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THE PHILIPPINE "MIRACLE RICE" PROGRAM AND ITS AFTERMATH

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I

FOREWORD

Part One of this paper provides a general non-technical description of some of the factors which contributed to the breakthrough in Philippine rice production and current challenges and problems resulting from the breakthrough.

The more one becomes involved in analyzing the Philippine experience, the more unanswered questions he uncovers. The data required to support an objective and precise analysis of the situation on a national scale are simply not available and great care should be used in interpreting the statistics cited below.

Part Two deals with the impact of the rice program on the farmer. A description of the farmer's initial contact and subsequent involvement with "Miracle Rice" is followed by a short case studies of farmers from a "typical" rice farming community in Central Luzon.

The reader who desires a more detailed analysis of the national rice program should refer to the Spring Review - New Grain Varieties: Rice in the Philippines (Published March 1969 by USAID/Philippines; limited copies are available in AID/Washington). Another report on the institution - building aspects of the USAID/Philippines assistance program should be published soon by the Stanford Research Institute under contract by AID/Washington.

THE PHILIPPINE "MIRACLE RICE" PROGRAM AND ITS AFTERMATH

PART ONE: A GENERAL REVIEW

I. The Problem of Agricultural Stagnation

Until 1965, per hectare yields had long remained at 30-35 cavans (1.3-1.5 metric tons) per hectare.[1/] New varieties of seed and improved farming techniques were being developed and disseminated to the farmer but these promised only slight (10-20%) gains in productivity. Consequently, the farmer saw little value in changing his approach and, over time, the government's extension services became relatively emasculated. Most small farmers operated at marginal or sub-marginal levels and were frequently in debt to landlords or usurers. Where irrigation was inadequate for a second rice crop, the land and farmers were idle from four to six months out of the year. The farmer's attitude toward his situation was generally one of resignation since he had become inured to his condition. The Government was generally not viewed as an instrument of assistance for improving his lot.

In 1965, a small group of USAID and Philippine officials became concerned because several years of U.S. and other foreign assistance had failed to produce any significant change in agricultur l productivity. Institutions had been created for research, education, and extension but they were not making any impact on the problem of increasing yields of the basic food crops. The Philippines continued to spend an average of $50,000,000 per year to import rice and $75,000,000 for fruit and vegetable imports.

Scholarly treatises and technical studies predicted that rice production would not catch up with population growth unless more land was brought under irrigation or the "tradition-bound" Filipino farmer changed his ways (a possibility which was regarded as very remote).

It was decided that a new approach to the problem of increasing rice yields would be made by initiating pilot projects at the provincial level. The Provinces of Tarlac and Laguna were

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1/ One cavan of rough rice (palay) weighs about 44 kilograms or 97 lbs.

selected because their Governors were young, energetic, and deeply interested in improving the economic, well-being of their rural people. For the first time, USAID was given authority by the GOP to work directly with provincial governments instead of channeling all assistance through national agencies. The new project, sponsored by USAID and the National Economic Council (NEC), was called "Operation SPREAD" (Systematic Program for Rural Economic Assistance and Development).

II. The Ingredients for a Breakthrough in Rice Production

A. Operation SPREAD

It is really difficult, if not impossible, to point to a specific factor and say that this was responsible for the cooperating farmers in Operation SPREAD being able to increase their rice yields 100%, 200%, or even more. Operation SPREAD was a pragmatic and experimental effort by Americans and Filipinos to identify and solve the farmer's problems as they arose. Between mid-1965 and late 1966, the program identified and effectively utilized the basic ingredients for a successful food production program. Many of the same ingredients were incorporated into the national rice program which was initiated by President Marcos in 1966. To some extent the same general features would also have to be present before the Philippine experience is adopted by other countries. These general ingredients are discussed in the next section.

B. Some Causes of the Breakthrough

1. The development of high-yielding rice varieties

The development of IR8 or "Miracle Rice" at the International Rice Research Institute at Los Baños in Laguna provided the technological breakthrough needed to dramatically increase yields. The development of IR8 began with 1962 experiments which crossed a short indica rice from Taiwan (Dee-geo-woo-gen) with Peta, a tall tropical indica variety. By 1965, the new nitrogen-responsive variety had progressed to the point where it was yielding over 200 cavans (8800 kilograms) per hectare in experimental plots. IRRI donated 2-1/2 kilos of IR8 seed to Operation SPREAD in Laguna for planting in January 1966 in a small test area of 1,280 square meters. From this small 1966 dry season experimental plot, the planting of IR8 was expanded in one year to 9,598 hectares or 32% of the rice area of Laguna. A similar expansion occurred in Tarlac. When the national program became fully operational in Crop Year (CY) 1967-68, IR8 and two other approved high-yielding varieties (BPI-76-1 and C-18) were promoted by the RCPCC (Rice and Corn Production Coordinating Council). While reliable national statistics are not available, the RCPCC reported that

82,596 hectares had been planted to the HYVs by the end of CY 1966-67. This grew as follows:

Season	Rice Area (Ha.)	Area in HYVs (Ha.)	HYV as % of Rice Area
Wet Season 1967	2,276,880	225,635	9.90%
Dry Season 1968	704,070	164,659	23.38%
Wet Season 1969	2,039,717	356,179	17.46%
Dry Season 1969*	434,188	209,546	-

*Estimate as of May 1969 (RCPCC Monthly Progress Report for May 1969). Estimate for Dry Season 1969 reflects reduced plantings due to serious drought, but there is also a significant lag in the forwarding and processing of data.

NOTE: In CY 1968-69, IR8-68, IR5 and C4-63 were added to the list of approved HYVs.

The HYVs thus accounted for a relatively small percentage of the area planted to rice, but their significantly higher yields resulted in sufficient additional production to meet consumption needs of 107,953,738 cavans of palay in CY 1967-68. Thus in CY 1967-68, HYVs accounted for about 13% of the area harvested but yielded 26,386,227 cavans of palay (rough rice) or 22% of the total production of 119,306,007 (estimate from RCPCC).

Although yields dropped to about 75 cavans per hectare when the HYVs were expanded from limited demonstration plots to a program with national coverage, this was still more than double the 35 cavans reported for traditional varieties.

2. Trained agriculturists were available to carry out extension work.

The past investments made by the U.S. and GOP in foreign training grants for agriculturists (about 780) and the development of high quality domestic training centers such as the University of the Philippines' College of Agriculture (UPCA) ensured that people with professional skills were available to carry out the rice program in the first priority areas. Short intensive courses dealing with the new varieties were provided by UPCA, IRRI and GOP agencies such as the RCPCC.

3. Top political leaders gave the program adequate support.

The achievement of rice self-sufficiency was a priority goal of President Marcos. To reach it, he appointed his Executive Secretary, Rafael Salas, as Rice Action Officer and Executive Director of the Rice and Corn Production Coordinating Council (RCPCC). Vice-President Lopez served as Secretary of Agriculture and Chairman of the RCPCC. Both the President and Vice President gave Secretary Salas the support he needed to effectively control the activities of the 20 or more agencies involved in agricultural production. Salas' personal charisma, dedication, and leadership skills were also critical elements in making the rice program a success.

4. One agency was given authority to coordinate the program.

As indicated above, the RCPCC, under the operational leadership of Secretary Salas, was placed in charge of the program. It designated the provinces which were to receive priority attention and sought to ensure that production inputs were available where and when they were needed. The RCPCC was able to attract several competent technicians to serve in its Manila office and in several field operations. The RCPCC staff was almost completely borrowed from other agencies and, in the provinces, it relied almost entirely on older agencies such as the Bureau of Plant Industry and the Agricultural Productivity Commission to implement its programs. Using local currency funds provided by USAID and the NEC, the RCPCC was able to provide small incentive allowances and per diem to the field directors and technicians in Priority I Provinces to help them do their jobs more effectively. However, the effectiveness of the RCPCC program varied from province to province, depending upon the quality of the personnel made available by the parent agencies. Unlike Operation SPREAD, there was apparently little involvement of the Governors in most of the RCPCC's provincial programs so the element of local political leadership and support was not present. Approximately eight USAID Rural Development advisors directly supported the RCPCC's rice program, with most of the advisory services being concentrated in the 12 (later 15) Priority I Provinces.

5. <u>A system of program priorities was developed to facilitate concentration of resources.</u>

The 65 Philippine provinces were divided into Priority categories of I, II, and III, with Priority I being limited to those provinces with adequate irrigation to be able to grow the new HYVs on a large scale. Adequate irrigation was and is a critical limiting factor in the expansion of high yielding varieties. RCPCC programs in the 12 (later 15) Priority I category were given preferance in supplies and equipment for extension operations, credit support, etc.

6. <u>The private sector played an effective role in providing and distributing needed production inputs.</u>

The Philippines has a relatively aggressive private commercial sector which penetrates into many of the rural areas. Key roles were played in the rice program by agro-business firms, such as the Atlas Fertilizer Company and the ESSO Standard Fertilizer and Agriculture Company (ESFAC), and by the private Rural Banks. Supervised agricultural credit programs were tested by NEC/USAID during Operation SPREAD and these became the basis for an expanded Agricultural Guarantee and Loan Fund (AGLF) which was administered by the Central Bank of the Philippines through the Rural Banks. In many areas, close cooperation developed between the banks and the agro-business firms to make the AGLF operate more effectively. For example, in some areas the farmer approved for an AGLF loan was not given cash, but chits which could be redeemed for required seeds, fertilizers and other production inputs at the local agro-business store. This helped ensure that the loan was actually used for crop improvement. An important role was also played by private seed growers' associations which ensured that adequate supplies of high-yielding varieties were made available to interested farmers on a timely basis.

