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 A review of the selected studies deemed most helpful and relevant towards planning activities for agricultural development. The base for the review was a total of 1,000 studies "directly useful" to the project. The review is divided into ten sections: situation/policy; development/growth; crop management; livestock/poultry management; agricultural marketing; machinery and fertilizer products; agricultural credit; and international trade.

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PREFACE

In an earlier phase of the research project, Agricultural Diversification and Markets in the Philippines, Project ADAM for short, an extensive survey of research reports on and related to agricultural diversification and markets was undertaken as an initial and basic step. Such a survey initiated the activities necessary for the achievement of ADAM's objectives, which are: (1) to identify and develop agricultural production alternatives and market opportunities at four levels--farm, regional, national, and international; and (2) to develop, specifically for the Philippines, the mechanism for a continuous analysis and re-evaluation of such alternatives and opportunities as actual production and market conditions change.

In the course of the survey, a total of more than 9,000 research studies/reports pertinent to Philippine agriculture were reviewed; this bulk was eventually trimmed down to a relatively smaller number (slightly more than a thousand) classified as "directly useful" to the project. Such a review provided the base for ADAM's third working paper, Planning for Agricultural Development: A Review of Literature.

No claim, however, can be made on the exhaustiveness of the coverage of this review, but we regard this as an important step in agricultural planning in the Philippines, for it may provide the baseline for planning and steering the agricultural sector on a modified course to development. From the standpoint then of national and international policy planning, it is hoped that this work can contribute to an eventual breakthrough in the search for innovations to achieve our agricultural development goals.

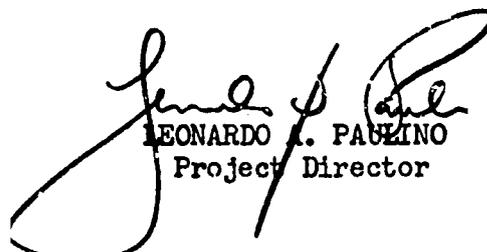

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TABLE OF CONTENTS

	Page
1. INTRODUCTION.....	1
2. PHILIPPINE AGRICULTURAL SITUATION AND POLICY.....	6
State of Philippine Agriculture; Problem Areas.....	6
Agricultural Development Planning in the Philippines; History and Implementation Problems.....	9
National Development Programs/Plans.....	12
Regional/Sectoral Programs.....	14
Others [Programs].....	15
3. PHILIPPINE AGRICULTURAL DEVELOPMENT AND GROWTH: A REVIEW	16
Rice and Corn.....	16
Problems in Production.....	18
Program Implementation Problems.....	23
Coconut.....	23
Abaca.....	24
Fisheries.....	25
Tobacco.....	26
Fruits and Vegetables.....	27
Mango.....	28
Banana.....	29
Citrus.....	29
Pineapple.....	29
Tomato.....	29
Scorghum.....	30
Soybean.....	30

	P a g e
Livestock and Poultry.....	31
Production.....	31
Marketing.....	32
Seed Distribution Program.....	33
Dissemination of HIVs.....	35
LAND REFORM PROGRAM.....	39
Land Reform and Land Use.....	39
Land Reform Concepts/Objectives.....	39
Land Reform in the Philippines.....	41
Towards Improved Landlord-Tenant Relationships.....	41
Towards Leasehold and Owner-Cultivatorship.....	43
Land Reform - Success or Failure.....	45
On program implementation.....	45
Legislative loopholes.....	48
Administrative problems.....	49
Financing problems.....	49
Tradition.....	50
Socio-political aspects.....	50
Farm productivity.....	50
Income redistribution.....	52
Land Reform Outlook.....	52
Land Taxation.....	52
Land Classification, Disposition, and Utilization.....	53
5. AGRICULTURAL DIVERSIFICATION.....	54
Diversification: Concept/Objectives.....	54

	Page
Multiple cropping.....	54
Intercropping.....	55
Crop rotation.....	55
Moroculture.....	55
Diversification Activities.....	55
Diversification (by crops).....	57
Rice crop rotation.....	57
Rice/green manure crops.....	57
Rice/cabbage, gabi, tobacco, sweet potato.....	58
Abaca intercropped.....	59
Corn intercropped.....	59
Calamansi intercropped.....	60
Sugarcane intercropped.....	60
Fish-vegetables.....	61
6. CROP MANAGEMENT.....	62
Agricultural Productivity and Technology.....	62
Mechanization and Cost of Production.....	63
Mechanization and Labor Displacement.....	65
Factors Affecting Adoption of High-Yielding Varieties...	67
Effects of Irrigation on Yield per Hectare and Income...	68
Problems Associated with Irrigation.....	71
Fertilizer.....	72
Chemical Control of Pests.....	73
Chemical Disease Control.....	74
Chemical Weed Control.....	74

	Page
7. LIVESTOCK AND POULTRY MANAGEMENT.....	76
Livestock Management.....	76
Livestock Population and Production.....	76
Swine Raising.....	77
Poultry Management.....	78
Production.....	79
Problems Associated with Livestock and Poultry Enterprises.....	80
8. AGRICULTURAL MARKETING.....	81
Marketing Costs and Margins.....	81
Problems: Suggested Improvements/Solutions.....	82
Marketing Boards/Orders and Other Marketing Practices...	84
Rice and Other Grains.....	85
Demand and Consumption Patterns.....	85
Credit: Its Influence on Rice Marketing Practices....	88
Means of Transport in Marketing.....	89
Situation and Outlook: Warehouses and Rice Mills.....	91
Marketing Practices.....	92
Marketing Problems and Solutions.....	93
Coconuts/Copra.....	94
Methods of Marketing.....	94
Market Outlets.....	95
Conversion of Nuts to Copra.....	97
Marketing Problems.....	98
Livestock, Poultry and By-products.....	98
Demand and Supply.....	99

	Page
Slaughterhouses and Meat Processing Plants.....	101
Transporting Livestock and Processed Products.....	105
Marketing Chilled Carcasses.....	107
Practices and Problems.....	108
9. AGRICULTURAL MACHINERY AND FERTILIZER PRODUCTS: STATUS AND DISTRIBUTION SYSTEMS.....	112
Agricultural Machinery.....	112
Government Policies and Programs Affecting Farm Mechanization.....	114
The Fertilizer Industry.....	115
Background and Present Situation.....	115
Domestic Consumption.....	116
Government Activities Affecting Fertilizer Demand.....	117
Fertilizer Distribution System.....	118
Distribution facilities.....	121
Transport and movement.....	121
Problems of the Fertilizer Industry.....	122
Pricing of fertilizer.....	122
10. AGRICULTURAL CREDIT.....	124
Credit Agencies.....	124
Some Weaknesses of Credit Institutions.....	130
ACA-FACOM/S.....	130
Rural banks.....	131
Lack of Credit Facilities.....	132
The Present Credit Structure: An Assessment.....	133
Supervised Credit: An Answer.....	136

11. INTERNATIONAL TRADE.....	140
Traditional Export Products.....	143
Coconut Exports.....	143
Sugar Exports.....	146
Abaca Exports.....	147
Copper Exports.....	148
Forest Products.....	149
Tobacco.....	151
Potential Export Products.....	151
Fruits and Vegetables.....	151
Pineapple.....	152
Banana.....	152
Mango.....	153
Fishery Products.....	153
12. LITERATURE CITED.....	154
13. TABLES.....	174
14. AUTHOR INDEX.....	186

PLANNING FOR AGRICULTURAL DEVELOPMENT: A REVIEW OF LITERATURE

INTRODUCTION

Agricultural productivity in the Philippines is quite low and, consequently, agricultural production lags behind effective demand. Agriculture has failed to consistently grow at a rate that is compatible with the needs and demands of the population, as well as the requirements of industries for raw materials and intermediate products used in manufacturing. The quantitative and qualitative inadequacy of inputs, both conventional and uncoventional, is considered the root cause of this poor state of agriculture in the country.

