the project was to process the coconut into coconut oil in a mill which was developed at the site for that purpose. That proved to be not viable as the price of coconut oil fell, however, and all coconut from the estate and the NES System is now sent to Pondok Gede (3-4 hours away) for processing into desiccated coconut.

The Nucleus Estate Smallholder (NES) System:

The NES System is basically a community development project or a land distribution project which is intended to provide landless farmers who had been cultivating government land in the area as squatters, with land and a developed estate crop with required production inputs and a guaranteed market.

Under this program each farmer is allocated, and eventually receives title to, 2 hectares of land consisting of 1.5 hectares of tree crops (coconut) and 0.5 hectare of food crop and house lot. The investment period for developing the crop is 5 years. During that period the farmers work as laborers to establish the plantation and other infrastructures with guidance from the PTP. At the end of the investment period, the farmers sign a credit agreement with Bank Rakyat Indonesia, which acts as the channeling bank for World Bank financing. Under this agreement the farmers are required to sell all of their tree crop produce (coconuts) to PTP XI. The total amount of credit for each farmer is between Rp 4.5 and Rp 5.5 million (US\$2,150 - 2,600) which is to be paid by the farmer over 15 years by the deduction of 30 percent of the gross value of produce sold to the PTP. The PTP is responsible for collecting, processing and marketing the coconut, and also deducting the farmers credit repayment on behalf of the bank.

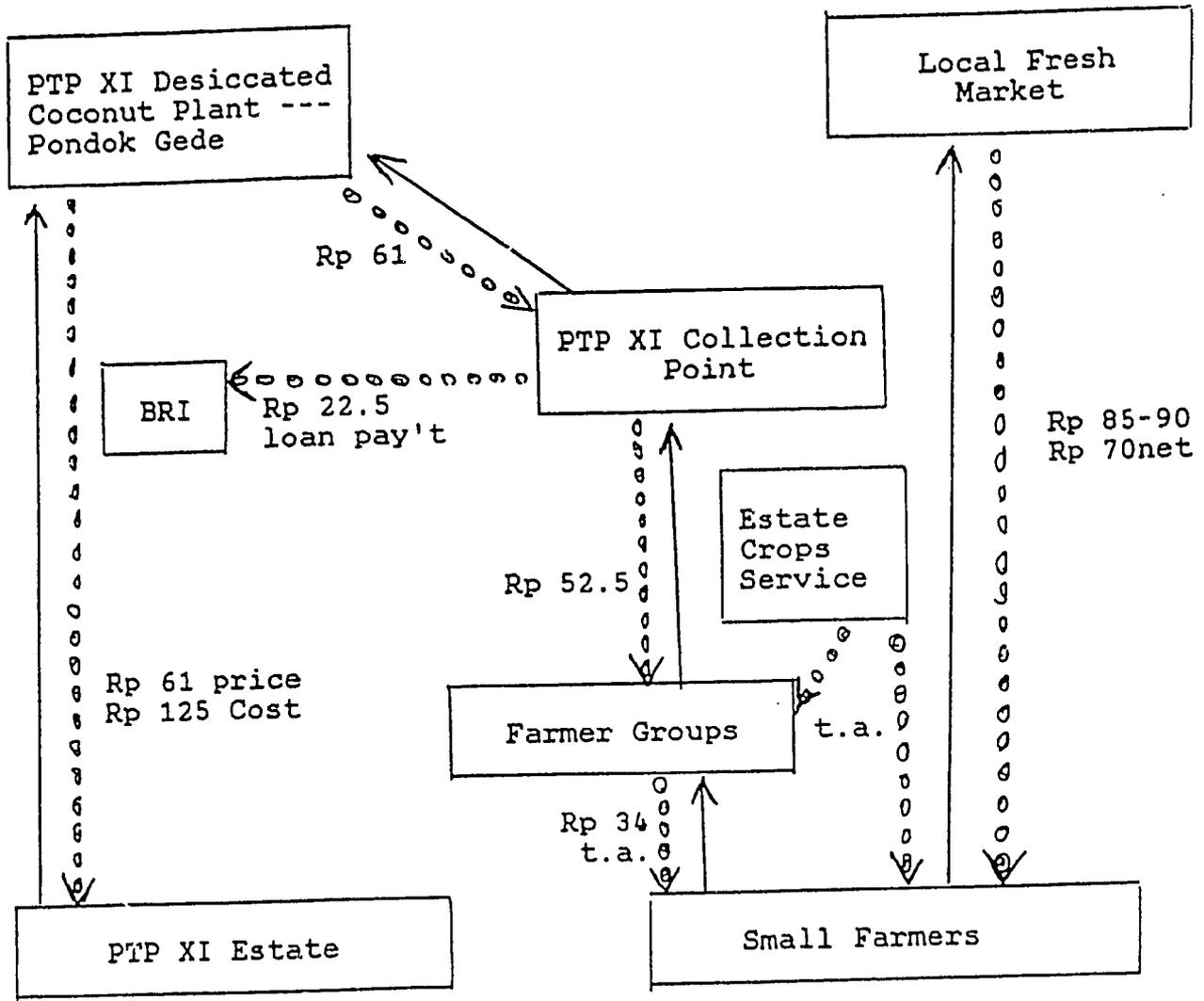
The Farmer/Participants:

Participants in the NES System were selected from among local residents, many of whom had no land of their own to farm previously. No individual is allowed to hold title to more than one plot under the scheme but several members of the same family may be allocated plots. There are reported to be few absentee owners. The low return to farmers from this project, in terms of cash income, is illustrated clearly below. There remains some enthusiasm for the project, however, as the farmers appreciate the infrastructure development (mostly roads) which have opened up the area for other types of agriculture and they will eventually be allowed to plant other crops on their land. There is no effective sanction for failing to make required loan payments.

The Small Farmer - Processor Linkage:

The farmers are formed into groups of 15 to 25 members. These groups coordinate harvesting and crop maintenance activities, sometimes using outside labor to do the work. No KUD (village level cooperative) is involved. PTP XI provides transportation for the produce from the field to the warehouse in the estate. Each area is harvested once a month with PTP sending trucks to every collecting point in the area.

PTP XI Coconut Marketing Plan



-----> = product flow
 ooooooooooooo> = other flow
 Rp = raw material payments

The PTP records the amount of produce each farmer sends each month. The 30 percent loan repayment (currently Rp 22.5/fruit) is deducted before the balance is sent down to the farmer group for distribution to individual farmers. PTP receives a management fee of .25 percent of the total farmer repayment from Bank Rakyat Indonesia (BRI), who acts as the channeling bank on this project.

The crop flow is actually quite simple and straightforward with small farmers coordinating their harvesting through their group leaders (ketua kelompok) who, in turn, coordinate with the PTP to insure an even flow of product. Payment then passes back down the same line with appropriate deductions being made by the PTP (for loan repayment) and by the farmer groups (for transportation and other services). Technical assistance is provided by extension officers from the Department of Agriculture, Estate Crops Service, and extension services provided by the PTP. There is no ongoing farmer assistance package in terms of working capital loans or agricultural inputs.

Small farmers do have alternative markets for their crop and can realize higher prices in those markets.

Current Status:

This entire operation is in danger of collapse in the near term as neither the farmers nor the PTP are able to profit from the current operation. There are several reasons for the perilous state of the program, none of which are really related to the nature of the processor - farmer link. The basic problem is the crop is simply not profitable under current pricing structures.