7. <u>A system of supervised credit was made available to the smaller farmers.</u>

As indicated above, the Agricultural Guarantee and Loan Fund was established to provide credit to small farmers who were willing to use their loans to finance the

production of high-yielding varieties. The loans were to be secured only by the anticipated harvest although a "responsible" person was usually required as a co-signer. Under AGLF, each Rural Bank was to assign a credit technician to assist the farmer in drawing up a farm plan and budget as a prerequisite for the loan. The technician was also to assist the farmer on crop problems during the year. Where implemented, the system contributed greatly to the overall success of the rice program. Unfortunately, the Central Bank was unable to provide the Rural Banks with sufficient credit technicians to cover AGLF loan programs in some areas. The problem was handled in some areas by recruiting local extension technicians to assist in the credit programs.

Starting in 1966 with an initial deposit of ₱5 million in PL 480 funds by NEC/USAID, the AGLF grew to ₱34 million by 1969 (with deposits from RCPCC and the government social security and insurance organizations). By February 1969, 193 Rural Banks were actively participating in the AGLF program.

8. <u>The farmer was ensured that he would receive a reasonable price for his crop</u>.

The GOP, through the Rice and Corn Administration (RCA), agreed to pay ₱16 to ₱17 (about $4.00 - $4.25) per cavan of rough rice (palay). However, there were certain limitations placed on such procurement in the RCA's legislative mandate (which was actually passed beyond the advent of the new high-yielding varieties):

a) No more than 100 cavans could normally be purchased from one seller.

b) Rice had to have 97% "purity", a moisture content of 14% and weigh 46 kilograms per cavan (in contrast to the normally accepted weight of 44 kilograms).

It was also never intended that the RCA would buy more than 10% of the total production, but the RCA was not even provided with adequate funds to do this. Consequently, the RCA buying program was curtailed in early 1968. However, the price support program did help keep the actual price close to the support

price in many areas until this time. Farm prices were hardest hit in areas with bumper harvests but limited access to markets. There was a general price recovery during the "wet season" of 1968 because a serious drought threatened production. Prices in recent months have been considered generally good. Although the RCA has not been given adequate funding, some additional finances for procurement were made available through banks and cooperatives.

There has been much discussion about what constitutes a reasonable price for the farmer. As implied earlier, the yields of the HYVs drop significantly when disseminated on a large-scale basis. This usually means that the farmer is not using the recommended quantities of fertilizer and other inputs. It is thus generally misleading to use the costs of employing recommended practices as a basis for calculating profits. There is really little available data to go by, but many farmers have indicated that they can still come out ahead with a price of ₱11-12 per cavan. However, if the goal is to maximize yields, then a minimum price of ₱13-14 is probably needed to encourage the farmer to stop skimping on fertilizer, insecticides, etc.

To summarize, the RCA price support program was crucial in the early stages to encourage adoption of the new varieties. There was considerable disillusionment when the program bogged down in early 1968 for lack of funds, but various other factors have kept prices from becoming dangerously low. The earlier fear that farmers would generally abandon the new high-yielding varieties (because of their higher production costs) has not been substantiated by the data. The percentage of rice area planted to the HYVs appears to be gradually increasing each crop year.

III. Some Benefits of the "Miracle Rice" Program

Following are some gains which USAID staff members have associated with the "Miracle Rice" program. These observations are based both on available quantitative data and on frequent contacts with technicians, farmers, and others who are deeply involved in the rice program.

A. Many farmers have become confident that they can significantly improve their economic well-being

Part Two of this report deals in more detail with the impact of the "Miracle Rice" program on the farmer and his way of life. Here we would merely like to observe that the earlier complaints and generalizations about the Filipino farmer being unwilling to innovate do not really appear to be very valid. Even after the initial breakthrough with IR8, there were widespread fears that the slightest adversity would send the Filipino farmer back to his traditional ways. However, the disappointment of many farmers over the low prices received for IR8 has led them to switch to newer varieties which promise yields equal to IR8, but also have improved palatability and milling qualities. IR8 was just the pioneer and many farmers are keenly aware of the new varieties still being developed by IRRI, UPCA, and BPI. In fact, farmers are eager to cooperate in field tests of the new varieties even without knowing how these will perform.

B. A closer relationship has been created between the government and the farmer.

As indicated above, the farmer is very interested in applying new research findings to his crops. Because of his experiences with the rice program, the farmer has developed a new confidence in the ability of government research and extension staffs to help him. Most extension people have responded to this challenge by keeping better informed. Training activities for technicians have also been greatly increased. In provinces where USAID advisors were involved, many farmers identified the successful "Miracle Rice" program with the U.S. assistance program. Farmers and local officials often commented to USAID personnel that the rice program represented the first visible evidence that U.S. assistance was directly benefiting the people in the rural areas.

C. The nation produced more rice than it consumed for the first time in history.

In his January 1968 State of the Nation Address, President Marcos proclaimed that the country had attained self-sufficiency in rice and corn one year ahead of the deadline set by his administration. In spite of President Marcos' statement, there was considerable debate in 1968 over whether the Philippines had, in fact, achieved self-sufficiency. Various government agencies involved in the rice program brought forth conflicting statistics on rice production and stocks on hand; some claimed a deficit still existed while others maintained that a sufficient surplus existed to permit the Philippines to export rice. For 1967, the RCA had contracted for the importation of 377,258 metric tons (MT) of rice at a price of $57 million to help cope with an estimated shortages of buffer stock requirements. When a bumper harvest for 1967 became evident, the RCA moved to reduce imports and succeeded in cancelling orders for, or re-exporting 194,408 MTs. This resulted in a reported savings of about $30 million. 1967 was the first election year in which the incumbent administration did not have to make generous imports to keep retail prices low during the traditionally "lean" months following August. In 1968, surpluses permitted RCA to arrange for the nation's first commercial scale exportation of rice. This amounted to only 40,000 MT and further export efforts were curtailed because no generally acceptable statistics were available to support the declaration of an exportable surplus. Little action was taken in CY 1968-69 to accelerate export efforts. Some of the reasons for this were: (a) policy conflicts and a change in the head of RCA, (b) the quality of most Philippine rice was too low to compete in the international market, (c) fear of domestic shortages as a result of a drought, and (d) a feeling that the international market would soon be too limited to warrant a significant export effort. The effects of the drought were over-estimated and production for CY 1968-69 is expected to exceed consumption requirements by a comfortable margin.

D. Many farmers can move on beyond subsistence-level production to multiple-cropping and product diversification.

With the new fast-maturing and photo-insensitive varieties, the Philippine farmer can now grow 2-1/2 or 3 crops of rice a year if he has adequate irrigation. However, since it is also feared that the rice market could easily become glutted,

steps are being taken to introduce new food crops and increase the production of livestock and feedgrains.

After the initial burst of pride associated with the achievement of rice "self-sufficiency", there was about a year of self-searching and experimentation to map out the next phase for moving Philippine agriculture ahead. There was a general admission that some problems had not been solved, even in the area of rice production. There was fear in some quarters that a slackening of efforts in rice production would soon permit population gains to again overtake production increases. The fact that 1969 is a Presidential election year has reduced some of the top-level energy and support which was present during the earlier phases of the rice program. To politicians, rice shortages are crises, but rice surpluses are only problems. In spite of the remaining problems to be solved in the critical areas of credit, price support, and irrigation, most government technicians and administrators, private businessmen, and the farmers themselves desire to move ahead to new crops and cropping practices. The exact dimensions of the next phase are not agreed upon, but a general strategy is now taking shape. Many problems promise to be more complex and difficult than those associated with the improvement of a single, traditional crop such as rice.

IV. New Directions and Challenges in Philippine Agricultural Development.

In recent months, USAID, UNDP, and GOP personnel have been meeting informally to discuss new efforts to maintain the gains of the rice program and introduce new improvements. Following are some of the assumptions and constraints which have influenced this program planning:

1. Areas which cannot grow rice profitably should be converted to new crops.

2. The introduction of new crops, (either as primary or secondary crops) will probably be more difficult to plan, sell, and implement than the improvement of a traditional crop such as rice.

3. There must be closer ties between production and marketing improvements if the farmer is to receive a more equitable share of the income resulting from his increased productivity. The failure of RCA to live up to expectations has led the GOP to encourage the development of local associations and cooperatives to assist the farmer in both the production and marketing of his produce. The GOP must also expand the new program for distributing marketing information which was initiated with USAID assistance during the rice program.

4. The training and retraining of administrators, technicians and farmers on new products and methods must be pursued as energetically as they were under the rice program if Philippine agricultural technology is to advance.

5. More attention and resources must be devoted to the improvement of agricultural data to permit better planning and decision-making. As indicated earlier, critical decisions regarding exportation could not be made because there were insufficient reliable data regarding the harvests and stocks of rice. More effort must also be devoted to improving agricultural policy research and planning.

6. The private sector will be expected to play the major role in providing the needed funds, especially for expansion or improvement of physical facilities processing and handling of rice and other grains.

The following now appear to be the major program objectives which will be pursued to solve existing problems and introduce needed innovations:

1. Maintain self-sufficiency in rice through the continued promotion of high-yielding seeds and improvement of farm credit programs.

2. Improve the production, processing, and marketing of cash vegetable crops, grain legumes, feed grains (corn and sorghum), swine, poultry and fish.

3. Establish an effective GOP organization to assist farmers with their marketing problems.

4. Improve the collection, processing, and dissemination of information on agricultural production and marketing.

5. Create more effective local farmers' cooperatives and expand the marketing operations of the national Grain Marketing Cooperative of the Philippines.

6. Create an effective national organization for providing technical assistance on agricultural development to local governments and private or civic organizations.

7. Increase irrigated areas through more effective use of surface and subterranean waters and improve the management of available water resources.