The improvement of agricultural productivity in order to attain self-sufficiency in agricultural products has always been accorded priority consideration for policy. This is in recognition of the importance of agriculture in the economic development of the country, since a majority or more than 70 percent of the population is engaged in agricultural activities. The objective of increasing agricultural productivity was borne by the earlier four-year agricultural plans and programs, and carried over to the "rolling" plans which updated the annual goals.

Until the declaration of Presidential Proclamation No. 1081, programs for increasing agricultural productivity had been guided by the usual question raised by policy makers, "How do we raise agricultural production to the point of self-sufficiency?" With the imposition of martial law, however, came set goals to be achieved in a relatively short time. A shift in policy orientation has resulted as program implementors assumed a radical change of attitude. Efforts are now geared towards the achievement of these set goals rather than of planning and programming per se. Because the issuance of decrees in support of the agricultural program enhances the expeditious achievement of pre-determined goals, the question to resolve now is: "When we achieve self-sufficiency in the cereals and other food crops and livestock, then what do we do next?"

The new outlook in policy-making would seem ideal for analyzing and selecting alternatives for pursuing objectives that are conducive to the rapid development in and growth of agriculture. In the context of meaningful achievements that are lasting and which create linkages forward and backward, and intersectorally, planners may well raise another

question: "Are there other and better alternatives and opportunities that have not been explored, but which could lead to more desirable ends in relation to the welfare of the rural population and the country's population in general?"

The choice of alternatives open to a prospective end requires that a planner or programmer be knowledgeable of the direction towards which development turns. In this regard, a starting point which must establish benchmarks, trends, projections and behavioral responses is a requisite to the assessment of the different approaches to use.

The result of agricultural development efforts expected of the Philippines is the transformation of agriculture from one that is traditionally subsistence-oriented to one that is market-oriented. Necessarily, increased production must occur; and this can be brought about by either or both of the following measures: (1) expanding area planted to crops; and/or (2) increasing yield per unit area.

The intensity of input utilization, quality of inputs and level of technology are factors which influence increased yield. Inasmuch as the use of basic resources is entailed by this means, resource limitation may be a major drawback in intensifying utilization of inputs. More capital requirement may complicate any new venture of a small-farm operator because he is not able to meet this need. Adoption of new or modern technology may be hindered by farmers' difficulty in learning new skills required. Moreover, risk-aversion which may accompany considerations for the institution of major changes in farm operations can be a deterrent to the adoption of modern technology by farmers.

The preceding implies that the input-intensive approach to increasing agricultural productivity is met with several constraints.

In addition to those already cited, the fact should also be mentioned that the introduction and adoption of certain technological inputs, in themselves, cannot solve the prevailing problem of low productivity. There are innovations which are not adoptable under certain conditions due to some limiting factors such as soil, climate and others. In view of these arguments, it can be seen that alternative approaches to agricultural development are imperative.

Whether the approach should lie in intensive rigorous supervision in farm management, or in a big push through massive expenditure for supportive services and resources, or in a combination of these that would utilize all factors of production to the best advantage, would have to be determined. The role of prices in relation to productivity should be duly considered, especially in determining the extent to which it is most profitable to increase the utilization of factors of high productivities and decrease that of factors of low productivities.

Hayami and Ruttan (1971) have expressed the view that the problem of agricultural development is not that of transforming static agricultural sectors into modern dynamic sectors, but of accelerating the growth consistent with the growth of other sectors in a modernizing economy.

Johnston and Mellors (1970) have pointed out that the most practical and economical approach to achieving sizeable increases in agricultural productivity lies in enhancing the efficiency of existing agricultural economies through the introduction of modern technology resulting from agricultural research education and extension.

The case of Japan's and Taiwan's technological progress which resulted in rapid over-all growth of agricultural output is also the outcome of agricultural research extension activities and other develop-

ment services. Output that was obtained from the operations of these undertakings more than offset the large initial investment thereby incurred.

The foregoing should give due emphasis to a compelling consideration for a specific approach that will contribute to increased agricultural productivity and over-all economic growth. Towards this end, this paper attempts to analyze how Philippine agriculture has grown over the years and to evaluate the present state of agriculture in the country.

Philippine Agricultural Situation & Policy

State of Philippine Agriculture; Problem Areas

The state of Philippine agriculture in terms of the country's growth rates may be characterized as a series of rate decreases observed within the past two decades. Dalisay (1972) wrote that from a high 9.8 percent yearly increase in the volume of the country's agricultural output during the period 1950 to 1954, growth rates went down to 8 percent in 1955 to 1959; 4.2 percent in 1960 to 1964; and still further down to 3.3 percent during the period 1965 to 1969.

Paris (1971) supplemented this with the following observations:

Partial and total productivity indices for 1948 to 1967 show that total agricultural output increased from 56.7 to 123.3 or an average annual rise of 4.2 percent. The index of total inputs increased from 61.0 to 124.2 from 1948 to 1967, or an average annual growth rate of 3.8 percent. There was a slight increase in productivity for the whole period, estimated at 8.8 percent. However, most of the increases occurred during the earlier periods especially from 1948 to 1955. The high growth rate during the earlier period was ushered by the fast pace of the Philippine government's reconstruction activities, the post-war accelerated demand for Philippine crops by the United States, and the unabated increase in cultivated land.

Growth rates of agricultural income were likewise on a downtrend, averaging 13.5 percent during 1946 to 1949; 5.4 percent during the 1950s; and 4.0 percent during the period 1960 to 1969. Since the decrease in growth rate correspondingly signifies our inability to derive maximum income from agriculture, there are serious implications on the rural economy, with more than 70 percent of the Filipinos engaged in agriculture (Tanco, 1970) and about 75 percent of the population dependent on

income from agriculture (Quintana, 1970). The bulk of the population thus faces a rather bleak future based on income trends unless measures to increase farm productivity and consequently farm earnings are pursued.

Liao et al (1968) pointed out that the major problems of Philippine agricultural production are: usurious financing by middlemen, tenancy problems, irrigation, lack of capital and proper incentives, and inadequate research studies or inefficient dissemination of research results. Marketing problems also hinder the progress of agriculture and among them are the feeder roads linking farms to the main road, inadequate storage facilities for perishable crops, insufficient distribution centers, lack of product standardization, and low prices.

Agricultural production in the Philippines also faces problems that have sociological roots. Paulino (1967) cited the existence of a social structure which tends to limit agricultural productivity and hamper the growth of the rural sector of the economy as one of the primary problems that have challenged agricultural development planners in the Philippines. He said, "Traditional attitudes in the rural areas have affected the implementation of agricultural development plans in the Philippines to no small degree. The natural resistance to change age-old farming practices requires additional efforts for education and extension. The value placed on leisure and the tendency to overuse resources during family and community occasions have contributed to the less than desired level of farmer participation in agricultural programs for increased productivity and for land reform."