- The Director General of Estate Crops has established a small farmer purchase price of Rp 75 per coconut for the current crop year.
- The cost of production on the nucleus estate is estimated at 125 per coconut. High overhead costs are reportedly a major factor in this high cost per unit.
- The desiccated coconut factory pays only Rp 61 per coconut delivered to the factory.
- Farmers receiving Rp 75 per coconut sold to PTP have a total of Rp 41 deducted (Rp 22.5 loan payment, Rp 10 transportation, Rp 1.5 farmer group administration, Rp 5 harvesting, Rp 2 loading). They thus typically receive a net payment of only Rp 34 per coconut. They report being able to harvest approximately 1100 coconuts per month from their 1.5 hectare plot. Their net monthly income is approximately Rp 37,400 (US\$18). On an annual basis, this totals Rp 450,000 (US\$215).

- They can double this cash income by selling the coconuts on the local market at a net cash price of about Rp 70 per coconut. The lack of any effective sanction for non-payment of their loan, together with no clear financial interest on the part of the PTP to collect their fruit increases the likelihood that a high percentage of fruit will find its way to the local market.
- The lack of any credit program for maintaining the fields, and the resulting failure to fertilize and maintain the fields properly also suggest that average yields are likely to fall over time.

Conclusions and Recommendations:

The non-viability of the crop under current pricing regimes makes it impossible to properly analyze the appropriateness of the program for linking the farmers and the PTP. There are a few observations which may be offered, however.

On the positive side, the system is relatively simple and avoids the imposition of non-representative intermediary groups. On the negative side, however, due to the lack of an effective farmer assistance package and the existence of an attractive alternative market together with the absence of sanctions for non-payment of loans, the PTP has little or no effective control over the crop. The farmers are more or less free to sell their fruit as they choose. The PTP, in fact, appears to be minimizing its loss with every coconut it does not buy from the NES System farmers.

One suggestion which might be considered is to investigate alternative coconut processing technologies (activated charcoal, coir matting, cosmetics, etc.) to determine if there might be a way to increase value added at the estate and make better use of coconut by-products. Another, more radical possibility, is that the entire scheme might be redesigned to make better use of the farm land which is located within easy reach of the Jakarta market. This estate might be sub-divided and privatized with part of the land being developed as housing and industrial estates, which would include small processing plants and packing houses to care for the produce of the NES System farmers. This would be a very major undertaking, but there appears to be no alternative to implementing some type of major restructuring which would avoid the major losses being incurred by the PTP at this time.

Annex D - Case Study #4

BAT Tobacco Scheme - Lombok

The following brief case study is based on interviews with key informants from all levels of the production-processing-marketing chain. Interview subjects included: the BAT Leaf Production Manager in Lombok; the head of the regional office of the Agriculture Department (Kantor Wilayah) and the Estate Crops (Perkebunan) division; two BAT field extension staff; and, several farmers who participate in the program. It was not possible to meet with an officer of the private bank which finances small farmer production as part of the BAT procurement scheme.

These interviews provided the researchers with a clear understanding of the BAT operation in Lombok and the nature of its relationship with local farmers who supply it with the flue-cured Virginia tobacco leaf it requires to operate. More detailed research may be required to verify the conclusions and recommendations offered at the end of this case study.

The interviews undertaken as the basis of this research were aimed at understanding the supply system as it was intended to work and identifying strengths and weaknesses in that system. The findings which follow should be considered as illustrative rather than diagnostic or prescriptive, as the time and resources devoted to this case were far from sufficient to suggest a high level of confidence for the specific findings. The team is confident in its general conclusions, however, and recommends that more intensive follow-up analysis be carried out to determine the validity of the preliminary recommendations.

The Business:

PT BAT Indonesia is the Indonesian affiliate of one of the world's leading tobacco processing and marketing organizations. In Indonesia, the company operates several tobacco production/buying stations in Java, Lombok and Bali as well as a "green leaf" processing station in Solo (Central Java) and a large-scale cigarette manufacturing plant in Cirebon (West Java). By far, the largest portion of the company's business in Indonesia involves the procurement of local tobacco for processing into cigarettes which are sold on the domestic market. This case study focuses on one particular aspect of the business of PT BAT Indonesia -- the system by which it procures flue-cured tobacco from small farmers in Lombok.

The company purchases tobacco from all three districts (kabupaten) of Lombok, though production is centered in the Central and East Central parts of the island. Production targets have increased steadily since the program was initiated in 1973. The 1993 target of 2000 tons was achieved by involving 454 farmers with 522 drying barns and farming 1,200 hectares of mostly rented land. The company does not operate any nucleus farm of its own but provides considerable assistance to the small farmers who participate in its production scheme.

Small farmer tobacco is purchased at BAT's centrally-located buying station and warehouse. The tobacco is graded as it comes from the farmer (and in the presence of the farmer) then reprocessed (sorted and baled) into 100 kg bales for shipment by truck to Solo in Central Java where downstream processing begins. BAT is a highly profitable company which is highly committed to its program of purchasing tobacco from small-scale farmers.

The Farmer/Participants:

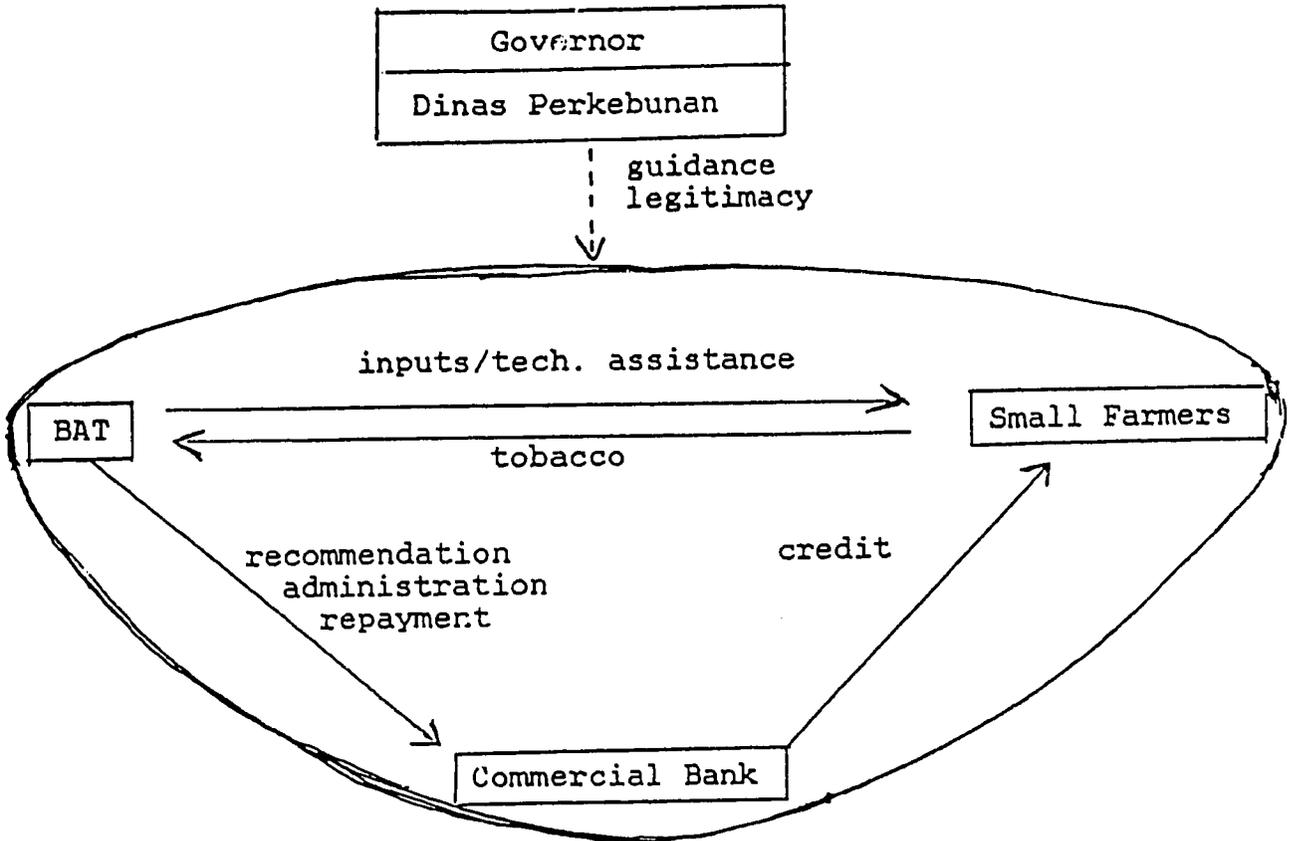
The 454 farmers who participate in the BAT scheme in Lombok are small by any commonly accepted definition. The smallest farms at least 1.5 hectares (3.7 acres) of tobacco while the largest farms eight hectares (nearly 20 acres). However, of this land, the average farmer owns only about .66 hectare (1.6 acres) with the balance being rented from neighbors on a seasonal basis at a cost of Rp 600 - 700,000 per season (US\$285 - 335). The tobacco season is concentrated during the season when rice is not commonly grown. Alternative off-season crops are limited.