8. Promote the increased use of small-scale equipment for harvesting and handling of grains at the farm level.

Implementation of most of these activities will be initiated through the use of demonstration projects in a few selected provinces. As new products and techniques are successfully tested, the results will be disseminated through such organizations as the RCPCC and its participating agencies. As in the rice program, irrigation, credit, and marketing will probably be critical problem areas. There is little doubt that the programs now planned will have a significant positive and long-range effect on the farmers involved. It is not unreasonable to expect that, within five years, Philippine agriculture could develop into a flexible and progressive sector of the economy if it would receive the same type of support as was given the program to achieve self-sufficiency in rice.

PART TWO

CHANGING TO HIGH-YIELDING RICE VARIETIES: EFFECTS ON RURAL PHILIPPINE LIFE

I. INTRODUCTION

While there are many similarities among Philippine farmers and their farming operations, the differences are sufficiently great to prevent a description of a "typical rice farmer". Rice is produced under many different conditions: inundated flood plains, where rainfall and flooding streams are the source of water; areas where water is diverted by man-made structures and devices for irrigation; upland areas dependent solely on rainfall which may so limit production that a crop failure may be expected once in three years. Rice is produced on farms varying in size from two to over one hundred hectares. The larger farms may be broken up into many small tenant farms, which introduces another variable. Some of the farms are fortunate to have an abundance of irrigation water and can produce two or more crops per year while others without supplemental irrigation can only produce one with the land laying idle for the balance of the year. Introduction of the HYVs, with their early maturity, has permitted the planting of secondary crops, such as melons, vegetables and alternate feed grains, while there is still enough moisture to assure their success. Three types of land tenure, common to rice farms are as follows:

1. The TENANT farmer does not own the land but is assigned an area to farm by the land owner. The tenant is required to pay the land owner a certain percentage of the crop produced on the land as payment for the use of this land. Many different percentage agreements are in effect, however, it is generally true that as the percentage paid to the land owner increases, the inputs such as fertilizer, insecticide and possibly credit furnished by the land owner also increase.

2. The LEASEHOLD farmer rents the land he farms. The usual practice in the Philippines is to average the annual rice production for the three years prior to the leasehold agreement and charge 25% of that amount as annual rent. Under this arrangement the leaseholder is required to furnish all of the necessary inputs, seed, fertilizer, etc. and make his own arrangements for credit.

3. The PRIVATELY OWNED farm is worked by the owner who supplies all of the inputs but in turn receives all of the income from the land.

Because of the variation in conditions under which rice is produced in the Philippines no attempt is made to identify a "Typical Case" study. Section II presents the reactions of farmers on growing the new rice; Section III illustrates how the HYVs have improved the farmers' way of life. In Section V a series of nine case studies prepared by the Rural Bank of Mexico, Pampanga, have been selected for presentation. These studies do not cover the spectrum of possibilities. However, they do represent a significant segment of the farmers of that area and the effect of the introduction of the HYVs on their social and financial status in the community. A comprehensive case study has been prepared in Section IV on Mr. Paulino Sotto, who is Case #4 of the nine studies attached.

II. FARMERS' REACTIONS TO ADOPTING NEW PRODUCTION METHODS FOR HIGH-YIELDING RICE

It is difficult to make farmers adopt new farming methods. This is why so often extension programs have failed. Unless the new practice substantially increases their income, most farmers will not bother with it. Idle time also has its value and if the new practice requires additional time it must be remunerative in order to be accepted.

"Miracle Rice" was first tested on farmers' fields at two pilot areas. These were Bay, Laguna and Mayantoc, Tarlac. The success of the new variety there proved so great that farmers throughout these provinces wished to test it and the new practices for high yield. The problem was how to extend this type of production rapidly throughout the Philippines. That was the reason for AID's program to widely disseminate rice kits.

1. The Rice Kit Program

Most farmers who started growing "Miracle Rice" first heard of it through the Kit program. They were introduced to the kits either through 4-H Clubs, their Extension Agent, an Agro-Service Center or their Rural Bank. For P70 a farmer could purchase sufficient high-quality seed and the necessary inputs to transplant a 200-square meter plot. What was more, he did not need to pay until his crop was harvested. Because of the great publicity, "Miracle Rice" had received, most farmers knew of it. The opportunity to see if it was as good as advertised with little personal risk was one most farmers could not resist.

The Rice Kit program needed careful supervision in order to succeed for it required a whole new series of inputs to which farmers were not accustomed. Among these were systematic transplanting at spaced intervals, heavy applications of fertilizer as well as weed, pests and rodent control. Only through a close cooperation between the user of a kit and his Extension Agent could the new practices be assured and the original loan be collected.

Large numbers of Extension Agents were trained in short courses at IRRI and these men were sent to the areas where Kit programs were established. Basically, this was the reason for the program's great success.

2. The results of the Kit Program

Reaction to the use of "Miracle Rice" and the modern practices for its high production was instantaneous. Farmers were so impressed with their high yields that in most cases they would not sell their seed preferring to save it for a more extensive planting the following growing season. Where the seed was sold, however, speculation proved rampant and it was not uncommon during the first years of the Kit program for a cavan of IR8 seed to sell for as high as ₱100. After all, the national average for the old varieties had been 32 cavans per hectare whereas with IR8, it was not uncommon to obtain yields equivalent to 100 or even 150 cavans per hectare.

3. Problems farmers faced in increasing their area of production

The production of one or two hundred square meters of high-yielding rice presented very different problems than when a farmer decided to grow one or two hectares of the crop. Now he needed extensive credit, for the new variety was costly in fertilizer requirement and in the use of insecticides to control rice pests. The intensive cultural practices required for it to realize its potential high yield necessitated a great deal more labor. Farmers had to decide whether or not to take such a large financial risk and whether the additional labor compensated for the extra income they could receive.

The positive decision soon became apparent when large numbers of farmers approached their traditional sources of credit, the landlord, the money-lender, the Farm Cooperative and the Rural Bank to apply for loans. It was this strong demand for credit that led NEC/USAID to create a new Agricultural Guarantee and Loan Fund which was administered through private Rural Banks and which became a vital part of the RCPCC program.

4. The role of the Rural Banks

A large portion of the credit required for the extended production of the new rice was thus provided through the AGLF. Under this fund, farmers were permitted to borrow up to ₱800 per hectare for their inputs. Of this not more than ₱200 was to be loaned in cash and that could be used only to pay for labor expended by the farm family. This

provided a means of subsistence to tide them over until harvest. Credit for seed, fertilizer, insecticides and simple farm tools was extended in the form of chits which the farmer would take to his Agro-Service Center and exchange for the respective inputs.

The Rural Banks and the farmers both recognized the tremendous burden of responsibility which the new type of farmer was to bear. Initially, it was necessary to limit those who would receive credit to the best farmers only. The Central Bank sent out Farm Credit Advisors to the Rural Banks partaking in the program. A very close relationship had to be built up between these advisors and the farmers they assisted. In each case, before credit was granted, the farmer and his Farm Credit Advisor and, where possible, an Extension Advisor from the Agricultural Production Commission (APC) worked hand in hand with the farmer, helping him to prepare his seedbed, to transplant and fertilize and to advise him on what control measures to take at the first indication of disease or insect attack. This was the second phase in educating farmers to modern agriculture. Farmers were generally enthusiastic. They asked for and were given short courses on modern methods of rice production. They competed with one another for the highest yields and with their Extension Agents, they organized field days to see IRRI or to visit farms in which good practices were resulting in outstanding yields. But there were many problems.

5. Problems associated with the program

The first problem that became apparent was the need for the availability of necessary inputs and technical assistance on time. For the farmer to succeed, seed had to be available at the time of planting, fertilizer had to be available close to the farm and if a new insect pest appeared suddenly, a source of supply of the correct pesticide was needed before the damage extended. A crash program to train extension workers on the new varieties was also one of the initial critical needs. During the first years of this program the inavailability of some inputs at critical times affected many farmers' production. In recent years, this situation has been almost eliminated by private industry. An Association of Philippine Rice Seed Producers now provides certified seed at a fixed price of P30 per cavan throughout the priority rice production areas. Except in the most remote areas, one now finds local Agro-Service Centers which

supply fertilizers and a vast array of pesticides. Should a necessary product be in short supply, they guarantee to obtain it within 24 hours.

A second problem was loan repayment. In the Philippines, government loans for farming have a poor record of collection. Politicians have so often used government loans as "give-aways" that farmers often considered this a way of life. To avoid repayment, they would pretend that their harvests were smaller than they were, that rat or insect damage had wiped them out or that they had been hit by excessive typhoon damage.

To assure a high rate of repayment it was found necessary to have either the Farm Credit Advisor or the Extension Advisor present at the harvest. A system was set up whereby farmers were required to deposit their rice at RCA-bonded warehouses. They were then paid the guaranteed price of P17 per cavan and the loan was subtracted from the total.

IR8 and the subsequent high-yielding varieties mature in three and one half months while the old varieties required five to six months. This meant that the new varieties were harvested during the heavy rain months. It complicated threshing and made drying of the grain a major problem. Solutions to these problems are still being sought. Under an AID/W contract with IRRI, a small drum-type thresher, which small farmers can afford to buy, has been developed and is successful at threshing rice while still damp. There has been a campaign to establish grain dryers both on private farms and at rice warehouses but until this time too little rough rice is being dried artificially and spoilage is rather high.

As the quantity of high-yielding varieties has increased, a serious lack of storage facilities has developed in some areas. After the rainy season harvest, rice warehouses are overflowing and farmers have to be turned away.

Finally and perhaps most serious, is the fact that in both 1967-1968 and 1968-1969 more rice was produced than could be consumed locally. Difficulty exists in finding export markets, since the experience with the high-yielding varieties in the Philippines has revolutionized rice production in other countries as well. After the 1968-69 crop, production was so great that the Rice and Corn Administration lacked

adequate funds to purchase the harvest at its guaranteed price. For a while, prices in some localities slumped to as low as P9 a cavan and it was only the threat of a shortage caused by a prolonged drought that brought prices back closer to the support price.