The present predicament of the Philippine national economy, particularly that of the rural sector, is a case for thorough development

planning, which Dalisay defines as:

... an attempt to facilitate the mobilization of scarce physical resources together with scarce human talents for the development and growth of the national economy... concerned with the intervention of the public sector in the activities of the private sector, thru positive development and other policies designed to promote growth and change-toward desirable goals in social and economic development. More important, perhaps in the light of common strivings towards national identity is the concept of enterprise viability, based on the completion of the elements in a triangle of private enterprise development and generation of the ever-widening circle of productivity, social stability and national growth.

At this time Philippine government has drawn up priority and development targets to accelerate the growth of the country's rural economy. But development planning is not by any means a unique concept in Philippine development. Attempts at country-wide programs had been initiated by various planning commissions during the earlier stages of the development of the country. The first such attempt was made in 1934 by the Philippine Economic Association, which indicated the major problems then facing the Philippine economy, suggested appropriate measures for their solution, and delimited the problems for further study and research (Sandoval, 1965).

Set up in 1937 was a joint committee of Filipino and American experts who were asked to formulate recommendations for the transformation of the Philippine economy from a colonial economic status to an independent one. This committee's recommendations were far-reaching and could have proven fruitful for the national economy but for the outbreak of World War II.

A steady stream of plans came after the war. The first ones (Joint Philippine-American Finance Commission Report and Recommendation 1946, Hibben Plan - 1947, Feyster Industrial Plan - 1947 to 1951, and

Cuaderno Plan - 1949) were all aid-oriented. Dalisay (1967) noted that the underlying aim of the programs was the accomodation and effective utilization of foreign materials and assistance and, only secondarily, the mobilization of internal resources for development.

The Yulo Plan provided the government development guides in 1950 to 1954. Unlike earlier plans, it laid emphasis on accelerating agricultural progress rather than industrialization and increasing basic development services.

Succeeding programs became more detailed and comprehensive as well as sophisticated as modern statistical techniques were used. The most recent plans point out priority sectors, tend to adopt an agri-business approach, and devote special attention to the so-called "second-generation" problems or to the areas of food processing, marketing and finance besides intensifying agricultural production. This may give way to the ultimate integration of industries using agricultural raw materials or semi-processed products. The integration of agriculture and industry will not only result in dollar savings or earnings, but will also increase the country's gross national output and per capita income by creating more job opportunities.

Agricultural Development Planning in the Philippines; History and Implementation Problems

Although development planning in the Philippines has been re-adjusted to internal problems and resource scarcities, it still has notable weaknesses such as those mentioned by Dalisay, including the absence of perspective planning, and the highly centralized planning procedure at the national level, i.e. little provision made for regional

and local planning^{1/}. Dalisay also observes that the means of relating physical targets to sources and availabilities of capital funds have not been clearly defined, and planning at the national level, in relation to comprehensive planning, remains largely uncoordinated, i.e. medium-term planning by the National Economic Council (physical planning), Presidential Economic Staff (investment planning), Budget Commission (fiscal planning) and Central Bank (monetary planning) have been loosely coordinated and integrated. It is believed that the current Integrated Reorganization Plans of the Administration would lead to the more coherent operations of the various government agencies

Macaspac (1963) enumerated the obstacles to the satisfactory implementation of national agricultural development programs, as follows:

(1) inadequate government resources; (2) traditional attitudes and practices; (3) inadequate infrastructure and marketing facilities; (4) instability of external markets; and (5) failure on the part of the government to formulate an adequate and integrated system of policies and to undertake measures for the promotion and stabilization of the agricultural economy. These were the same problems that Paulino cited in his anatomy of the problems involved in implementing agricultural plans in the Philippines.

To provide solutions to these problems, Paulino said that the government is tapping financial institutions for support of agricultural

^{1/} Regional authorities have already been created, starting with the Mindanao Development Authority in 1961. It is asserted, however, that even the most advanced of the regional authorities are saddled with the problem of inadequate finances.

projects. Intensified efforts are also being exerted toward effecting better coordination among the different agencies involved in the interdependent activities of the agricultural program; at the rural level, community development projects are showing significant results in meeting the problems brought about by tradition.

I. National Development Programs/Plans

- 1934 Joint Philippine-American Finance Commission Report and Recommendations
- 1947 Hibbon Plan
- 1947 - 1951 Beyster Industrial Plan
- 1949 Cuaderno Plan
- 1950 - 1954 Yulo Plan (laid emphasis on agricultural development; more of a public investment plan rather than an economic program for the Philippines)
- 1950 Philippine Agricultural and Industrial Program (not submitted to the National Economic Council for adoption but was nevertheless used as a guide in programming U.S. economic aid to the Philippines)
- 1955 - 1959 Rodriguez Plan (the first five-year Economic Development Program of the Magsaysay Administration; set as its target a 10-percent increase in national income; introduced an innovation in the Philippine economic planning, i.e. the inclusion of an allocation for social development)
- 1957 - 1961 NEC Economic and Social Plan
(Five-year Fiscal Plan or the First Budget Plan of the Magsaysay Administration; the first attempt to program the fiscal needs and disposition of the government)
- 1958 - 1962;
1959 - 1963 Updated Five-Year Fiscal Plan
- 1960 - 1962 Loecin Plan (revised NEC Three-Year Program for Economic and Social Development; it carried out detailed sectoral development programs and specific production goals, thus differing from previous programs)

I. National Development Programs/Plans (Cont'd)

- 1962 - 1966 Five-Year Integrated Socio-Economic Development Program
- 1963 - 1967 Macapagal Plan
- 1966 - 1969 Marcos Socio-Economic Program
- 1967 - 1970 Four-Year Economic Program (goals included achieving a growth rate of 6.2 percent for the Philippine economy; land reform projects were given priority)
- 1970 - 1973 Four-Year Development Program
- 1967 - 1970 Four-Year Development Program
- 1971 - 1974 Four-Year Development Program (expected to continue the "Green Revolution" that was started with rice, to bridge the protein gap, and to expand exports of both traditional crops such as yellow corn, sorghum, cornstarch, poultry, eggs and pork)

The programmed target is an increase in the national income of 6.25 percent annually, or specifically a raise in the sufficiency ratio for foodcrops from around 85 percent in 1969 to 95 percent by 1974; for livestock, from the per capita consumption requirement estimate of 45 percent to 64 percent; for fishery, from an estimated 71 percent to 93 percent; and to expand wood production by 2 percent.

- 1963 a. Land Reform Program
- b. Land Development Program - Land Classification and Soil and Water Management of the Bureau of Soils.