The rent paid by tobacco farmers provides the land owner (usually small farmers themselves) with a higher cash income than direct farmer participants in some of the other commodity programs analyzed (e.g. coconuts and oil palm) are able to generate in a full year. In addition, the land owners still have access to the land for their most important crop (rice) which can only be grown once per year in this area, in any case.

Participating farmers are required to have one drying barn for each approximately 2.3 hectares of tobacco they farm. This represents the most significant capital expenditure for the farmers (approximately Rp 1,250,000 or US\$595). During the 1970s and 80s many of these barns were financed by low cost (subsidized) Small Industry Credit (KIK) loans from government banks. This program has been ended, however, and long-term financing is no longer available for this purpose. The researchers did see new barns being built from the farmers own funds.

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The BAT/Lombok Purchasing System



The several farmers interviewed, including one whose crop had largely failed this year, professed great satisfaction in being a tobacco farmer and confidence in their relationship with BAT. They took pride in pointing out how much tobacco had "done" for them. One measure of their success is the increasing amounts many are able to pay for rent for tobacco farming from year to year. The only criticism of the company voiced by a farmer during the interviews was that he did not always understand why the BAT grader put his tobacco in a lower class (with a lower price) than he had expected. BAT and the farmer both responded positively to the suggestion that it organize an off-season program to teach the farmers more about grading standards.

The Small Farmer - Processor Linkage:

The purchasing system used by BAT in Lombok (as well as in Bali) is characterized by the high degree of interdependence among the three main parties and the rather limited role of government. Many of the participants interviewed volunteered that it was a type of "Bapak-Angkat" (foster-father) program by which large companies are able to provide assistance to the development of farmers and small industries.

BAT, after establishing its production target for the year, surveys farmers who wish to continue in or join its program, selecting those with whom it has had good experience or those who offer the greatest potential for participating in the program profitably. Priority is given to "loyal" farmers already in the program. Many have now been a part of the program for 10 years or more. Two have been active in the program since its initiation in 1973.

Selected farmers are then recommended to the commercial bank, which has been selected by BAT, to receive working capital crop loans, which are administered and repaid by BAT as the crop is purchased. Farmers are able to borrow up to 40-50 percent of their working capital requirements (about Rp 1.15 million per hectare). BAT also assists the farmers in the procurement of various crop inputs and barn insurance using the loan proceeds. BAT acts more as a coordinator or facilitator than benefactor or supplier in the provision of these goods and services. It links the small farmers collectively into the commercial systems they would not be able to approach as effectively as individuals (e.g. fertilizer and kerosene supply systems).

Loans are provided by the participating commercial bank on the basis of a tri-partite agreement between the farmer, the bank and BAT. Individual loan agreements are prepared for each of the selected farmers, and each is liable for the full amount of the loan given. BAT provides no guarantee for the loan but does offer the bank the "security" of its production and marketing systems and lowers

the bank's operating costs by administering the loan program through its own computerized record-keeping program. The program has been so successful from the point of view of the banks that others have begun approaching BAT to compete for the role of handling bank. It should be noted that a rather small private commercial bank played this role in 1993 after several years of working with one of the larger state-owned banks where BAT felt the bureaucratic requirements were too great.

BAT also provides the farmers with technical assistance from 7 qualified field men and gives them seeds at no cost to insure that high quality seeds of the appropriate varieties are used. Farmers are also frequently provided cash advances as they wait for loan processing to be completed or for the final harvest of their crop. All of the financial transactions (loans, advances, sales, repayments) are tracked by BAT via its computerized accounting system. A separate account is maintained for each participating farmer, and each is able to review his account at any time.

The primary role of government is centered in the office of the Governor where prices are negotiated and finally determined each year just before the harvest season, based on the costs of production. Prices are set in a negotiating meeting which includes farmer representatives (group leaders), government representatives (Perkebunan, Koperasi, Kanwil Pertanian), the bank which has agreed to finance the program, and BAT itself. The price schedule is then formally established by directive of the Governor (S.K. Gubernur). This system appears to benefit BAT and the farmer by providing a firm framework of prices which are clearly understood and accepted by all parties. Dinas Perkebunan also assists in the evaluation and selection of new farmers to participate in the program.

BAT pays an export tax ("retribusi") to the provincial government of Rp 75 per kilogram of tobacco sent off of Lombok. This payment totalled over Rp 150 million (US\$73,000) in 1993.

Several other companies in the area vie for small farmer tobacco production using some variation of the same system. This creates some competition in the tobacco market but it effectively moves that competition upstream in the production season with farmers and buyers making their decisions as to who they will work with before the crop is planted. There are some other, more traditional, farmers who operate independently, generally producing lower grades of tobacco for local consumption.

Numerous itinerant traders appear at harvest time and purchase tobacco on a cash basis. These traders are generally considered to be "poachers" who are seeking to divert tobacco which should be channeled to other buyers who have been working with the farmers throughout the crop year. They only become a

serious problem at times when tobacco crops in other areas (mostly Java) have failed for one reason or another and market prices are bid up by the resulting shortages in the market. This was the case in 1989 and these traders made serious inroads into the crop sold to BAT and other companies. This led to modification of the BAT program to decrease the likelihood of a recurrence.

BAT places a high priority on the development of loyalty among its farmer group by providing them with valuable assistance and dealing with them fairly. There is less than a 10 percent turn-over in the BAT farmer group each year. It is apparent that farmers value their relationship with BAT highly and that it is a matter of pride that they work with the "best" company. Many farmers have now been a part of the program for 10 years or more.

There is no formal Cooperative (KUD) involvement in the program. In some cases, farmers have joined together into informal groups (kelompok petani) for specific purposes (purchase kerosene, harvest, etc.). BAT uses those groups as channels for technical assistance where appropriate, but it sees its most important relationship as being with individual farmers.

It should be noted that BAT has developed this program especially for use in Lombok and Bali. In Java, where an extensive system of tobacco brokers has been developed, BAT and the participating commercial bank work with those brokers who, in turn, work with the farmers with whom they are associated, in their normal way.

Current Status:

The BAT system resulted in production totalling 2,060 tons grown on approximately 1,200 hectares in 1993 -- three percent over the preseason target.