The overproduction with its potential price declines has caused many farmers to consider whether they can afford to use all the expensive inputs needed for optimum production. If the price drops below P14 a cavan, they could well get into debt. The effect has been that as the area in HYVs has expanded many farmers have started to cut corners and the average yields per hectare on a nationwide basis are going down.

It has become apparent that an ever greater source of credit at reasonable interest rates has to be found. This requires not only additional capital but more Farm Credit and Extension technicians as well. Training and money for salaries and travelling expenses for the supervisory personnel has been inadequate. Yet experience has shown that where technical services are overextended, the repayment on loans has fallen sharply.

6. <u>The secondary effects of the high-yielding varieties</u>

Today one sees rice being harvested at all times of the year. This is because the new varieties are photo-insensitive and with adequate irrigation water, crops can be planted any month. In contrast, the old standard varieties are inflexible. They mature and produce best at the end of the rainy season when days are shortest and so little is planted out of season. Consequently with the new varieties there has been a concerted effort to extend irrigation facilities. Now, with additional irrigation waters, many farmers are planting a second crop where only one crop of rice was grown before. All over the priority rice producing areas one sees new wells being dug and new irrigation facilities being constructed.

A new enthusiasm has developed among the nation's farmers. Where before they valued their idle time and enjoyed gambling at the cockpits or drinking at village fiestas, they now have an incentive to work harder to improve their income and well-being. More farmers are growing secondary crops or using their time to advantage in short courses and seminars. There is a desire to put new ideas into

practice and many areas are ready for a diversified type of agriculture. There is now a great interest in expanding the production of feed grains for swine and poultry. The production of vegetable crops, grain legumes and fruit is increasing every dry season.

Another side effect of this enthusiasm has been the organization of farmers into community associations for rural improvement. Today farmers feel the confidence to demand the construction of more public schools for their children, better roads to markets and the extension of rural electrification. A new confidence has developed in the government's intention to assist the rural areas and farmers begin to evaluate which government agencies are being of assistance to them and which are not.

Perhaps the biggest problem yet to be solved is improved marketing facilities for the sale both of rice and secondary crops.

III. THE EFFECT OF THE USE OF HIGH-YIELDING RICE VARIETIES ON IMPROVING THE WAY OF LIFE OF PHILIPPINE FARMERS

Very often the question is asked, "How has the small farmer benefited by the new emphasis placed on growing high-yielding rice?" It is quite generally agreed that it is the small farmers who have most benefited. Ask any Barrio Captain in an area where the new varieties are grown about the number of children going to school today as compared to three years ago. He will explain that before, many parents just could not afford to send their children. They did not have money with which to pay the matriculation fee, or to buy textbooks and adequate clothing. Today this is no longer true. Many rural children attend at least the primary grades and one is surprised by the number of high schools under construction in even the more remote rural areas. One is told that many small farmers now can afford to send their children to trade schools and colleges in the cities.

In an agricultural baseline survey made by USAID, GOP, and contract researchers, the pilot project areas of Bay, Laguna and Mayantoc, Tarlac were compared both before and after the high-yielding varieties were extensively grown. (See Tables 1 and 2 attached.)[1/] The changes in indicators of living standards were notable and probably reflect the changes taking place in other rural areas of the Philippines.

No attempt was made to directly measure income in the baseline survey because of the difficulty in trying to get this information in a relatively short interview. The researchers did attempt to get such measures of well-being as type of house construction, ownership of radio or sewing machine, use of electricity, etc.

The tables show a rather significant movement toward the use of more durable and higher priced materials in construction of roofs and walls in farm dwellings. The study also showed a marked shift from oil lamps (primarily coconut) to kerosene lamps. There was some shift from natural to controlled water systems, although piped water

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1/ See last report on the baseline study: Baseline Study of Bay, Laguna; Mayantoc, Tarlac; and Naic, Cavite; conducted for USAID/Manila, March 21 to April 10, 1968 by Asia Research Organization, Inc.

TABLE 1. SELECTED INDICATORS OF FARMERS' LIVING CONDITION
Bay, Laguna

	1965		1967		
	Number of Farms	% of All Farms	Number of Farms	% of All Farms	% Change
A. Roofs					
Galvanized Iron	875	76	957	87	+ 11
Nipa	133	12	72	7	- 5
Cogon	142	12	62	6	- 6
Bamboo	-		3	x	
B. Walls					
Cement	11	1	21	2	+ 1
Board	692	60	776	71	+ 11
Bamboo	275	24	181	17	- 7
Nipa	155	13	111	10	- 3
Cogon	17	2	5	x	- 2
C. Source of Water					
Piped	48	4	57	5	+ 1
Artesian Well	108	10	265	24	+ 14
Pump	759	66	605	55	- 11
Open Well	36	3	40	4	+ 1
Rain or Spring	199	17	127	12	- 5
D. Lighting Used					
Electricity	108	9	266	24	+ 15
Pressure Lamp	59	5	43	4	- 1
Kerosene Lamp	983	86	768	70	- 16
Oil Lamp	-		17	2	+ 2
E. Have Radio	593	52	667	61	+ 9
F. Have Sewing Machine	340	30	378	35	+ 5
Total Number of Farms	1150		1094		

Note: x - represents less than 1%

TABLE 2. SELECTED INDICATORS OF FARMERS' LIVING CONDITION
Mayantoc, Tarlac

	1965		1967		
	Number of Farms	% of All Farms	Number of Farms	% of All Farms	% Change
A. Roofs					
Galvanized Iron	814	51	987	62	+ 11
Nipa	17	1	27	2	+ 1
Cogon	771	48	557	35	- 13
Bamboo	8	x	9	1	+ 1
B. Walls					
Cement	7	x	37	2	+ 2
Board	228	14	327	21	+ 7
Bamboo	1282	80	1170	74	- 6
Nipa	65	4	38	2	- 2
Cogon	28	2	8	1	- 1
C. Source of Water					
Piped	-		2	x	
Artesian Well	139	9	94	6	- 3
Pump	1129	70	1276	80	+ 10
Open Well	270	17	104	7	- 10
Rain or spring	72	4	104	7	+ 3
D. Lighting Used					
Electricity	51	3	94	6	+ 3
Pressure Lamp	62	4	8	1	- 3
Kerosene Lamp	491	63	1473	93	+ 63
Oil Lamp	1006	63	5	x	- 63
E. Have Radio	591	37	873	35	+ 18
F. Have Sewing Machine	500	31	587	37	+ 6
Total Number of Farms	1610		1580		

Note: x - represents less than 1%

is still rare in these municipalities. Also noted was a gain of 18.5% in radio ownership and 5.3% in sewing machines. In short, most of the variables indicate that the farmers in the survey areas earned enough during the two years between 1966 and 1968 to finance improvements in their dwellings and utilities and to purchase such consumer items as radios and sewing machines.

There are other evidences of an increase in income, too, and this is in the personal adornment which is seen in the rural areas worn both by the farmer and his wife. Almost every farmer wears shoes when he goes to the city. Both men and women now own dress material, barongs for the farmer and a styled dress for his wife and one is surprised by the number of wrist watches worn by laborers in the rice fields.

Unfortunately, the available statistics are very deficient with regard to what percentages of small farmers started to use the new high-yielding varieties at any one time during the last three years, or by what percentage these farmers' incomes were increased in different provinces of the nation. The Bureau of Agricultural Economics (BAE) places the area used in rice production at approximately 3,000,000 hectares.[2/] Recent statistics published by the RCPCC show that during the first crop of the 1968-69 crop year, almost 20% of the nation's total rice producing area was planted to high-yielding varieties. However, USAID has no available statistics on what percentage of the area growing rice is share-cropped, farmed under leasehold, or owner-operated. (See Tables 3, 4 and 5 attached.) We do not know the ownership pattern in Central Luzon where much rice land is already under the Land Reform Program. However, let us assume that the break-down in types of farm tenancy in Central Luzon would be almost as follows:

Types of Tenancy	% of Farmers
Tenant farmers	50%
Leasehold farmers	30%
Owner-operator farmers	20%

2/ Agricultural Census 1960.

TABLE 3. FARM AREA BY TENURE CLASS

Bay, Laguna

	1965		1967		
	Area of Farms (Has.)	% of Total Area	Area of Farms (Has.)	% of Total Area	% Change Between '65 & '67
Total Farm Area	2470	100%	2709	100%	10%
Farm Area by Tenure Class					
Fully-owned farms	438	18	501	18	+ 14
Part-owned farms	578	23	745	28	+ 29
Tenanted farms	1243	50	1259	46	+ 1
Managed farms	2	-	75	3	+3650
Other types of tenure a/	209	9	129	5	- 38

a/ "Other " includes mixed types of tenure on same farm.

TABLE 4. FARM AREA BY TENURE CLASS

Mayantoc, Tarlac

	1965		1967		
	Area of Farms (has.)	% of Total Area	Area of Farms (has.)	% of Total Area	% Change Between '65 & '67
Total Farm Area	5473	100%	7239	100%	+ 32%
Farm Area by Tenure Class					
Fully-owned farms	1583	29	2525	35	+ 59
Part-owned farms	2670	49	3503	49	+ 31
Tenanted farms	1077	20	957	13	- 11
Managed farms	10	-	24	-	+140
Other types of tenure a/	133	2	230	3	+ 73

a/ "Other" includes mixed types of tenure on same farm.