II. Regional/Sectoral Programs

- 1968 Central Luzon Integrated Agricultural Development Program (aimed to meet tenancy problems, combat lawless elements, raise per capita income and employment levels and introduce improved farm practices)
- 1972 a. Central Luzon Rehabilitation Program - Development Council/NEC Matisayon (a special integrated program for Cotabato)
- b. NFAC Ilocos Feedgrain Program
- 1972 a. Reforestation Project of DANR, the National Youth and Manpower Council and Coordinating Council of Wood Association (designed to replant 100 million trees, over the 40,000 hectares Pantabangan Water used in Nueva Ecija)
- b. Candaba Swamp in San Fernando, Pampanga
- c. Nueva Ecija Land Reform Integrated Development Program (NELRIDF)
- d. BIDECC Four-Year Socio-Economic Development Program

III. Others

1965 - 1970

Five-Year Program of the Agricultural Productivity Commission (APC) (expected to effect a higher farm production thru the expansion and improvement of existing irrigation systems and their subsequent turn-over to cooperatives for effective management, maintenance and control when developed)

1967

- a. ICPCC Integrated Drier Program
- b. World Food Program (carried out in developing countries by the Food and Agriculture Organization of the United Nations; aimed at providing farmers foodstuff such as corned beef, luncheon meat, processed cheese and dried skim milk at a very nominal cost)

1970

NFAC Feed Grains Program
(aims to meet the estimated need of 1.34 million cavans of yellow corn and grain sorghum for the first half of 1970-71; to attain self-sufficiency in soybeans in 1976 or earlier, to stabilize farm prices, to promote continuity of increased production thru improved yield and market conditions and soybeans exportation after meeting local requirements)

Philippine Agricultural Development and Growth: A REVIEW

Rice and Corn

Rice. It is understandable that the bulk of research studies should be concentrated on rice as it is the staple food item of about 80 percent of the Filipino people (Drilon and Goldberg, 1969). Some 3 million hectares representing 40 percent of the country's usable land are devoted to rice while about 60 percent of the labor force are located in rice-producing areas, and more than 15 million Filipinos depend on the industry as their main source of livelihood.

The country's rice production during the 1950s and towards the tail-end of the 1960s was considered one of the lowest in the world (Bratton, 1954) and our rice yield of 28 cavans per hectare was considered poor (Lawas, 1968), particularly when compared with Thailand's rice yield of 35 cavans per hectare (Swangwatana, 1969). Our rice yield barely reached a third of Japan's (Cook, 1961) and trailed those of Formosa, Indonesia, Burma, and the United States (Maulit, 1967). Rice importations were continuously made during this period. Statistics from government offices show that except during the year 1959 (when there was a huge surplus carried over from the 1958 importation), we have been a consistent rice importer.

From the observation made on a long-term basis for a period of about half a century since the early 1900s, Ona and Hsieh (1966) noted that the unit yields of both rice and corn have been maintained at a

stable level without significant improvement. Significant increases during this period had been due to expanded hectarage.

Concentrated government efforts to provide the necessary farm facilities, inputs and services have effected significant gains in Philippine cereal production. Whether or not these increments have enabled the country to be self-sufficient in rice at one time or another is still debatable.

Banogon (1959) claims that since the second world war, the Philippines has been self-sufficient in rice "for only three years - 1953, 1957, and 1959 - when domestic production exceeded normal consumption."

The Food and Agriculture Organization (1970) noted that having reached self-sufficiency (underscoring ours) at the end of the four-year program for 1967-1970, the Philippines is entering the second program with a paddy production target of 6.66 million in 1974. It intends to cover the present irrigated area of 860,000 hectares with HYVs by 1973. To avoid surpluses, sub-marginal lands are to be diverted to other crops during the first and second years of the program.

At present, a continuous importation of rice from the United States, Japan, Thailand and China is being made to meet domestic needs. The large volume of our 1972 importation has been made necessary by the bad crop in 1971. The poor rice yield in 1971 may be traced to a number of reasons, foremost of which are the peace and order situation, followed by diseases, which destroyed a considerable portion of the rice crop. Still further, there were typhoons which hit the rice areas, particularly portions of Central Luzon and Quezon Province, and, as a coup de grace, "the after-effects of the floating exchange rate" (CRC, 1972).

Corn. Importation of corn, the staple crop of 21 percent of the Philippine population and a major feed ingredient, are still being made. USDA projections had it that 291,000 cavans of corn were to have been imported in 1967, and 478,000 cavans in 1968 (RCA, 1967). Although corn production increases from year to year, the increment is mainly due to expanded hectarage. The average corn yield per unit area in the Philippines is still one of the lowest in Asia.

Problems in production. Shortages in corn and rice production are attributed to under-production and inefficient distribution. The root cause of low cereal output may be traced to tenancy problems, lawlessness, tungro, worms and downy mildew, lack of modern farm implements and necessary farm inputs such as fertilizers, insufficient finances, adverse weather conditions, small farm size, inadequate technical expertise and insufficient irrigation facilities. This last - irrigation - is particularly an important aspect in production since it is an infrastructure requirement in agricultural development (Wickham, 1972).

The marketing problems of the rice and corn industry, on the other hand, include the lack of mechanical dryers and warehouse and transportation facilities, erroneous grading and classification, inefficient cooperatives and inadequate credit (Anao, 1950). Low prices for their produce are also among the problems faced by rice and corn farmers.

The same problems were observed by Antiporda and Huelgas in their 1971 study on corn production and marketing in Cotabato and Bukidnon, who wrote that

...corn production and marketing in Cotabato and Bukidnon are beset by technical and economic problems... (technical problems) low physical productivity of the farms, incidence

of pest and disease and lack of expertise and information on corn production. The economic problems include the lack of capital for financing the enterprise and the absence of feeder roads and trading storage facilities.

Still another reason cited for the low cereal output is the lack of proper legislative support. Montelibano (1964) asserted that the main reason for the constant and increasing deficiency in the country's production and supply of staple products has been the adoption of wrong economic policies. Maulit (1967) also indicated that government assistance in the form of price support is a failure, being itself basically much more political than economic.

Congress passed price support laws to stabilize the rice and corn industry. The enactment of these laws entailed the establishment of regulating bodies, the first of which was the National Rice and Corn Corporation (NARIC) under R.A. 663. NARIC followed a program of regulating supply and stabilizing price by maintaining buffer stocks and authorizing cereal importations.

NARIC, as some authors indicate, was not too popular among farmers. Tiongson and Corcolon (1963) said that while farmers recognized the convenience of trading with the government agency in terms of the favorable prices NARIC offered, they preferred to trade with private dealers because of delayed payments inherent in dealing with government agencies.

In addition to the above limitations of the rice agency, Arzadon (1960) wrote that

NARIC lacks facilities such as moisture tester and grain dryer, for conditioning the grain. Even the piling of rice sacks in 44 maldistributed NARIC warehouses was apparently done improperly, causing undue rice spoilage.

Labadan and Visdo (1959) added that

...general conditions in NARIC warehouse favored the rapid multiplication of various pests....

NARIC was replaced by the Rice and Corn Administration (RCA) with the enactment of R. A. 3452, otherwise known as the RCA Charter (later amended by R. A. 4653). RCA pursued the same objective sought by NARIC, i.e. stabilizing the prices of palay, rice and corn and corn grits. It also followed the procedure of regulating prices by absorbing from the market seasonal surpluses of the cereals during harvest and unloading them during the lean months. RCA was guided by the following policies: (1) price support for palay of at least ₱16.00 a cavan kilos gross, clean and dry, F.O.B. nearest RCA center, (2) price support for corn of not less than ₱13.00 a cavan of 56 kilos, clean and dry, F.O.B. nearest RCA; (3) sale of rice recovered from the palay purchased by RCA at ₱1.40 a ganta for the ordinary variety, and higher prices for better varieties; (4) sale of corn grits at no more than ₱0.80 per ganta; and (5) institution of the quedan system of procurement requiring the purchase of palay and corn grains by the RCA through payment against warehouse receipts.