Credit totalling Rp 1,377 million (US\$655,000) was advanced to 454 farmers by Bank Universal on the recommendation of BAT to finance production of the 1993 crop which totalled Rp 5,500 million (US\$2.62 million) in value. One-hundred percent loan repayment was achieved for the fourth year in a row. This is probably partially the result of the care BAT takes in recommending farmers for loans and also the rather conservative policy of the bank in lending only 40-50 percent of the anticipated working capital requirements of the crop. This latter policy does force farmers to seek other sources (including their own funds) to finance the balance of their working capital requirements. Interest rates are high (20 percent currently) but effective interest payments are moderated by treating each loan as a line of credit and paying interest only on the principal balance at a given time.

Dry leaf yields in 1993 (after drying in farmers' barns for one week) were somewhat lower than in previous years but farmers were still able to earn a net profit estimated at about Rp 2.5 million (US\$1,190) per hectare. It was apparent that both the farmers and BAT were concerned about this problem and felt that it was in their mutual interest to determine the cause. Rather than each party blaming the other for the problem, they are cooperating to understand it and develop a solution before the 1994 crop year gets underway.

Labor requirements during the season average six to seven workers per hectare adding about 7,500 farm jobs in the area during a period when other employment opportunities are very limited. BAT itself adds approximately 100 seasonal workers (some of which are relatively well-paid grader positions) to its payroll during the three-month harvest season.

Conclusions and Recommendations:

The BAT procurement program in Bali appears to be a successful example of a large processing company linking with small-scale farmers to obtain the raw materials they need. The following appear to be important factors in that success:

- the commitment of BAT to develop the program successfully over a period of several years and its flexibility in modifying the program from time to time to maximize its effectiveness;
- the profitability of the crop for farmers;
- the apparent mutual respect and trust between the farmers and BAT and their participation as interdependent and equal partners in a profitable production and marketing system;
- the limited but appropriate role played by government in supporting the system;
- the complementarity of tobacco's production cycle with that of rice - the area's major food crop;
- the strong sense of loyalty to BAT among participating farmers based on their experience in the program; and,
- the simplicity of the system with the commercial relationships being established between the parties directly involved.

If there is a weakness in this program it would appear to be BAT's relative lack of monopsonistic control over the market for the product they require. Other buyers compete for the crop both before the season begins and at the time of harvest. The system is designed by BAT to insure that it will be able to purchase the amount of tobacco it requires, however, by developing programs of technical assistance, production credit, and assured prices with encourage a high degree of loyalty among participating farmers. There remains a healthy amount of competition, however, as the farmers are free to change their programs from year to year, and the company is free to change farmers from year to year.

There are undoubtedly many problems which arise every year in the management of this program. To the extent that these indicate the need for systemic adjustments, such adjustments are carried out. If there are major weaknesses in the program, they are not apparent to this research team which recommends that this program be used as a "benchmark" when evaluating or designing farmer-processor linkages in other settings. It is clear that this program cannot be transferred as a whole to other situations but it is equally clear that there are valuable lessons to be learned from this case.

Annex E - Case Study #5

BAT Vanilla Scheme - Bali

The following case study is based on interviews with key informants throughout the production-purchasing-processing chain. Interview subjects included: one of the BAT managers responsible for non-tobacco operations; the production supervisor; both of the field advisors; and, two farmers. The manager in charge of the overall operation on the ground in Bali was not available and it was somewhat more difficult to obtain data than it was in other cases examined.

It was not possible to interview all of the people that could have made substantive contribution to this research but the researchers did gain a general understanding of BAT's vanilla business in Bali and its linkage with the farmers who produce the crop. Much more field research is required to verify the conclusions of this research and prescribe any firm recommendations for overcoming operating problems.

The interviews undertaken as the basis of this research were aimed at understanding the supply system as it was intended to work and identifying strengths and weaknesses in that system. The findings which follow should be considered as illustrative rather than diagnostic or prescriptive, as the time and resources devoted to this case were far from sufficient to suggest a high level of confidence for the specific findings. The team is confident in its general conclusions, however, and recommends that more intensive follow-up analysis be carried out to determine the validity of the preliminary recommendations.

The Business:

PT BAT Indonesia is the Indonesian affiliate of one of the world's leading tobacco processing and marketing organizations. In Indonesia, the company operates several tobacco production/buying stations in Java, Lombok and Bali as well as a "green leaf" processing station in Solo (Central Java) and a large scale cigarette manufacturing plant in Cirebon (West Java).

In the mid-1980s the cigarette market in Indonesia underwent a major change as filters were added to the traditional "kretek" cigarette. This addition broadened the market for these already popular clove flavored cigarettes considerably and caused a corresponding downturn in the market for the so-called

"white" cigarettes produced by BAT. At this time it appeared that BAT might find itself in financial difficulties if it did not diversify its business activities.

As part of this diversification the company decided to enter the vanilla business on the north coast of Bali. Not only did it appear to be a highly lucrative crop with a strong and growing world market but it was also well-suited to the agricultural conditions of the area and appeared to be appropriate for small holder production and procurement using systems similar to those which had been developed earlier in the tobacco business. A cleaning and drying plant was built near the BAT tobacco warehouse in Singarajah, Bali, and the company started buying beans from existing farmers in 1990. Operations were initiated on the basis of open market purchases in competition with numerous other buyers while a contract farming program similar to the one used in the tobacco business was developed.

The company has not developed a nucleus farm for vanilla production and thus must rely on small-scale farmers to produce the beans it needs to satisfy its market.

At this point BAT is marketing whole, high grade, dried vanilla beans to buyers outside the country. It has not yet made a decision to install an extraction plant which would enable it to use a wider range of bean qualities and address a much wider international market niche.

BAT has established a similar processing facility in Ungaran (Central Java) and has buyers in North Sulawesi, South Sulawesi and North Sumatra.

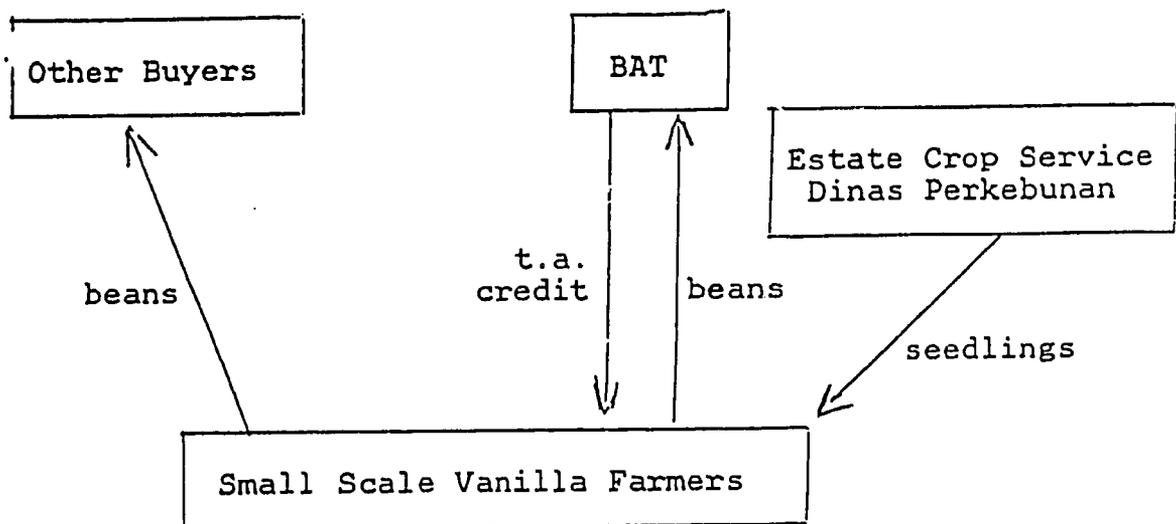
The Farmer/Participants:

BAT is, at present, working with 90 farmers in the Singarajah area and is seeking to increase this number each year. These are small-scale farmers in the highland rather dry areas of Northern Bali. The average farm size is quite small (less than one hectare average) and alternative cash crops are few.