TABLE 5. FARM AREA BY TENURE CLASS

Naic, Cavite

	1967	
	Area of farms (has.)	% of Total Area
Total Farm Area	392	100%
Farm Area by Tenure Class		
Fully-owned farms	3	1
Part-owned farms	68	17
Tenanted farms	319	81
Managed farms	-	-
Other types of tenure[a/]	2	1

NOTE: This place was not included in 1965 Baseline Survey. It just served as a control area in 1967.

[a/] "Other" includes mixed types of tenure on same farm.

These figures are probably as acceptable as any others to those who are knowledgeable regarding rice production in this area.

The RCPCC estimates that the arable farm land in the seven provinces of Central Luzon (Bulacan, Pampanga, Tarlac, Nueva Ecija, Pangasinan, Bataan and Zambales) is 717,349 hectares.[3/] Of this, 651,345 hectares or about 90% produce rice. The population of these provinces is 3,690,996.[4/] Within this population, 1,599,963 persons or about 43% are farmers. Using the 90% figure above, about 1,439,967 persons derive their livelihood from rice production.

Assuming that 20% of the nation's rice producing area is planted to high-yielding varieties, as cited above[3/], and if we take the figure of about 1,439,967 people who earn their living from rice production, we may assume that 287,993 people were favorably affected as a result of switching over to the high-yielding rice in Central Luzon. This does not include their dependents, an average of about 6 persons per family.

In a study on the cost of producing rice in the Philippines which appears in the Fourth Annual Report of AID/IRRI Contract No. CSD-834 for research on Power Equipment in the Production of Rice, the authors chose four farms on which to make a cost comparison.[5/] See Table 6 attached.) On two of these farms the crop was irrigated and on two it was not. Under each condition a tractor was used for the land preparation in the first case while in the second case, only carabao power was used.

The authors make a comparison of the costs and returns on the traditional and the improved varieties as follows for production on a one-hectare basis:

3/ RCPCC Report of December 1968.
4/ Agricultural Census 1960
5/ Annual Report on AID Contract CSD-834 for period July 1, 1965 to June 30, 1967.

TABLE 6. COSTS AND RETURNS OF PRODUCING PALAY PER HECTARE, 1966 WET SEASON, FOUR RANDOMLY SELECTED SITES IN CENTRAL LUZON AND LAGUNA PROVINCES

	IRRIGATED		NON-IRRIGATED	
Site No.	03	03	15	42
Production per hectare (cav.)	62.8	43.0	45.0	50.0
Production per hectare (kg.)	2,763	1,892	1,980	2,200
Prices received for rice (pesos)	18.40	20	20.00	18.00
Gross Receipts (pesos)	1,155.52	860.00	900.00	900.00
	PESOS PER HECTARE			
CASH COSTS				
Hired labor	169.00	66.16	148.00	48.00
Food	-	2.33	16.75	-
Fertilizer	-	-	40.00	24.00
Farm Chemicals	4.33	3.20	7.00	--
Irrigation Fee	-	3.66	-	-
TOTAL CASH COSTS	173.33	75.35	211.75	72.00
NON-CASH COSTS				
Seed Used	36.80	40.00	20.00	14.40
Threshing & Harvesting	189.50	107.66	180.00	144.00
Irrigation maintenance	9.20	-	-	-
TOTAL NON-CASH COSTS	235.52	147.66	200.00	140.40
TOTAL CROP COST	408.85	223.01	411.75	230.40
Share to the landlord	380.00	356.66	350.00	385.20
Landlord's Cost	149.15	93.26	153.50	123.20
Net to landlord	230.85	263.40	196.50	262.00
TOTAL CROP COST INCLUDING NET TO LANDLORD	639.70	486.41	608.25	492.40
NET RETURNS TO TENANT FOR MGT., LABOR AND CAPITAL	515.82	378.59	291.75	407.60
Value of Operator, Family and Exchange labor	28.00	95.67*	80.50	178.50
TOTAL COST INCLUDING ALL LABOR	667.70	582.08	688.75	670.90
Net Returns to Mgt. & Capital	487.82	277.92	211.25	229.10
Cost per cavan	10.63	13.53	15.30	13.41
(Cost per kg.)	(0.241)	(0.307)	(0.347)	(0.304)

Average cost of all P13.21/cav. (P0.299/kg.)
Price Received per cavan P18.00 - 20.00
(Price Received per kg. P 0.410- 0.454

*Includes charge for own animal.

	Improved Varieties	Present (Old) Practices
Yield	125 cavans (5,500 Kg.)	45.4 cavans (2,000 Kg.)
Gross receipts @ P17/cav	P 2,125.00	P 771.80
Total Costs	1,456.00	726.40
Net Returns	P 669.00	P 45.40
Cost per cavan	11.64	16.00
(cost per Kg.)	(0.264)	(0.363)

It is pointed out, "....the improved varieties and practices not only indicate a lower cost per unit, but a two-to-three fold increase in product."

Let us now see what the increased income might be on the basis of one hectare, in the case of the three types of tenancy: tenant farms, leasehold farms and owner-operated farms. For this purpose, we can use the costs of production presented by Mr. Harold D. Koone in "A Case Study of Economic Returns to One Hectare of Farmland in One Year in the Province of Pampanga."[6/] However, instead of the 148 cavan production obtained in Mr. Koone's study, let us use a more average harvest of 80 cavans HYVs and 45 cavans where non-improved varieties are grown with chemical fertilizer. (See Tables 7, 8 and 9).

The three models show that farmers' incomes are considerably improved when they switch from local varieties to HYVs for seed. Their income is correspondingly increased from the tenant group to the leasehold group and again even more so in the owner-operator group. Though the owner-operator earns by far the biggest returns from the use of HYVs, in Central Luzon the number of tenant farmers (50%) and of land-lease farmers (30%) outnumber the owner-operator farmers (20%) four to one. As a consequence the first two groups are the ones who have most visibly been benefited as regards an improved living standard. Where incomes are initially very small as in the first two groups, an increased earning of over 50% as these groups have experienced means a correspondingly even larger increase in the goods and services they can afford.

6/ USAID/ORD report by Harold D. Koone dated July 19, 1968.

TABLE 7
MODEL NO. 1

Comparison of Income to Tenant Farmer in the Production of 1 hectare HYVs and 1 hectare of Local Varieties

HIGH YIELDING VARIETIES

GROSS INCOME:	80 cav. sold for ₱17/cav.	₱1,360.00	
	Farmer's share (45%)		₱ 612.00

CASH OUTLAY	Total	Farmer's Share
1 cavan HYV seed	₱ 28.00	₱ 12.00
2 bags fertilizer (14-14-14)	44.00	22.00
2 bags fertilizer UREA	92.00	46.00
2 bags (40k) Basudin	100.00	50.00
Pulling of seedlings	20.00	10.00
Transplanting (in cross check)	60.00	30.00
Harvesting contract	164.00	82.00
Threshing contract (5%)	68.00	30.60
EXPENSES	₱ 576.00	₱ 282.60
GROSS INCOME	784.00	329.40
LANDLORD's SHARE ₱454.60		
NON-CASH OUTLAY		
Land Preparation		80.00
Labor in fertilizing		20.00
Labor in treating w/insecticides		20.00
Labor in hand weeding		40.00
TOTAL NON-CASH EXPENSES		₱ 160.00
NET INCOME		₱ 169.40

LOCAL VARIETIES

GROSS INCOME:	45 cav. sold for ₱17/cav.	₱	
	Farmer's share (45%)		₱344.25

CASH OUTLAY	Total	Farmer's Share
1 cavan local seed	₱ 20.00	₱ 10.00
2 bags fertilizer (14-14-14)	44.00	22.00
Pulling of seedlings	20.00	10.00
Transplanting (traditional)	40.00	20.00
Harvesting contract	100.00	50.00
Threshing contract (5%)	38.25	17.20
EXPENSES	₱262.25	₱129.20
GROSS INCOME	502.75	215.05
LANDLORD'S SHARE ₱287.70		
NON-CASH OUTLAY		
Land Preparation		60.00
Labor in fertilizing		10.00
Labor in hand weeding		30.00
TOTAL NON-CASH EXPENSES		₱100.00
NET INCOME		₱115.05

TABLE 8
MODEL NO. 2

Comparison of Income to Leasehold Farmers in the Production of 1 hectare HYVs and 1 hectare of Local Varieties

HIGH YIELDING VARIETIES

GROSS INCOME:	80 cav. sold for P17/cav. Farmer's Share (all but fixed rental)	P 1,360.00
CASH OUTLAY		
1 cavan HYV seed		P 28.00
2 bags fertilizer (14-14-14)		44.00
4 bags UREA fertilizer		92.00
2 bags (40 k.) Basudin		100.00
Pulling of seedlings		20.00
Harvesting contract		164.00
Transplanting (in cross check)		60.00
Threshing contract (5%)		68.00
Hauling palay to warehouse		20.00
Interest on borrowed capital		60.00
Fixed rental on property (25% average yield on 3 previous harvests)		191.25
EXPENSES		847.25
GROSS INCOME		512.75
NON-CASH OUTLAY		
Land Preparation		80.00
Labor in fertilizing		20.00
Labor in spreading insecticide		20.00
Labor in hand weeding		40.00
TOTAL NON-CASH EXPENSES		P 160.00
NET INCOME		P 352.75

LOCAL VARIETIES

GROSS INCOME:	45 cav. sold for P17/cav. Farmer's Share (all but fixed rental)	P 765.00
CASH OUTLAY		
1 cavan local seed		P 20.00
2 bags fertilizer (14-14-14)		44.00
Pulling of seedlings		20.00
Transplanting (traditional)		40.00
Harvesting contract		100.00
Threshing contract (5%)		38.25
Interest on borrowed capital (from money lender)		60.00
Fixed rental on property (25% average yield on 3 previous harvests)		191.25
EXPENSES		513.50
GROSS INCOME		251.50
NON-CASH OUTLAY		
Land Preparation		60.00
Labor in fertilizing		10.00
Labor in hand weeding		30.00
TOTAL NON-CASH EXPENSES		P 100.00
NET INCOME		P 151.50

TABLE 9
MODEL NO. 3

Income of Owner-Operator
in the
Production of 1 Hectare HYVs*

HIGH YIELDING VARIETIES

GROSS INCOME: 100 Cavans sold for ₱17/cav.	₱ 1,700.00
CASH OUTLAY	
1 Cavan Certified HYV seed	32.00
2 bags fertilizer (14-14-14)	44.00
4 bags fertilizer UREA	92.00
1 quart bottle MCPA weedicide	9.00
1 quart tin treflan	50.00
Land Preparation with hand tractor	60.00
Pulling of seedlings	20.00
Transplanting in cross check rows	60.00
Harvest contract	164.00
Threshing contract (5%)	85.00
Hauling palay to warehouse	25.00
EXPENSES	₱ 641.00
GROSS INCOME	₱ 1,059.00
NON-CASH OUTLAY	
5 days labor driving tractor @₱8.00/day	40.00
Labor in fertilizing (split application)	50.00
Labor in spreading herbicide	40.00
Labor in spreading insecticide	50.00
TOTAL NON-CASH OUTLAY	₱ 180.00
NET INCOME	₱ 879.00

*The above projection anticipates the use of tractor-drawn equipment and modern practices. For this type of farming, a comparison with local varieties is not feasible.