RCA's initial implementation of the price support law for palay and corn was apparently effective. The average price of palay throughout the country increased from ₱13.50 in 1965 to ₱17.40 a cavan in 1966 when it maintained a floor price of ₱16.00 for the cereal. Similarly, the price of corn increased from ₱10.00 in 1965 to ₱12.00 in 1966 and further up to ₱13.00 in 1967. These increases led to higher palay and corn yield and consequently to greater farm income. RCA reported that

...increased farm income resulting from increases in

producing based on 1965 figures amounted to ₱153 million in 1966 and ₱305 million in 1967.

The price of palay was pegged from ₱12.00 to ₱16.00 per cavan as per the Price Support Law which was passed in March 1966. This was later changed to ₱25.00 and further up to ₱27.50. That of corn was changed from ₱9.00 to ₱13.00 a caven.

RCA's over-all operations were also considered a failure. So was the government price support program, its failure partly due to its limited funds for palay procurement. Dalisay (1968) commented that the Philippines' price support on rice as a policy draws criticism because of insufficient funds to purchase more than a token amount of rice at the support level; this observation was also made by Alix (1972).

Corpuz (1971) elaborated on this as follows:

Price support schemes benefit farmers in proportion to the quantity of output they sell to the price support agency. Since most price support agencies have limited procurement funds ... the bulk of the purchases often are supplied by the big farmers since such agencies also have to minimize their handling and administrative costs. The small farmers are, therefore, often not benefited at all, although they are generally the intended beneficiaries when price support legislation is being considered.

The brief history of RCA showed that like N/RIC it operated at a loss. Some factors that placed RCA deeply in debt are the following: (1) RCA's policy of subsidizing rice importation; rice was sold at a loss of ₱0.83 per ganta in 1965; and (2) RCA's vulnerability to undesirable transactions.

RCA was abolished recently following a special order of the President, its functions taken over by the newly created National Grains Authority (NGA). The NGA has executive backing for its direct-purchase plan for farmers and for its other programs. In support also of NGA.

programs, the Philippine National Bank is intensifying its commodity loans for palay stocks, and is undertaking the financing of a loss-safe system of storage.

Another law that ensures the promotion of the welfare of Filipinos engaged in the production and distribution of rice is R. A. 3018, otherwise known as the Rice and Corn Nationalization Law. The law sets aside ₱50 million in DBF funds to be loaned out to rice and corn millers, processors, and others engaged in the marketing of the cereals.

Legislative supports were coupled with the implementation of priority programs designed to step up cereals production. The Rice and Corn Self-Sufficiency Program, programmed for fiscal years 1967 to 1970, specifically sought to increase rice and corn production by 7.5 percent in 1967; 15 percent in 1968; 22.5 percent in 1969; and 30 percent in 1970. The means to be utilized in accelerating the growth rate of the country's cereal output under the program are: (1) the establishment of floor prices for paddy rice (palay) and corn; (2) construction and repair of irrigation systems; (3) HYV dissemination; (4) proper soil management and fertilizer application; (5) control of pest and disease; (6) extension of adequate credit to rice and corn farmers; (7) infrastructure development to ease marketing difficulties; and (8) conduct of researches. Since 1952, researches on rice and corn have been concentrated on varietal improvement, cultural management and crop protection.

Another cereals production program is the Feedgrain and White Corn Program of the National Food and Agriculture Council (NFAC), programmed for fiscal years 1971-1974. Among the objectives of this program are: (1) to satisfy the increasing demand of white corn for human consumption.

and for industrial uses, and (2) to produce enough yellow corn, sorghum and soybeans for the feed requirements of the livestock and poultry industry.

Program implementation problems. Hsueh (1968) listed the socio-economic factors associated with the implementation at the farm level of rice production program as follows: irrigation water; divisible physical inputs, extension-education service, credit institutions and incentives, farmers' characteristics, and communication and institutional arrangement.

Coconut

Coconut production grew rapidly at an annual rate of 35 percent just after the war, declining to seven percent at the end of the 1950s and even in the 1960s (Caramacion, 1967). Nyberg (1968) said that the long-term growth rate in coconut production from 1911 to the mid-1960s was about 5 percent per annum. This was accounted for almost entirely by expansion in the use of traditional inputs -- land and loan. Hicks and McNicolls (1971) reported that the long-term growth in yield during this same period was less than one percent per annum, much of this yield due to the shift in geographical distribution of trees from Luzon to the higher yielding regions of Mindanao. Decreases in coconut yield were caused by the occurrence of typhoons, kadang-kadang infestation, use of primitive processing facilities and crude production methods at the farm level, inefficient domestic marketing system that gives the farmers less than 70 percent of the value of their produce, inadequate credit and even the lack of a well-coordinated coconut development program. Coconut farmers interviewed for a particular study stated that

they rarely resorted to covercropping, green manuring, fertilizing, cleaning and pest and disease control (Dionglay, 1968). Abella (1967) set the growth rates of copra and coconut oil productions as follows:

During the pre-war (1920-40) period, production of copra increased by 3.15 percent and then at an even faster rate of 4.25 percent during the period covering the years between 1949 and 1965. Production of coconut oil, on the other hand, increased by 9.49 percent from 1946 to 1965, more than double the rate of copra production for the same period.

To boost coconut production, the government has launched coconut rehabilitation programs in 26 leading coconut-producing provinces. It is designed to replant old and devastated coconut plantations, open new ones, and set up demonstration plants in strategic areas which will serve as show-windows on proper coconut culture and maintenance (BFI, 1971). The establishment of a coconut research and breeding center in Zamboanga City is expected to hasten the development of the coconut industry. The Coconut Coordinating Council (CCC) has likewise come up with a program that involves massive research in improved production techniques, processing and marketing of coconuts. CCC will deploy trained farm management technicians and research teams to assist farmers in using the scientific method of germinating seednuts known as the "polybag" system. It also plans to put up 2,400 propagation nurseries in 600 municipalities.

Abaca

The present state of the abaca industry in the country indicates a retrogression when its production rates are viewed. The National Institute of Science and Technology (1970) noted that abaca production has largely decreased after World War II. In 1960, abaca production was 747,076 bales, some 555,027 bales shy of the total crop yield in

1910 to 1940.

The abaca industry faces several problems. In the Bicol Region, abaca growers get low prices for their produce. This may have stemmed from the tight money situation in the area. In Mindanao, the market for abaca has been partly saturated by synthetic fibers. So with the world market which has been increasing its sisal consumption (Anon., 1971).

Four problems in particular limit the expansion of abaca production: first, the prevalence of mosaic and second, occurrence of typhoons which have destroyed potential larger harvests and have discouraged farmers especially in the Bicol area; third, antiquated production methods; and fourth, poor marketing facilities.

Fisheries

Fish catch in the Philippines has been small despite the vast fishery resources that abound in the area. Although Philippine fishing resources consist of 166 million hectares of marine water (coastal and offshore), one million hectares of fresh water (lakes, rivers, swamps, paddy fields, etc.) and 500,000 hectares of brackish water swamps, we had to import roughly 50,000 metric tons of fish worth ₱10 million in 1967 to meet local consumption needs. Recorded production for the period was only 746,000 metric tons and clearly highlights the under-utilization of our fisheries resources. Mans (1968) also revealed that our marine water covers approximately 166 million hectares, of which only the coastal and the immediate offshore areas are utilized for fish production; "... we have one million hectares of inland bodies of fresh water that are potential areas for fish production of which

only about 40 percent has so far been exploited and ... about 500,000 hectares of swamplands which could be converted and developed into fishponds...