The farmers act independently and there is no involvement of the cooperative department. One of the farmers interviewed is sharecropping with a landowner (himself a small farmer). The farmer has 20 years of experience in vanilla farming and is responsible for the technical aspects of establishing the farm while the land owner only provides the land.

While enthusiasm for vanilla farming appears to be high, there are significant barriers to entry to the crop. The cost of developing a new planting is high (Rp 2 million per .6 hectare), two to three years of investment are required

The BAT/Bali Vanilla Purchasing Scheme



before economic yields are generated, and peak yields are not realized until the sixth year. The risk of crop failure is high due to agronomic (pests and disease) and weather (drought and storms) factors. Maintenance costs are high with hand pollination being required to insure a good crop.

The farmers interviewed noted that the market for their vanilla is good, with buyers coming around even before they have a crop ready to harvest. There is some enthusiasm for the type of scheme BAT uses in the tobacco business, however, with the farmers seeing it as a way to improve their access to the inputs they require (including credit) and reduce their risk of loss.

The Small Farmer - Processor Linkage:

As is evident in the map above, the system used by BAT for purchasing vanilla from small-scale farmers in Bali is a simple one with, at this point, only minor variations from a purely free market system.

BAT does offer technical assistance and a very limited amount of production credit (for inputs) to selected farmers but some of the critical elements of its successful tobacco program are missing:

- There is no commercial bank participation to extend the farmers the level of medium-term credit required to develop new fields of vanilla and maintain them until commercial yields are realized.
- BAT purchases only the top grades of vanilla leaving the farmers to find alternative markets for their lower grade beans.
- There is no formal agreement linking BAT to specific farmers.

Both BAT and the farmers have expressed an understanding that it would be in their mutual best interest to develop a more comprehensive program of cooperation and support, but up to this time not much has been developed in this regard beyond BAT's employment of two agricultural field advisors to work with the farmers and identify those with whom the company might most productively cooperate more directly.

Apparently none of the other buyers have gone even as far as BAT in developing a comprehensive working relationship with individual farmers. They simply buy whatever crop is available and ship it directly off of Bali for processing.

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Dinas Perkebunan (the Estate Crops Service) assists the farmers by operating a small nursery which provides seedlings to vanilla farmers at below market prices. The Dinas is also trying to organize farmer groups to improve the position of individual farmers in negotiating with buyers. The Dinas recently encouraged the governor to issue a regulation prohibiting the sale of vanilla before May 1st in order to reduce the amount of unripe (and therefore low grade) beans being sold.

Current Status:

There is some inconsistency in the team's findings with regard to the vanilla industry in Bali. On the one hand, farmers appear to be optimistic about the crop and are increasing their plantings with assistance from BAT and Dinas Perkebunan. On the other hand, data provided by BAT and the Agricultural Department indicate a significant and steady decline in vanilla production since 1988. The two sets of data are not easily reconciled but they both indicate that the industry would appear to be in serious trouble on Bali.

BAT purchased 100 tons of fresh vanilla beans in 1993 out of a total crop they estimated at 400 tons. They paid an average of Rp 15,000 per kg for those beans. All purchases were made for cash net of any credit repayment.

Yields of two to three tons per acre are achievable once the fields reach full productivity (year 3) and these yields can be maintained for 6 to 10 years or more before the vines must be replaced. A farmer can thus generate gross income of Rp 30 million (over US\$14,000) for each hectare of vanilla he produces. One problem faced by the farmers is the protection of their high-value crops during the harvest season. This level of income appears to be inconsistent with declining levels of production unless there are serious agronomic problems which have effected the crop. No such problems appeared during the course of interviews.

Conclusions and Recommendations:

A great deal of research remains to be done before this production and marketing system can be fully understood. However, there are two factors which seem to be limiting the success of the program at this time:

- BAT has not made the level of commitment to the program that it did with its tobacco operation. The farmer assistance package is less comprehensive, and they do not commit to buy all of the crop.

Annex F: Case Study #6

P.T. Markisa Segar - Passion Fruit Processing

The following case study is based on interviews with key informants from all levels of the production-processing-marketing chain. Interview subjects included: the purchasing manager and marketing manager from PT Markisa; the chairman of the Markisa Producers' (processors) Association; the manager of a participating local cooperative (KUD); the owner of a small processing plant in the same area; several farmers; and, farmer group leaders.

Interviews enabled the researchers to gain a general understanding of the business being studied and the characteristics of the linkages between the processing plant and the small-scale farmers who supply it with raw materials. More field research is required to verify the conclusions of this research or support firm recommendations for overcoming any operating problems.

The Business:

PT Markisa Segar is an Ujung Pandang-based company which, in 1990, established a modern facility for processing passion fruit near the town of Malino, a productive horticulture area in the highlands approximately 85 km east of Ujung Pandang. The company is owned by PT Raditta (45 percent), the cooperative organizations (PUSKUD and KUDs) (20 percent), and several individuals (35 percent).

The plant has an operating capacity of four tons of fresh passion fruit per hour. Its primary product is ultra heat treated (UHT) pure fruit juice which is aseptically packed in plastic-lined steel drums for shipment to overseas buyers. The equipment can, with rather minor technological adaptations, process a range of other fruit as well (mango, papaya, etc.) but this is not being done at present and there are apparently no other fruits in the area grown in sufficient quantity to justify processing. The company received technical assistance in plantation management and processing technology from two VOCA volunteers for two months in 1992.

The company operates a 220-hectare nucleus estate at the factory site. The nucleus estate, which is farmed on a "full intensive" basis, averages eight tons of fruit per hectare. Yields of 15 tons per acre have been achieved on smaller demonstration plots. Small farmers who supply the balance of the factory's inputs

farm on a semi-intensive (multi-cropping) basis and generate average yields of three to four tons per hectare. 4,000 - 5,000 hectares of semi-intensive production are required for the factory to operate year-round at full capacity (two shifts). The company estimates that 1,500 hectares of production are required for it to reach a break-even level of operations.

Small Farmer Participants:

The farmers who supply passion fruit to PT Markisa Segar are small-scale vegetable farmers on the highland area around Malino. They generally farm one to eight hectares of their own or rented land. Intercropping is the rule in the area and there are few employment opportunities outside of agriculture. There is a tradition of coordinated farmer action through informal farmer groups in the area. This tradition applies to labor sharing ("gotong rayong"), the purchase of agriculture inputs and marketing.

The cost of establishing one hectare of passion fruit on a semi-intensive basis (seedlings, stakes, wire, fertilizer) is estimated at Rp 1.8 million (US\$857) excluding labor costs. Annual maintenance costs are estimated at Rp 580,000 per hectare. At an average price of Rp 12 per fruit (Rp 300/kg) farmers can realize an average annual profit (excluding labor costs) of Rp 620,000/hectare (US\$295) beginning in year two and recover their establishment cost by the end of year four. This income is in addition to the profits they can gain from the potatoes, peppers or other vegetable crops which they intercrop with the passion fruit.