It must be remembered too that these models are each based on the production of one hectare of rice while the average size of the farms in Central Luzon is 3 hectares. Also many farmers have some land which they may irrigate. In such cases, two crops may be grown during the year. These factors have to be taken into account also in figuring a farmers' total income.

The following assumptions were used in working out three models above: In the first two models: that for tenant farmers and that for leasehold farmers, land preparation is calculated on the basis of carabao traction. Weeding is calculated to be by hand. These are the general agronomic practices employed under such conditions. Also, in these cases, it is possible to compare the costs of production of the HYVs with those when local varieties are used. In the third model, that of owner-operator farmers, it is assumed that modern farming is practiced. Under these conditions, land preparation is performed by tractors; weeding is by the use of herbicides with a minimum of hand pulling; and periodic treatment is practiced for the control of insects. Where modern farming methods are used, no intelligent farmer would consider growing any but the HYVs and therefore no attempt has been made to compare the cost of production with the costs of using local varieties.

The models assume that rice sells for ₱17/cavan, the Government support price. Threshing is usually at a fixed contracted rate of 5% of the production and this percentage has been used. In Model No. 1, the tenant/landlord's share is as follows: 45% of the crop goes to the tenant and 55% goes to the landlord. This is an accepted division for Central Luzon. In Model No. 2, that of a leasehold farmer, rental is considered to be fixed. It is based on the standard formula employed, i.e., 25% of the average yield for the past three seasons; in this case the previous three harvests were considered to be equal.

IV. A CASE STUDY OF PAULINO SOTTO AND HIS PARTICIPATION IN THE RICE PROGRAM*

Paulino Sotto of Mexico, Pampanga, gives credit to the IR8 rice variety and a sensible credit program for improving his way of life. For many years Mr. Sotto has farmed a three-hectare area in Barrio San Juan, a rather isolated rice and sugar cane area near the slopes of Mt. Arayat in Central Luzon.

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* Material herein was provided by the Rural Bank of Mexico.

Prior to 1967, Mr. Sotto planted two crops of rice on a two-hectare portion and a crop of rice and one cropping of vegetables and pulses on the other hectare. The water was supplied by the nearby streams through gravity irrigation, The rice was a local variety and took up to 160 days for maturity. Yields very rarely exceeded 30 cavans per hectare and the second crop often failed to mature. No chemical fertilizers were applied and only on rare occasions were insecticides used. The crop upon harvest was sold thru a local merchant, if there was any rice left after family consumption and lease contract requirements were satisfied.

The three-hectare area was leased from an absentee owner who lived in Manila with a rent of 57 cavans of palay per year. The land owner provided no support to any of Mr. Sotto's farm operations. His farm equipment consisted of two carabaos, one wooden and one moldboard plow, and two native harrows. Around his home were some fruit trees such as mango, banana and starapple. Most of this produce was home consumed, but occasionally a small amount was sold in local markets adding to his meager income from rice. Mose of his vegetable produce was mungo and string beans which he frequently sold to itinerant middlemen at the time of harvest stricly on a cash and carry basis. No improved techniques in cultivation were used and no fertilizers were applied except carabao manure.

During these years the Sottos were raising a large family of seven boys and four girls. They lived in a two-room nipa hut. The portion under the living quarters was utilized as a storage area for tools and sheltering for the carabaos and a few scavenger chickens. The home lacked electricity and had no bath or latrine facilities. Drinking water was obtained from a pump near the home. The cooking facilities were very primitive and were located in the open. Mr. Sotto handled his credit through the use of local usurer. The minimum was 30% interest per annum, but frequently interest rates were as high as 50 to 80%. Mr. Sotto could not avail himself of government or private lending institutions as he did not have the requisite collateral to obtain loans.

Over the years, Mr. Sotto had no meaningful contacts with technical personnel in agriculture from government or private

agencies. He personified the attitudes and fatalistic outlook of life so many of the rural people in Central Luzon possessed. It was not of outright rebellion or anger but a reluctant acceptance to the reality of things around him. By 1966, the Sotto family managed to set all children out on their own with the exception of a teenage son and daughter. His physical assets remained as meager as they were 20 years prior and he had no savings of any kind.

In the fall of 1966, the rice improvement program under the RCPCC was being earnestly implemented in Pampanga. Mr. Sotto was contacted by the Rural Bank of Mexico to be a prospective farmer under the supervised credit program for rice sponsored through the Central Bank of the Philippines in the AGLF (Agricultural Guarantee and Loan Fund) program. He was skeptical but agreed to give it a try by planting 0.8 hectare of IR8 utilizing one of the do-it yourself rice kits for part of this planting. The farm plan was prepared by Sotto with assistance from a farm technician of the Central Bank and approved by the Rural Bank of Mexico. The bank agreed to provide P500 in crop loans for this farm operation and accept the standing crop as collateral. The farm technician visited Mr. Sotto's farm weekly following the seedbed preparation in December 1966. The prescribed fertilizers, insecticides and cultural practice requirements as set forth by the RCPCC were consistently followed. In April, the harvest resulted in 123.5 cavans of palay or a computed yield of 154.5 cavans per hectare. The results astounded Mr. Sotto for this was about 5 times his normal yield with a local variety. He was sold on the new "miracle" rice because he saw that his local "Surigao" produced only 30 cavans per hectare. He was also impressed because the IR8 took 120 days to mature whereas the local variety required 160 days.

By the following wet season, almost his entire hectarage was devoted to the "miracle" rice and at that time the local ESSO Agroservice representative cooperated with the Rural Bank to promote a barrio rice demonstration on the Sotto farm. Results remained constant with the first plantings of the IR8, and Mr. Sotto produced an average of over 130 cavans per hectare. The bank continued to finance his farm operation with speedy well supervised loans. In 1967, Mr. Sotto borrowed over P2,000 from the bank and was

able to pay all of his debts on time.

In 1968 crop year was pretty much a repeat of his 1967 operation. He faithfully followed the advice of his loan supervisor and repaid all loans on a timely basis. By the end of 1968, the Sotto family had over ₱2,000 in savings deposited at the Rural Bank.

Despite a long drought in late 1968 and 1969, Mr. Sotto continued to improve his farm operations and made serious effort to develop his alternate crops to a higher level of production. New improved mungo and higher yielding corn developed by the College of Agriculture were used and yields double those of previous varieties were recorded.

With the shorter-season, high-yielding varieties of rice, Mr. Sotto was able to plant his alternate crops earlier and harvest these crops before the effects of the drought could appreciably affect production.

Today, the Sotto family's economic and social conditions had appreciably changed for the better. Although they have not built a new dwelling, they have improved the home with such items as wooden walls, a galvanized metal roof, a sanitary toilet, improved kitchen facilities and a clean, closed storage area for chemical fertilizers and insecticides. By the end of 1969, he will have electricity supplied by a consumers' cooperative organized by the people of seven barrios in the immediate area. His wife has purchased a sewing machine and he has acquired a radio and a bicycle. His two youngest children have remained on the farm and actively engage in the family's active agricultural business. Mr. Sotto now owns a knapsack sprayer and has improved his tools for cultivation. He has been able to market his rice through RCA procurement thus obtaining good prices for his produce. In early 1969, he leased an additional two hectares of land for production purposes which is administered by his son. Best of all, he is now debt-free and has money in the bank. He is able to plot his own course utilizing the resources at his disposal. He is representative of the many farmers in his area of Pampanga who have restored confidence in what government can do. He is an active participant in the local community development of San Juan Barrio and is willing to be a farmer leader for the innovation of newer agricultural practices. Sotto, father of 11 and grandfather of 20 says, "Now I can even help my married children by helping them look after the health and welfare of my grandchildren."

V. REPRESENTATIVE STUDIES OF FARMERS UNDER THE AGLF PROGRAM

1. Pedro Dizon - Before AGLF, his farm income was always not enough for his growing family so this farmer has to complement his farm income with off-farm income. He used to leave the farm right after the transplanting of his ricefields and return when the rice crop is about to be harvested. Two years under AGLF gave him comfortable farm income such that he was able to send all his children to school, re-model his home, buy 2 work animals, buy 3 residential lots in the capital of the province, and bought a new sewing machine for his wife. Both this farmer and his wife have joined the cursilista movement in the town of Mexico.