Several reasons can be cited for the low productivity of Philippine waters. One of them is that although the Philippines has an extensive coastline of 11,000 miles with numerous protected anchorage, the continental shelf around the several islands is narrow. This physical geography has limited the productivity of Philippine marine areas (Iuna, 1965).

Tobacco

The fullest potential of the Philippine tobacco industry has not been developed due to several reasons. Traditional practices in tobacco culture still persist, thus leading to the harvest of poor or low-quality tobacco leaves. Street (1963) observed that the tobacco industry in the country has been intrinsically enmeshed in politics, to the detriment of the industry in particular and of the country in general.

To help develop and stabilize the industry, the Philippine government instituted a system of price guarantees and direct purchase from the farmers - a system known as the Tobacco Subsidy, but Street further claims that this, too, failed in its objectives.

The Philippine Tobacco Administration (PTA) which had been assigned the task of implementing the tobacco support policy of the government (R.A. 1194) was the butt of criticism for some time. Comments centered around the delayed payments of the tobacco levels purchased and the poor schedule followed in crop procurement. In spite of the lower prices private dealers offered for their tobacco crops,

farmers chose to deal with them because they received immediate payment in cash.

The failure of the FTA to carry out the tobacco stabilization program prompted the government to stop the tobacco subsidy, but it should be noted that earlier moves to abolish the FTA had been opposed by the farmers themselves. Tobacco farmers were assured of a higher price for their produce by the FTA, mainly because it wanted to compete with other tobacco buyers. A higher tobacco price and a ready market though were found to have disincentive effects on production. Farmers were certain of a market for their crop irrespective of class. Thus, they did not exert efforts to improve the quality of their produce. This loophole gave birth to a proposal to restrict the auction flow system of marketing leaf tobacco to the first two grades to improve the quality of the crop and maintain it on a competitive level.

Fruits and Vegetables

The Department of Trade and Tourism (formerly the Department of Commerce and Industry) has noted a growing consumption demand for fruits and vegetables in the country, spurred mainly by the expanding requirements of a rapidly increasing population. The lucrative export markets for preserved fruits and vegetables also add impetus to the development of the industry. The Presidential Economic Staff (PES) mentions at least 13 Philippine fruit and vegetable processors who have an aggregate consumption capacity of about 131,700 metric tons annually based on an eight-hour shift. DTT further reports that although fruit and vegetable production has been on the uptrend in recent years, no surpluses in production occur.

What hinders the expansion of the fruit and vegetable industry? Insufficient transportation, marketing and storage facilities have discouraged farmers from venturing into large-scale production. The problem of inadequate technical expertise also confronts fruit and vegetable growers. Comdas (1960), speaking on the production methods used in Baguio, commented that the cultural methods used locally are not as advanced as those used in other fruit-growing countries.

Comdas said further that the development of vegetable processing as an industry has been hampered by the lack of capital and skillful technicians, fluctuating prices of fruits and vegetables, increasing prices of packaging materials, and difficulties encountered in importing needed machineries, among others.

Mango. The National Food and Agriculture Council (NFAC) has developed a program for the promotion of the mango industry in Guimaras Island, Iloilo, with an eye at its export potential. Among others, its operating plans revolve around the establishment of modern systems or methods of commercial mango production, production of an adequate supply of mangoes, and the organization of mango producers and exporters into cooperatives.

Banana. Extensive studies on the type and quality of banana fibers, have revealed that banana fibers equal if not better Manila Hemp in quality. Banana fibers are not only good for processing into valuable pulp and paper products but are also good for manufacturing twine, rope, sacks, heavy packing fabrics, mats and rings.

A preliminary investigation of the Mindanao area has indicated that there is a large quantity of good banana land available for cultivation.

Its development is economically feasible and would find welcome among both private and government sectors. Although private investment on the banana industry has been heavy, the government has not stopped its efforts at further developing the industry. The banana export trade is currently flourishing and the BFI has been particularly unstinting in its assistance to the various sectors making up the banana industry.

Citrus. Citrus has been an established crop in several areas in the country. Mindanao and Batangas are known for their large citrus plantations and citrus is also grown in other places. A major problem of the industry has been disease. The Bureau of Plant Industry (BFI) has begun a citrus budwood certification program in the Bicol Region. The program aims to assist nurserymen and growers in the propagation of virus-free citrus trees.

Pineapple. The Research and Planning Board (1969) of the Office of the Governor, Daet, Camarines Norte said that the pineapple industry of the region faces a bright future. The place has ample lands available for increased pineapple hectareage. Pineapple is also grown on a wide commercial scale in some areas in Mindanao.

Tomato. Caibigan (1971) showed that tomatoes are marketed haphazardly in Calaca, Batangas. Farmers are often forced to sell their produce at low prices to wholesalers because of cut-throat competition, transportation, storage and road problems, and lack of proper grading and standards. In Cebu, tomato farmers in southern towns plant an off-season crop of giant tomatoes to avail of the seasonally high prices

prevailing. Tomatoes grown in the Mountain Provinces are considered comparable to those grown in temperate countries, but they also face marketing problems.

Sorghum. Sorghum, a dry-season crop, may be planted side by side with tobacco. It is a satisfactory substitute for corn in feed mixture. Thus, its cultivation is being encouraged. The Four-Year Development Program for fiscal years 1972 to 1975 proposes the planting of sorghum in areas where established feedmills exist, as in the Ilocos Region, Cagayan Valley, Central Luzon, Southern Tagalog, Bicol, Iloilo and Cotabato.

The low level of sorghum production can be attributed mainly to the uncertainty of the market for this crop and the lack of information on the proper cultural practices which sorghum requires (DTI, 1971).

Soybean. Corcolon (1971) said that the total soybean domestic production was up during the period 1959 to 1962 but gradually slid down during the years 1963 to 1968. Large volumes of soybean imports were made in 1963, 1965 and 1966, amounting to 11.5, 11.7 and 17.0 million kilos, respectively. The 1968 importation for soybean amounted to only 594,900 kilos.

The current annual consumption of feedmills amounts to 65,000 tons which is the production equivalent of 40,000 hectares. This is exclusive of the needs of small-scale factories producing protein-rich foods such as soybean, tahuri, tausi and tokwa. Under the NFAC Feedgrains Program for fiscal years 1971-1974, self-sufficiency in soybeans is projected to be attained in 1976 when about 86,400 hectares will have been planted to the crop.

Corcolon further said that more efforts must be exerted towards the promotion and improvement of the soybean industry. More information on better yielders among the available soybean varieties should be disseminated in regions where the crop is already grown extensively. At present, research on adaptable and desirable soybean strains of soybeans is being done at the University of the Philippines in Ios Baños and in various BFI stations. UPCA recently released CES 486, a high-yielding strain of soybean which can produce two tons per hectare.

Livestock and Foultry

The supply of livestock and poultry available locally has lagged behind nutritional requirements. The supply of poultry meat, according to Madamba (1969), was only 42.2 percent of sufficiency in 1969; pork, 77.4 percent; beef and other kinds of meat, 52 percent; milk, 1.7 percent; and eggs, 71.5 percent. This explains why the country has been spending a substantial amount for the importation of beef and milk. Miller (1969) said that the Philippines... spends almost ₱20 million annually for imported beef.