Markisa Producers Association:

This association of passion fruit processors, was formed in 1989, with 23 of the 31 small-scale processors in South Sulawesi, as well as PT Markisa Segar. Most of the members produce passion fruit syrup (or squash) which is a mixture of fresh juice and sugar. It is generally packaged in glass bottles though some processors are beginning to work with other forms of packaging. Most of the members market only within South Sulawesi though a few of the larger members do have commercial marketing arrangements in Jakarta.

The technology used by the members is very simple involving virtually no automation or machinery. The fruit is cut and the gel and seeds are removed by hand. The gel and fruit are then strained through a cheese cloth into large stainless steel pots where sugar is added and bottles are filled by a simple system of plastic tubes attached to the bottom of the pot. The largest of these small plants uses a

small mechanical separator for juice extraction and requires approximately 60 hectares of semi-intensive plantings to meet its production requirements -- only a bit more than 1 percent of the area needed by PT Markisa Segar.

The objective of the association is to elevate the status of the industry and to encourage small farmer production of passion fruit. The association has no specific program or agenda at this point and has some difficulty attracting members to meetings. There may be some potential for invigorating this organization and assisting it to address some common objectives in terms of identifying higher value products they might produce and markets they might address, developing and promoting successful farmer - processor linkages, gaining access to more costly capital equipment (e.g. for aseptic packaging), negotiating joint credit packages, etc.

The Small Farmer-Processor Linkage:

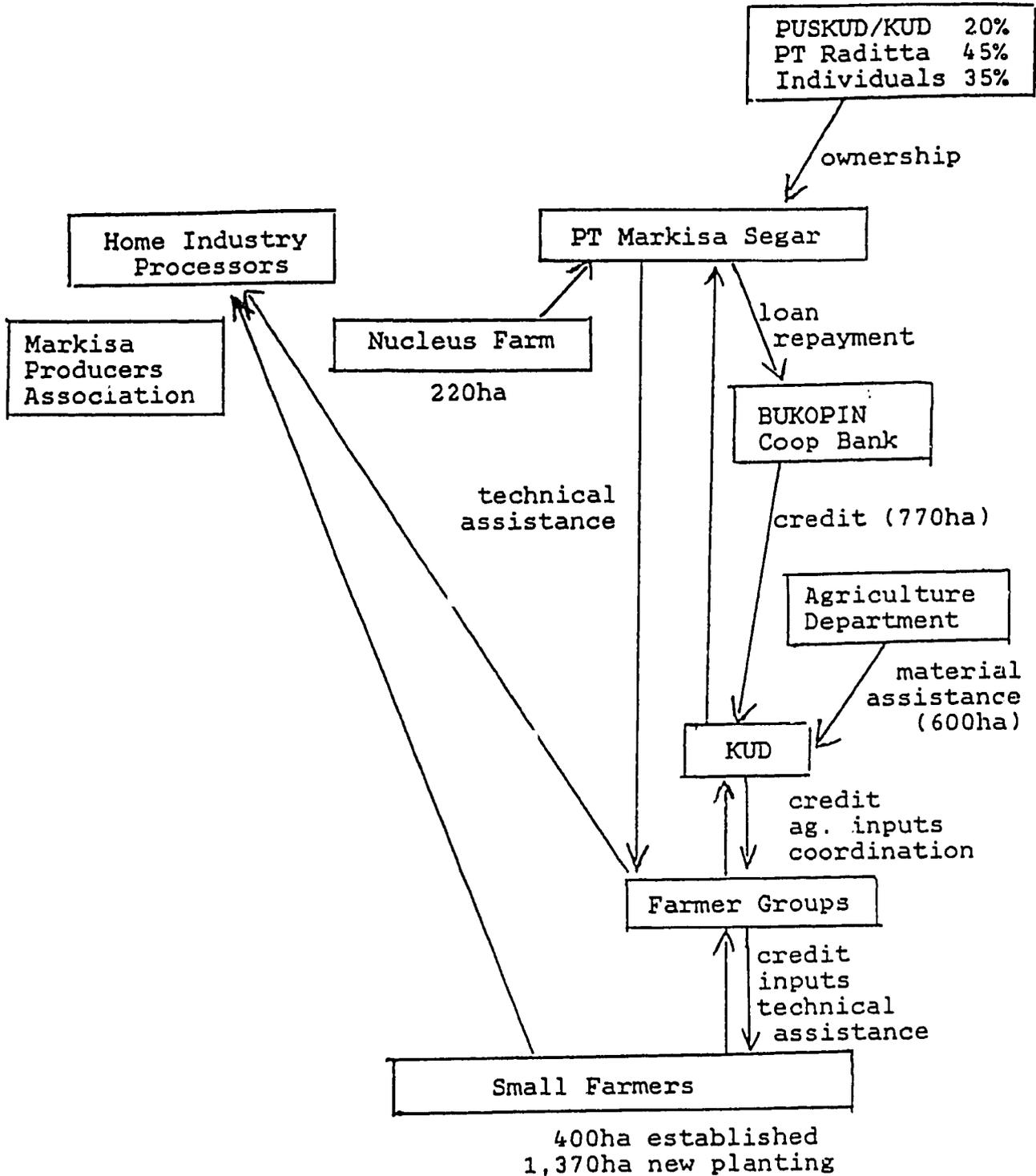
The following figure is largely self-explanatory but there are a few additional comments which will help to explain the situation of PT Markisa Segar. First, it should be noted that all of the upward flows represent the flow of product. The downward flows are defined on the diagram.

Five local cooperatives (KUD) play a pivotal role in the company's raw material procurement program and two of them are shareholders in the company. In fact, PT Markisa has committed itself to purchasing only through these cooperatives. The farmers on the other hand, have alternative markets for their produce in the form of the small juice processors in the area. This is an important factor only during the off-season, however, as market prices during the peak production season fall as low as Rp 2 per fruit -- far below the cost of production. As production continues to increase, there will be an increasing dependence on the company to stabilize prices at a level that will insure a reasonable return to the farmers. The company has recently agreed to pay the farmers the current market price with a guaranteed floor price of Rp 7 per fruit (Rp 375/kg).

Both BUKOPIN (the national cooperative bank), and the Agriculture Department (Dinas Tanaman Pangan) have undertaken programs to promote passion fruit production. BUKOPIN has established a Rp 1.5 billion (US\$714,000) loan fund to be channeled through the five participating KUDs to assist the farmers to establish 770 hectares of new production. The Agriculture Department has provided planting material, organic fertilizer and technical assistance on a grant basis to 750 farmers for the establishment of 600 hectares of new production.

These two programs would appear to insure the company of sufficient supplies to reach a break-even level of operations. The results are considerably

The Malino Passion Fruit Marketing Map



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less than expected, however, as the BUKOPIN program has been suspended with only Rp 315 million disbursed. Of this amount, it appears that a considerable portion has, for one reason or another, not reached farmers.

Some of the farmers interviewed indicated that they had received loans of only Rp 105,000 rather than the Rp 600-750,000 the program was designed to provide. It is also not clear that there has not been considerable overlap between the two programs further reducing the amount of new production which should be expected to come on line in 1984.

The company does provide technical assistance to farmers, through the small farmers' groups (kelompok petani) and pays a commission of Rp 6,500 (US\$3.10) to the KUDs for each ton of fruit delivered to the factory. In addition to this the KUDs receive a 2 percent interest rate differential for BUKOPIN loans passed through to the farmers. The company withholds 25 percent of payments due to KUD's/farmers for payment to BUKOPIN to clear the loans advanced for new production.