2. Gregorio Guevarra - Before AGLF, his farm income could support his children up to high school only. Two years under AGLF which was characterized by the shift from mainly sugarcane production to the production of the high yielding rice varieties and the secondary crops like sweet corn, sorghum, soybeans, peanut and other vegetables. Two years under AGLF enabled him to send 2 sons to study at UP College of Agriculture, re-model his home, put up a sari-sari store, and to keep savings account with the Rural Bank of Mexico.

3. Pablo Catap - Under AGLF for 2 years characterized the shift from mainly sugarcane production to the growing of the "so-called" "miracle rice," sweet corn, and vegetables which enabled him to repay in full his outstanding debts to private money lenders in his barrio, re-model his home, put up a sari-sari store and to keep savings account with the Rural Bank of Mexico.

4. Paulino Sotto - The 1st supervised farmer-borrower under AGLF of RB Mexico, this farmer refused to believe that he could obtain over 100 cavans of palay from 1 hectare of IR8. He lost his bet when his 1 ha. IR8 produced actually 123 cavans of palay and he danced joyfully before the big crowd that gathered to witness the 1st threshing of IR8 in Mexico, Pampanga as payment of his lost bet. Two years under AGLF enabled this farmer to acquire 2 more hectares of ricefields, re-model his home and maintain a savings account with the Rural Bank of Mexico, Inc.

5. Celestino Esquerra - He made so good in his 2 years under AGLF so that he was able to re-model his old home, acquire a new sewing machine for his wife, and repay all his debts to the private money lenders in his barrio.

6. Dominador Quiambao - Income under AGLF doubled that of the years before AGLF such that under the program of the Central Bank, this farmer was able to re-model his home, acquire a new work animal and to repay all his debts to the private money lenders of the barrio.

7. Tomas Canlas - Income under AGLF doubled that of the years before such that he was able to repay all his debts to the private money lenders in his barrio.

8. Francisco Mallari - Two years under AGLF enabled him to re-model his home, buy an irrigation pump and be elected as barrio councilor.

9. Crisanto Dizon - Always haunted by creditors, this farmer got further in debt during his 1st year under AGLF when his IR8 crop was destroyed by flood. His 2nd year under AGLF was so good such that he was able to repay in full his debts to the private money lenders and repay 80% of his outstanding loan with the RB Mexico.

Farmer-cooperator..... Pedro Dizon, 38 yrs. Grade II
Wife..... Apolonia Galang, 35 yrs., Grade V
Children ..... 2 boys, 3 girls
Location of Farm ..... Bo. San Juan, Mexico, Pampanga
Area leased & sharing basis ... 12 ha. for 72 cavans per year

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:		
Sale of vegetables & fruits	₱800.00	
Sale of 260 cavans Peta @ ₱14	3640.00	₱4,440.00
EXPENSES:		
Cash crop expenses	₱1750.00	
Value of palay paid as farm lease @ ₱14.00	1008.00	
Cash family living & other expenses	2000.00	4,758.00
NET FARM LOSS:		- 318.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱8450.00	
Sale of 156 cav. IR8 @ ₱28.31	4416.36	
Sale of 39 cav. IR8 @ ₱16	624.00	
Sale of 20 cav. Surigao @ ₱16	320.00	
Sale of 155 cav. C-18 @ ₱16	2460.00	
Sale of 561 cav. IR8 @ ₱17.50	9817.50	₱26,107.86

EXPENSES:

AGLF loans & bank charges	₱6890.00	
Additional crop expenses	2000.00	
Value of palay paid as farm lease	1152.00	
Cash family living & other expenses	3000.00	13,042.00

NET FARM INCOME: ₱13,065.86

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱7800.00	
Sale of 220 cav. IR8 @ ₱17	3740.00	
Value of 1070 cav. IR5 at bodega @ ₱14	14980.00	₱26,520.00

EXPENSES:

AGLF loans & bank charges	₱2500.00	
Additional crop expenses (own funds)	5860.00	
Value of palay paid as farm lease	1008.00	
Cash family living & other expenses	3000.00	12,368.00

NET FARM INCOME: ₱14,152.00

Farmer-cooperator	Pablo Catap, 47 yrs,, Grade IV
Wife	Raymunda Lopez, 42 yrs., Grade VI
Children	1 boy, 5 girls
Location of farm	Bo. San Antonio, Arayat, Pampanga
Area farmed & sharing basis ...	2 ha. ricefield; sharing 55-45
	4 ha. sugarcane; sharing 50-50

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:		
Sale of vegetables & fruits	₱ 80.00	
Sale of 120 piculs sugar @ ₱30 (share)	3600.00	
Sale of 27.5 cav. Peta @ ₱14 (farmer's share)	385.00	₱ 4,065.00
EXPENSES:		
Share of sugarcane crop expenses	₱1500.00	
Share of rice crop expenses	90.00	
Cash family living & other expenses	1700.00	3,290.00
NET FARM INCOME:		₱ 775.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Sale of vegetables & fruits	₱ 130.00	
Sale of 100 piculs sugar @ ₱34 (share)	3400.00	
Sale of 112 cav. IR8 @ ₱28.31 (share)	3192.00	
Sale of 78 cav. IR8 @ ₱17.50 (share)	1365.00	₱ 8,087.00
EXPENSES:		
AGLF loans & bank charges	₱2670.00	
Share of sugarcan crop expenses	1200.00	
Cash family living & other expenses	1700.00	₱ 5,570.00
NET FARM INCOME:		₱ 2,517.00

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Sale of sweet corn, vegetables & fruits	₱1350.00	
Sale of 105 piculs sugar @ ₱34 (share)	3570.00	
Sale of 100 cav palay @ ₱17.50 (share)	1750.00	
Value of 150 cav. IR5 in warehouse @ ₱14.50	2175.00	₱ 8,845.00

E X P E N S E S:

AGLF loans & bank charges	₱1780.00	
Share of Ssugarcane crop expenses	1100.00	
Cash family living & other expenses	1700.00	₱ 4,580.00

N E T F A R M I N C O M E: ₱ 4,265.00

Farmer-cooperator Gregorio Guevarra, 41 yrs., Grade II
Wife Conchita Gonzales, 36 yrs., Grade III
Location of farm Bo. Anao, Mexico, Pampanga
Area of farm & sharing basis ... 2 ha. ricefield; sharing 55-45
3 ha. sugarcane; sharing 50-50

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

I N C O M E:

Sale of vegetables & fruits	₱ 100.00	
Sale of 110 piculs sugar (share @ ₱30	3300.00	
Sale of 33 cav. Peta (share) ₱14	462.00	₱ 3,862.00

E X P E N S E S:

Share of sugarcane crop expenses	₱1020.00	
Share of rice crop expenses (cash)	100.00	
Cash family living & other expenses	2000.00	₱ 3,120.00

N E T F A R M I N C O M E: ₱ 742.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

I N C O M E:

Sale of vegetables & fruits	₱ 500.00	
Sale of 127 piculs sugar (share) @ ₱34	4318.00	
Sale of 132 cav. IR8 (share) @ ₱17.50	2310.00	₱ 7,128.50

E X P E N S E S:

Share of sugarcane crop expenses	₱ 900.00	
AGLF loan & bank charges	1182.00	
Cash family living & other expenses	2000.00	₱ 4,083.00

N E T F A R M I N C O M E: ₱ 3,045.00

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of sweet corn crop	₱ 800.00	
Sale of sorghum, peanut & vegetables	440.00	
Sale of 107 cav. IR8 (share) @ ₱17.50	1872.50	
Sale of 20 cav. IR5 (share) @ ₱35	700.00	
Sale of 120 piculs sugar (share) @ ₱34	4080.00	
Sale of 160 cav. IR5 (share) @ ₱14.50	2320.00	₱10,212.50

EXPENSES:

AGLF loans & bank charges	₱1385.00	
Share of sugarcane crop expenses	900.00	
Cash family living & other expenses	2500.00	₱ 4,785.00

NET FARM INCOME: ₱ 5,427.50

Farmer-cooperator	Paulino Sotto, 60 yrs., Grade II
Wife	Innocencia Canlas, 56 yrs., Grade III
Children	7 boys, 4 girls
Location of farm	Bo. San Juan, Mexico, Pampanga
Farm area & sharing basis	3 ha. rice farm leased 57 cav./yr.

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:

Sale of vegetables & fruits	₱1050.00	
Sale of 100 cav. Surigao @ ₱14	1400.00	₱ 2,450.00

EXPENSES:

Dry & wet seasons crop expenses	₱ 360.00	
Value of palay paid as farm lease	798.00	
Cash family living & other expenses	1000.00	₱ 2,158.00

NET FARM INCOME: ₱ 292.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱ 400.00	
Sale of 123 cav. IR8 @ ₱28.31	3482.00	
Sale of 32 cav. IR8 @ ₱16	512.00	
Sale of 5 cav. Surigao @ ₱16	80.00	
Sale of 238 cav. IR8 @ ₱17.50	4165.00	₱ 8,639.12

EXPENSES:

AGLF loans & bank charges	₱2229.81	
Value of palay paid as farm lease	912.00	
Cash family living & other expenses	2500.00	₱ 5,641.81

NET FARM INCOME: ₱ 2,997.31

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱1600.00	
Sale of 160 cav. IR8 @ ₱17.50	2800.00	
Sale of 182 cav. IR5 @ ₱14.50	2639.00	₱ 7,039.00

EXPENSES:

AGLF loans & bank charges	₱ 680.00	
Crop expenses without AGLF loan	700.00	
Value of palay paid as farm lease	798.00	
Cash family living & other expenses	2000.00	₱ 4,178.00

NET FARM INCOME: ₱ 2,861.00

Farmer-cooperator	Celestino Esguerra, 33 yrs. old, Grade VI
Wife	Luzviminda Punzalan, 29 yrs. old, Grade IV
Children	1 boy, 3 girls
Location of farm	Bo. Masamat, Mexico