Production. Like any other farming enterprise, livestock raising has been subjected to technical deficiencies, management inefficiency, inadequate credit, absence of tropically suitable dairy breeds, and increasing cost of animal feeds. Madamba (1970) said that full utilization of all available resources in the country can produce 13,380,000 animal units or 16,057,080 head of cattle and carabao at the extraction rate of 35 percent and an average carcass weight of 150 kgs. This would be equivalent to an annual beef production of 843 thousand metric tons.

The Food for Freedom Program, a NEC -USAID Pilot Project, was

initiated in 1968 to improve the production of livestock and feedgrains in the Philippines. Feedgrain production was also intensified with the adoption of the feedgrain program which provided for the establishment of feedmills in strategic places, e.g. in Northern and Southern Mindanao, Cagayan and the Bicol Region where corn is being produced as the principal crop. Added to this is the incentive given by the Board of Investment (BCI), in the form of its Third Investment Priorities Plan, specifying corn and soybeans as preferred areas of investment. The development strategy for the livestock and dairy industries includes the implementation of a national artificial insemination program for cattle, carabao and swine with the use of quality frozen semen. This is a faster and cheaper means of upgrading the Philippine breeds of livestock.

The Dairy Training and Research Institute (DTRI), in line with the efforts of the government to increase the country's meat and egg production, carried out a research pilot project on milk collection. The Los Baños Milk Collection Scheme had the following objectives: (1) to tap as much milk as possible from carabaos; (2) to improve the milking capacity of native carabaos thru the upgrading of Murrah buffaloes; (3) to pay a reasonable price for raw milk to the carabao owner; and (4) to sell processed milk at a reasonably low price to the consumer.

Marketing. Livestock and poultry production face marketing problems. Inefficient distribution is attributed largely to lack of storage, processing and transportation facilities, the lack of grading standards and measures in some places and their inefficient enforcement in others has been detrimental to the farmers.

The lack of storage facilities in the Greater Manila Area is, however,

not critical. Filipinos are generally prejudiced against chilled meat, as a result of centuries of practice and custom. Meat, thus, is marketed warm in Manila. The available chilling facilities are utilized to store animals slaughtered in excess of the daily requirement.

To safeguard public health, Manila Ordinance 4739 was passed prohibiting the sale of meat of illegally slaughtered animals and to hold those responsible for the act criminally liable. But generally, legal action is resorted to only in cases of inveterate violations and where large quantities are involved.

Losses are also incurred by the livestock industry from the non-utilization of slaughterhouse by-products like offals and condemned carcasses. In Manila, alone, the Veterinary Inspection Board (VIB) in 1964 condemned at least 41,555 kilos of carcasses and other slaughter by-products, 47,514.7 kilos of renderable materials such as confiscated "hot meat," spoiled meats surrendered by the various cold stores in the city, and confiscated fish and fish by-products. These raw materials, if processed by derendering would yield 23,700 kilos of meat and meat products and 11,880 kilos of tallow worth ₱10,309.50 and ₱29,700, respectively. A derendering plant will then be of inestimable value.

Seed Distribution Program

Seed certification in the Philippines started in 1957 but turned out to be a failure in 1966 when less than one percent of all seeds required were certified (Beachell et al, 1968).

Tomaso et al (n.d.) give a more detailed discussion of the seed certification program of the Bureau of Plant Industry (BPI) as follows: "In 1960, an increase in the volume of certified seeds was noted. This

indicated that more and more farmers are learning to use the recommended seed varieties. In 1964-65, however, the volume of seeds distributed as well as the number of farmers using these seeds dropped. Probably this was due to the sudden increase in the price of these seeds. From 1960-61 to 1963-64, the price of foundation and registered seeds was ₱13.50 per cavan and that of certified seeds, ₱12.00. In 1964-65, the price rose to ₱25.00 per cavan of foundation seed."

This certification program has been revised, this time with the private sector of the economy assuming a major role in maintaining the supply and distribution and in promoting the use of certified seeds in cooperation with several government agencies.

Honrado (1961) notes that significant improvements in rice and corn seed production in the Philippines have been attained, but there is yet no systematic seed production and certification program for vegetables and other legumes. This was supported by Celestino (1968) who observed that vegetable seed production under local conditions has not been sufficiently studied. Obviously, what has been done so far is only a scratch on the surface, especially on those relating to improvement through breeding and through better and more efficient cultural techniques. Other aspects, like the techniques of maintaining genetic purity and producing disease-free seeds and seed plants, remain untouched. Celestino added that as of 1968, no single enterprise in the Philippines specialized in the production and distribution of seeds to vegetable growers. Most vegetable seeds used in the Philippines are imported, mainly from Japan, the U.S. and Taiwan. Very few business concerns are engaged in vegetable seed importation and only as a secondary business. Some government agencies also often import a limited amount of vegetable seeds normally dis-

tributed through farmers' cooperatives. Since seed importation is usually limited they are often expensive.

To boost the seed program, Honrado further said that experiment stations and seed laboratories should be established; training on seed technology undertaken; seed selection, hybridization carried out and maintenance of seed purity and seed production and distribution certified by government institutions. The International Rice Research Institute (IRRI) has contributed much to rice varietal improvement, IRRI's breeding work on japonicas, indicas and japoni-indica crosses having resulted in the discovery of IR8-288-3, now known as IR8.

Dissemination of HYV

In the monsoon tropics, the Philippines so far seems to be the greatest beneficiary of new technology with about 40 percent of its rice area (1.3 million out of 3.2 million hectares), planted to high yielding varieties during the 1969-70 crop season. Barker and Quintana (1968) provided a higher estimate of the spread of HYVs in the Philippines with their claim that approximately one-half of the rice-growing area is at present planted to fertilizer-responsive varieties. High yielding varieties (HYVs) of rice were first introduced in the Philippines in 1966, and the first (IR-8) of these had at first been regarded with skepticism.

IRRI has adopted the minikit concept of distribution of HYV seed. The minikit was developed to allow a large number of typical rice farmers to evaluate "new and improved" strains in their own field before they are officially released as varieties. It contains the recommended fertilizer rates for the new rice strains plus needed granular and

sprayable insecticides and herbicides and mimeographed sets of instructions on proper cultural practices. IARI (1969) reported that while some operational problems were found, it was severally agreed that the mini-kit concept was valid in that farmers were able to recognize "superior" selection of varieties when given the chance to observe them on a day-to-day for a full season.

At this time, indications are that the gains in the use of HYVs have been below the expectations of scientists and policy-makers. Crisostomo and Barker (1971) talk of this as follows:

... yielding contribution alone to annual output has been about two percent per annum between 1964 to 1966 and 1968 to 1970. The figure combines the effect of a yield increases of 18 percent (for four years) on irrigated lands planted to the high yielding varieties with a much lower yield gain in other areas. In addition, it must be recognized that the expansion of irrigated area as well as the decline in non-irrigated area may have been the direct result of the introduction of high yielding varieties. It is impossible to consider these effects independently and therefore impossible to say precisely how much of the 4.5 percent growth rate should be attributed to high-yielding varieties. Nevertheless, it is also clear that the yield gains have not come up to the expectation of scientist and policy makers alike.

This contention is supported by Ishikawa (1970) who said that the yields per hectare of IR-8 in the farmers' fields (particularly in Central Luzon) are much lower than those attained in the experimental fields at the IARI and propagated throughout the country and even abroad, which showed the potentiality of HYV yield of 7 tons (in wet season) to 9 tons per hectare (in dry season). Model yields in Central Luzon appear to be around 4.4 tons.