Current Status:

At present the company is operating only sporadically and far below its break-even level with only about 620 hectares of passion fruit (220 intensive and 400 semi-intensive) in full production. Harvest of the newly planted area is scheduled to begin in January and February 1994 but this will not make a sufficient difference as yields are low during the first harvest season and far fewer than projected 1,370 hectares of new crop are expected to begin production.

An undetermined number of new plantings have been established but it is not clear that the farmers will have sufficient working capital available to maintain the crop properly and achieve expected yield levels.

The company made good progress during its first three years of operation exporting 10 tons, 19 tons and 180 tons respectively in 1990-1992. Production has fallen by about 40 percent in 1993, however, as the company has experienced cash flow difficulties which limited the amount of fresh fruit it could purchase. A recent injection of capital should alleviate this situation but a great deal of farmer confidence has been lost which is likely to reduce their willingness to commit their land to the crop in the foreseeable future.

Export prices for the juice appear to be falling somewhat but external demand for the company's products remains high.

Conclusions and Recommendations:

P.T. Markisa Segar is facing several major challenges in its program to gain access to sufficient raw materials to enable it to operate profitably.

- It has established a large scale, high overhead operation based on the most modern processing technologies which requires quantities of raw materials far in excess of those currently available within reasonable reach of the factory.
- It has relied primarily, though not entirely, on public sector programs (BUKOPIN, the cooperatives and the Department of Agriculture) to develop programs to increase passion fruit production in the area.
- Its direct contact with individual farmers has been limited by the use of the KUDs for the mobilization of farmers and the collection of and payment for fruit. Only two of the five participating KUDs are currently working effectively with the program.
- Cash flow problems in 1993, and resulting slow payments for fruit purchases, have caused the farmers to lose confidence in the operation and made them reluctant to commit themselves to intensive passion fruit cultivation. They have been able to purchase only an estimated 40 percent of the local crop in 1993.
- Small-scale processors are able to outbid the company for the fruit during the "off-season" when fruits are scarce though this may be expected to become a less serious problem as supplies increase because the absorptive capacity of these small plants is limited.
- Farmers in the area have other alternatives for cash crop production (primarily vegetables) which are proven and compete for the available agricultural land.
- The farmer assistance programs which have been established in cooperation with BUKOPIN and the Department of Agriculture are not sufficient to convince the farmers of the commitment of the company to the program or to enable them to establish and maintain a successful planting of passion fruit.

Without knowing the details of the recent reorganization and new cash infusion into the company, it is not possible to predict the ability of the company to

maintain itself and continue its efforts to develop sufficient supplies to support its operation but it is clear that a great deal more capital is going to be required before the company reaches a profitable level of operations.

PT Markisa might usefully consider the establishment of a direct farmer outreach/contracting program similar to that which has been successfully applied by BAT in the development of tobacco production in Lombok and Bali. While it might still be possible to involve the KUDs in the program as suppliers of agricultural inputs and perhaps coordinators of harvesting and collection activities, the company should be much more active in working directly with individual farmers and small farmer groups to develop their confidence and insure that targeted activities are being carried out.

As one incentive to the farmers, the company might develop its own seedling nursery, or develop it on a contract basis with a local farmer, and provide the seedlings to participating farmers at cost on a credit basis.

Another incentive for farmers to participate reliably in the program would be to develop a comprehensive package of bank credit, materials, technical assistance and purchase guarantees which would be provided to selected farmers who contract with the company to supply passion fruit. Farmers who demonstrate their "loyalty" to the company and participate effectively would be rewarded with increasing credit availability and other benefits. Farmers who do not uphold their end of the contract would be excluded in future. It would be necessary to involve a local bank (perhaps BUKOPIN) in this program but credits and repayments should be managed by the company. Such a credit program, which would be available only to farmers recommended by PT Markisa would ideally cover at least 60 percent of the establishment costs of the crop and 40-50 percent of the annual maintenance costs.

Annex G: Case Study #7

Agarindo Seaweed Project

The following case study is based on interviews with key informants from all levels of the production-processing-marketing chain. Interview subjects included: one of the three traders in Ujung Pandang who supply seaweed to PT Agarindo in Jakarta; farmers; one kepala kelompok (group leader) from the Tanjung Bunga area of Ujung Pandang; and, a representative of the company in Jakarta (interviewed earlier).

The interviews were aimed at gaining an understanding of the PT Agarindo supply system as it was intended to work and identifying strengths and weaknesses in that system. The findings which follow should be considered as illustrative rather than diagnostic or prescriptive, as the time and resources devoted to this case were far from sufficient to suggest a high level of confidence for the specific findings. The team is confident in its general conclusions, however, and recommends that more intensive follow-up analysis be carried out to determine the validity of the preliminary recommendations.

The Business:

PT Agarindo is a private company with two seaweed processing facilities located in Java (Tangerang and Surabaya). To fulfill the requirement of raw material for both processing facilities PT Agarindo relies on dry seaweed (*Gracilaria*) produced by small farmers in South Sulawesi. The Tangerang (West Java) plant is supplied by three collectors/traders located in Ujung Pandang. This plant alone requires 240 tons per month of raw material input. The seaweed is processed into agar which is sold on the international market. A new processing line is currently being added which will increase raw material requirements to 400 tons per month.

The trader interviewed is one of the three primary suppliers to the Tangerang facility. He also receives orders from other buyers (mostly outside the country) but is unable to supply much beyond the 80 tons per month he is contracted to send to Agarindo. His task is to purchase dried *Gracilaria* seaweed from small-scale farmers, clean and sort it, re-bag it and ship it to Jakarta for processing. The trader carries the commercial risk of buying from the farmers, holding the product in inventory and re-selling to Agarindo.

Although he receives advances from Agarindo to finance seaweed purchases he acts as an independent buyer and seller and not as a agent of Agarindo. The trade operates on an average margin (between his buying price and selling price) of around Rp 300/kg from which he must pay the cost of collection, cleaning, re-bagging and shipping (to Jakarta). This trader works with about 20 farmers (60 hectares) in Tanjung Bunga and another larger group approximately four hours away in Barru District. He estimates total production in South Sulawesi to average 500 tons per month.

The Farmer/Participants:

Gracilaria seaweed is cultivated by small-scale farmers in ponds ("tambaks") ranging in size from one to three hectares. During the peak production season, *Gracilaria* is harvested every 45 days for about four to five months (averaging four harvests per season). The harvest season is different in each area. In Tanjung Bunga the main harvest season begins in December and ends in May. After harvesting, the seaweed is dried on racks in the sunlight for one day to reach 35 percent moisture content. At this point it is purchased by the trader for cash. *Gracilaria* is normally inter-cropped with milk fish which promote seaweed growth during their early stages of development and serve as a food or cash crop as they mature adding as much as Rp 500,000 (US\$240) per hectare to the gross income of the farmer per year.