Area farmed & sharing basis ... 4 ha.with 55-45 basis (share tenant)

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:		
Dry Season -		
Sale of vegetables	₱ 200.00	
Wet Season -		
Sale of 180 cav. BE-3 @ ₱18	3240.00	₱ 3,440.00
EXPENSES:		
Dry Season crop expenses	₱ 200.00	
Wet Season crop expenses	1000.00	
Poultry & livestock expenses	100.00	
Payment of farm share to landowner	972.00	
Cash family living expenses	730.00	₱ 3,022.00
NET FARM INCOME:		₱ 418.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Dry Season -		
Sale of vegetables	₱ 700.00	
Sale of 2 hogs	300.00	
Wet Season -		
Sale of 113 cav. IR8 @ ₱17.50	1977.50	
Sale of 80 cav. Ramaja @ ₱16	1280.00	
Sale of 25 cav. BE-3 @ ₱18	450.00	₱ 4,707.50
EXPENSES:		
Dry Season crop expenses	₱ 200.00	
Wet Season AGLF loan	408.00	
Expenses for Ramaja & BE-3 crops	500.00	
Poultry & livestock expenses	100.00	
Payment of farm share to landowner	1000.00	
Cash family living expenses	1000.00	₱ 3,208.00
NET FARM INCOME:		₱ 1,499.50

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Dry Season -		
Sale of sweet corn crop	₱ 300.00	
Sale of vegetables	230.00	
Sale of 6 weanling pigs @ ₱50 each	300.00	
Wet Season -		
Value of 540 cav. IR5 @ ₱14	7560.00	₱ 8,390.00

EXPENSES:

Dry Season crop expenses	₱ 150.00	
Wet Season AGLF loan	763.85	
Livestock & poultry expenses	100.00	
Payment that went to landowner	1620.00	
Other expenses	1036.15	
Cash family living expenses	1200.00	₱ 4,870.00
NET FARM INCOME:		₱ 3,520.00

Farmer-cooperator "Dominador Quiambao, 32 yrs., Grade V
Wife ... Iluminada Macalong, 30 yrs, Grade VI
Children .... 1 boy, 2 girls
Leases 3 ha. farm in San Juan, Mexico for 25 cavans per year.

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:

Sale of vegetables & fruits	₱ 500.00	
Sale of 90 cavans BE-3 @ ₱18	1620.00	₱ 2,120.00

EXPENSES:

Wet & dry seasons crop expenses	840.00	
Value of palay paid as farm lease	450.00	
Cash family living expenses	800.00	₱ 2,090.00
NET FARM INCOME:		₱ 30.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱1100.00	
Sale of 190 cav. IR8 @ ₱17.50	3325.00	₱ 4,425.00
(rice crop partly damaged by Typhoon Welming)		

EXPENSES:

AGLF loan & bank charges	₱1540.00	
Value of palay paid as farm lease	437.50	
Cash family living expenses	1000.00	₱ 2,977.50
NET FARM INCOME:		₱ 1,447.50

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Sale of vegetables & fruits	₱1250.00	
Sale of 102 cav. IR8 @ ₱17.50	1785.00	
Sale of 17 cav. IR5 @ ₱35	595.00	
Value of 230 cav. IR8 @ ₱14 (warehouse)	3220.00	₱ 6,850.00

EXPENSES:

AGLF loans & bank charges	₱2450.00	
Value of palay paid as farm lease	435.50	
Cash family living & other expenses	1200.00	₱ 4,037.50
NET FARM INCOME:		₱ 2,812.50

Farmer-cooperator Francisco Mallari, 62 yrs., Grade VII
Wife Rosario Cortez, 48 yrs., Grade II with 4 children
Farm in Bo. Sabanilla, Mexico - 2 ha. leased at 12 cav. per year

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:		
Dry Season -		
Sale of vegetables	₱ 480.00	
Wet Season -		
Sale of 120 cav. BE-3 @ ₱17 (from 2 ha.)	2040.00	
Sale of chicken and eggs	50.00	₱ 2,570.00
EXPENSES:		
Dry Season crop expenses	₱ 50.00	
Wet Season crop expenses	400.00	
Lease payment of farm	204.00	
Cash family living expenses	1000.00	₱ 1,654.00
NET FARM INCOME:		₱ 916.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Dry Season -		
Sale of vegetables	₱ 480.00	
Sale of 2 hogs	320.00	
Wet Season -		
Sale of 160 cav. IR8 at ₱17.50	2800.00	₱ 3,600.00
EXPENSES:		
Dry Season crop expenses	₱ 100.00	
Wet Season AGLF loan	800.00	
Livestock feed expenses	100.00	
Lease payment of farm	210.00	
Cash family living expenses	1100.00	₱ 2,310.00
NET FARM INCOME:		₱ 1,290.00

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Dry Season -		
Sale of sweet corn	₱ 200.00	
Sale of vegetables (varied).	350.00	
Sale of chicken & hogs	300.00	
Sale of 11.5 cav. IR5 @ ₱35	402.50	
Wet Season -		
Sale of 240 cav. IR5 @ ₱14	3360.00	₱ 4,612.50

EXPENSES:

Dry Season AGLF Loan	₱ 746.50	
Wet Season AGLF Loan	806.41	
Livestock & poultry expenses	150.00	
Payment of lease of farm	168.00	
Cash family living expenses	1300.00	₱ 3,170.91

NET FARM INCOME: ₱ 1,441.59

Farmer-cooperator	Tomas Canlas, 35 yrs., 3rd High School
Wife	Adelina Austria, 32 yrs., Grade VI
Children	2 boys, 2 girls
Location of farm	Bo. Sto. Rosario, Sta. Ana; 4 ha. leased for 30 cavans per year.

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:

Dry Season -		
Sale of vegetables, chicken & eggs	₱ 150.00	
Wet Season -		
Sale of 180 cavans of palay @ ₱22	3960.00	₱ 4,110.00

EXPENSES:

Dry season crop & chicken feed	₱ 50.00	
Wet season crop expenses	1200.00	
Payment of farm lease	660.00	
Cash family living expenses	1000.00	₱ 2,910.00

NET FARM INCOME: ₱ 1,200.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Dry Season -		
Sale of vegetables, chicken & eggs	₱ 160.00	
Wet Season -		
Sale of 177 cav. IR8 @ ₱17.50 (from 1.5 ha)	3097.50	
Sale of 140 cav. Ramaja @ ₱16 (from 2.5 ha)	2240.00	₱ 5,497.50
EXPENSES:		
Dry Season crop & chicken feed expenses	₱ 20.00	
Wet Season AGLF loan	567.31	
Expenses for Ramaja rice crop	750.00	
Payment of farm lease	525.00	
Cash family living expenses	1200.00	₱ 3,062.31
NET FARM INCOME:		₱ 2,435.19

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Dry Season -		
Sale of vegetables (after IR8 crop)	₱ 350.00	
Sale of 2 hogs	260.00	
Wet Season -		
Sale of 214 cav. IR8 @ ₱14 (from 2 ha.)	2996.00	
Sale of 80 cav. Ramaja @ ₱14 (from 2 ha.)	1120.00	₱ 4,726.00
EXPENSES:		
Dry Season crop expenses	₱ 50.00	
Livestock expenses	50.00	
Wet Season AGLF loan	1600.00	
Expenses for Ramaja rice crop	350.00	
Payment of farm lease	420.00	
Cash family living expenses	1000.00	₱ 3,470.00
NET FARM INCOME:		₱ 1,256.00

Farmer-cooperator .....Crisanto Dizon, 44 yrs., Grade III
Wife ..... Feliza Lising, 51 yrs, Grade VI
Children ..... 2 girls
Location of farm ..... Bo. San Juan, Mexico
5 ha. leased farm (leased for 42 cav. per year)

COST & RETURNS OF 1966 FARM OPERATION
(Before AGLF)

INCOME:		
Dry Season -		
Sale of vegetables & 1 fattened hog	₱ 475.00	
Wet Season -		
Sale of 121 cav. Intan @ ₱14	1694.00	₱ 2,169.00
EXPENSES:		
Dry Season crop & livestock expenses	₱ 150.00	
Wet Season crop expenses	1000.00	
Payment of farm lease	588.00	
Cash family living expenses	800.00	₱ 2,538.00
NET FARM LOSS:		₱ 369.00

COST & RETURNS OF 1967 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:		
Dry Season -		
Sale of 30 cav. IR8 @ ₱28.31 (from 1 ha., flooded)	₱ 849.30	
Sale of vegetables (varied)	500.00	
Sale of chicken, eggs, and 2 hogs	350.00	
Wet Season -		
Sale of 100 cav. IR8 @ ₱17 (4 ha. typhoon damaged)	1700.00	₱ 3,399.30
EXPENSES:		
Dry Season AGLF loan	₱ 650.00	
Wet Season AGLF loan	1973.00	
Poultry & livestock expenses	100.00	
Payment of farm lease	735.00	
Cash family living expenses	800.00	₱ 4,258.00
NET FARM LOSS:		₱ 858.70

COST & RETURNS OF 1968 FARM OPERATION
(AGLF Financed & Supervised)

INCOME:

Dry Season -		
Sale of 114 cav. IR8 @ ₱17.50 (from 1.5 ha.)	₱1995.00	
Sale of vegetables (varied)	500.00	
Wet Season -		
Sale of 328 cav. IR5 @ ₱14 (from 4 ha.)	4592.00	₱ 7,087.00

EXPENSES:

Dry Season AGLF loan	₱1550.70	
Wet Season AGLF loan	1898.55	
Vegetable production expenses	100.00	
Payment of farm lease	420.00	
Cash family living expenses	1000.00	₱ 4,969.25

NET FARM INCOME: ₱ 2,217.75