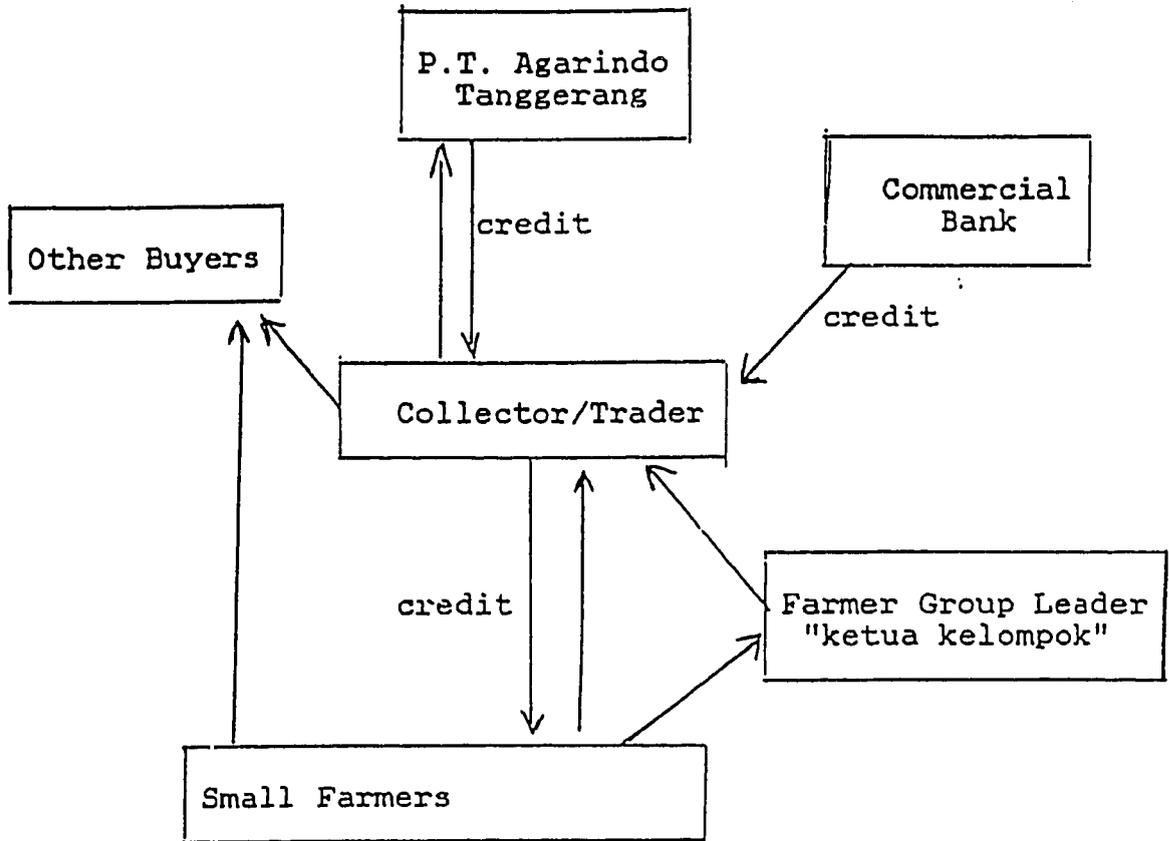
Annual yields average around four tons per hectare and farmers are paid about Rp 700/kg on average. Farmers can thus generate gross income of up to Rp 2.8 million (US\$1,300) per hectare per year from their ponds in addition to what they can earn from the sale of milk fish. The capital cost of building new tambaks is high at approximately Rp 6 million (US\$2,800) per hectare but the annual maintenance cost consists primarily of labor which the farmer can usually provide himself.

One of the farmers interviewed was in the process of developing a new ten hectare (25 acre) area of tambaks on land that he had just been given, on a long-term lease basis, by the local government. His plan is to farm three hectares of this land himself and sub-lease the other seven hectares to neighbors. The trader is providing some financial assistance for the development of the tambaks.

The Farmer - Processor Linkage:

The supply system illustrated on the following page is indeed a simple one with only the directly involved commercial players taking part and no involvement from outside of the commercial system. It is interesting to see that the trader is

South Sulawesi Seaweed Marketing Map



seeking to develop a group of farmers on whom he can rely for a steady flow of quality seaweed. In doing this, he is using many of the principles which were found in other successful farmer-buyer linkages: providing a comprehensive farmer assistance package, acknowledging and respecting the financial interests and independence of the farmers, developing a long-term relationship based on mutual respect and trust, and making a long-term commitment to developing the crop.

Of the total 100 hectares of seaweed ponds in Tanjung Bunga area of Ujung Pandang, about 60 hectares, belonging to 20 farmers, is collected by the trader interviewed. The supplier appears to have a good working relation with the farmers providing many with small loans to pay for tambak improvements, drying screens, fertilizers, etc. These loans are kept to no more than 20-30 percent of the anticipated value of the crop and are financed by the trader himself who deducts payment from the value of the crop when he purchases it. The loans serve as one way of building a relationship of trust between the trader and the farmers and thus providing some degree of security that the farmer will, in fact, sell his crop to the trader. The trader also provides farmers with seedlings (about 1.5 ton per hectare for new tambaks) and plastic net for drying the seaweed. The farmers interviewed indicated that they would sell their seaweed to this trader even if others came offering a somewhat better cash price because they have an obligation to this trader and wish to develop a long-term cooperative relationship with him.

The trader is also beginning to provide larger, and longer term, loans to selected farmers to support their development of new tambaks. The precise terms of these loans were not disclosed but it is possible to extrapolate some of the implications of this lending. If the trader were to lend 60 percent of the Rp 6 million required to develop one hectare of new ponds, the loan would total Rp 3.6 million (US\$1,700) and the farmer would need to raise Rp 2.4 million (US\$1,150) from other sources. If, as was mentioned above, the farmers can realize Rp 2.8 million per year from the sale of seaweed and the trader deducts 25 percent as loan repayment then it would take approximately four years for the loan to be completely repaid, including a modest level of interest.

This trader is also making use of the local "ketua kelompok" (group leader) as his local agent for coordinating harvest, selecting local farmers to receive credit, providing technical assistance on pond construction and farming, and maintaining communications with the farmers. It is not clear how the "ketua kelompok" is compensated for these roles.

Current Status:

The farmers interviewed indicated that they are quite satisfied with their relationship with the trader. This is primarily because he provides them with

credit, especially for living costs, and gives them a fair price for their seaweed. It appears that all parties in this system are able to profit and that all feel that it is in their interest to increase their involvement.

The farmers are being hurt by the low quality of their product and they do not have access to the technical assistance required to improve it. The trader, himself, is faced with the same problem as the product he sends to Jakarta is often sold as a lower grade than he had expected, and for which he had paid the farmers. Grading standards appear to be unclear or, at least, have not been clearly communicated from Jakarta to the production area.

A major problem which appears to lower the quality and yields of product in Tanjung Bunga is that they must rely on rain water as their only source of fresh water and each pond has only one water gate which is most often connected to a neighbors pond. (December to May). Furthermore, the ponds only used one gate for water inlet and outlet which is mostly connected to the neighbor ponds outside the scheme. These factors severely limit the farmer's ability to control the salinity in his ponds and optimize his results.

Conclusions and Recommendations:

This case give the impression of being a simple, functional and mutually beneficial linkage between the trader and the farmers from whom he purchases the raw material he requires. Commercial relationships and responsibilities are clear and outside interference is not a factor. The system also continues to evolve over time as the trader seeks to develop a group of farmers on whom he can rely for a constant supply of product.

There does appear to be a need for technical assistance in two technical areas -- both of which might be addressed by ADP working through the traders and group leaders.

First, it is apparent that grading standards need to be better understood by the traders and farmers. This might be as simple as providing a short-term training course involving Agarindo and/or outside trainers. It might be necessary to establish a simple testing laboratory in Ujung Pandang. This could serve as the focal point around which an association of seaweed producers and traders could develop.

The other need is for technical assistance in the area of water management. A qualified person needs to study the Tanjung Bunga area (and probably others) to determine what, if anything can be done to improve the ability of the farmers to manage their water quality (salinity). A determination should also be made as to

whether or not investments in the development of new ponds in Tanjung Bunga (where water pollution is a problem due to the proximity of a major urban area) are likely to be profitable.