Crisostomo and Barker further state that a separate set of government statistics on rice released by NFAC is at variance with the above findings. In October 1971, it was reported that the yields of HYVs

continued to average about double those of the traditional varieties. These estimates are not based upon normal statistical sampling procedures. Furthermore, if these estimates were reliable it would follow that the Philippines would be exporting large surpluses of rice instead of importing in 1971.

Barker and Quintana (1968) found, upon comparison of returns of local and high-yielding varieties, that the yields of HYVs (principally IR-8) were 73 percent above the yields of local varieties (97 cavans vs. 56 cavans). The gross returns, however, were only 43 percent higher (₱1,433 vs. ₱1,000) due to the lower price received from IR-8 (approximately 20 percent below many local varieties). The net returns above cash costs and in kind payments were only 30 percent higher (₱917 vs. ₱704) due to higher cash expenses per hectare for new varieties. However, the adoption of the technology reduced the total cost of production per cavan (₱10.48 vs. ₱14.21). Results of these studies should be reviewed with caution as the authors emphasized that the results reported were from early adoptors of new varieties who are above average farmers with above-average resources. They said that as the new varieties spread to other farms with poorer resources and management, the average yield advantage of new over local varieties will tend to erode. At the same time, the lower priced IR-8 will soon be replaced by other HYVs with superior grain quality.

Whatever the effect of HYVs on productivity, it is certain that HYVs will continue to spread. SEADAG (1970) noted that the "beachhead" in varietal improvement for rice and other food grains has been established. The strength of the production response as evidenced by the initial enthusiasm of Asian farmers, allays fears that there will be a

return to old varieties. Ishikawa (1970) took notice of the enthusiastic response of larger farmers and even non-cultivating landlords, who are transforming themselves into commercial farmers, to the new economic opportunities created by the innovation.



LAND REFORM PROGRAM

LAND REFORM AND LAND USE

Land Reform Concepts/Objectives

Land reform has been defined in quite a number of ways. Some authors limit its definition to a few concepts and/or postulates. Some heavily shift its bearing on particular socio-economic issues while still others give it an encompassing, sweeping definition.

Thomas F. Corral, a participant in the 1954 conference on land problems in Asia and the Far East held in Bangkok aptly stated that land reform means different things to different people. At various times, to a number of people, land reform has separately meant access to land previously denied; putting land to efficient use; a political tool in order to win support and/or loyalty of various classes of people; an important step toward state control; or interference with private property rights; taking land away from someone to give it to someone else. Others view land reform as a wide field of over-all improvement activities such as rural credit and extension services, often embracing the whole field of agricultural development.

Indeed, land reform can be all these. In many ways, it is as broad as the concept of government and its definitions range from the simplest land-to-the-tiller slogan through the generalized large-scale change in existing tenure patterns to the more economic concept of redistribution of agricultural income and earning capacity.

In the Philippines, the most apt definition of land reform seems to stem from the conglomerated political and economic aspirations of the people. Hoselitz (1961) says that the distributional and egalitarian objectives of land reform may at times be of vast political importance, and it is conceivable that in extreme cases, land reform may become a policy measure necessitated by actual unrest.

Cook (1961) made a blunt evaluation of the land reform program in the Philippines in the 1950s when he said that President Magsaysay used it to "undercut the basic appeal of the communist-infiltrated Hukbalahap rebellion in the heavily tenanted areas, and thus made possible the survival of the Republic .

It is not highly speculative to add that President Marcos is at present intensifying the implementation of land reform to quell the recurrence of similar uprisings or infiltrations.

Authors seem to have the consensus that land reform is a potent motivating force for increased farm productivity in the rural sector. Baskinas (1971) says that "land reform . . . generates incentives to produce . . ." Moreover, the acquisition of an economy-sized-farm doubles the farmer's freedom potential as owner-cultivator. Lessees become doubly receptive to improved cultural practices. In the First Asian Conference on Agricultural Credit and Cooperatives held in Manila in 1970, it was discussed that insecurity of tenancy together with high rents and absence of rights over cultivated land pose a serious obstacle to:

- 1) the widespread adoption of intensive agricultural practices and
- 2) the flow of necessary credits and farm inputs. The findings of Hsueh (1968) repudiate by implication the claim that non-ownership of land retards growth of agricultural productivity. Hsueh found that farmers'

ownership of the land they till will not necessarily mean that implementation of the rice production program at the farm level is more likely to take place.

Raup (1968) adds that land reform also provides a new basis for the "identification of reward with effort, of balancing costs against returns." In the present Philippine setting, it indeed appears to be the most promising instrument for social justice. On the other hand, De los Reyes (1972) views land reform as more than mere tenurial change or resettlement; it includes institutional innovation as well.

Land Reform in the Philippines

The beginnings of land reform in the Philippines can be traced to the issuance of Spanish decrees way back in the 16th century. The following discussion, however, is limited to recent developments in the land reform and therefore, begins with the enactment of Republic Act 1199, popularly known as the Agricultural Tenancy Act.

Towards improved landlord-tenant relationships. R.A. 1199 or the Agricultural Tenancy Act of 1954 (amended by R.A. 1263) has been referred to as the Magna Carta for Philippine Tenants (Klotharal, 1956), and as the most comprehensive landlord-tenant regulatory measure in many countries. It primarily aimed at ensuring the equitable distribution of farm proceeds between tenants and landlords, and security of tenure for the tenants rather than provide for the all-out distribution of large agricultural estates. The law was given support by Executive Order No. 67 which authorized the creation of the Agricultural Tenancy Commission (ATC) one month after the approval of R.A. No. 1199. ATC was given the responsibility for educating the landowners, tenants, agricultural

lessees and laborers, and the public on the legal aspects of tenancy and land reform.

Other laws were passed to complement the above land reform measure. The Court of Agrarian Relations (CAR) was established to take charge of tenurial disputes that cannot be solved by the ATC (R.A. 1267); the Agricultural Credit and Cooperative Financing Administration (ACCFA) was created by R.A. 821 to provide farmers with adequate production credit; R.A. 1160 also set up the National Resettlement and Rehabilitation (NRR) which was given the task of resettling tenants from the heavily tenanted areas of Central Luzon to sparsely settled regions, chiefly in Mindanao and Palawan.

These promulgations demonstrate that the government has been fully aware of the measures concomitant to its "land-for-the-landless" program. The government has recognized the need to make adequate provisions for agricultural extension services and credit to the affected tenants.

Hoselitz asserts that instead of looking at land reform as a policy to be carried out once and for all and that will create new situations which forever will remain frozen and inimitable, we should look at it as a general act of continuing policies designed to meet, in the long run, two objectives; equity and efficiency. To achieve these objectives demands rigid implementation of complementary measures; it also entails such support systems as more roads and irrigation facilities, the intensification of extension services supported by a well-coordinated research program and the establishment of more credit, supply and/or marketing organizations.

Hand in hand with the implementation of the land reform law, agricultural extension acquired new dimensions (Magine, 1969). Extension workers

took on the added function of effecting tenurial change besides their usual responsibility of promoting agricultural productivity. The role of the extension worker is of prime importance in the implementation of land reform because the tenant needs guidance in grasping the significance of his newly-acquired rights and responsibilities.

Sacay (1970) referred to the share tenancy system as it exists in the Philippines as one which nourishes paternalistic tendencies among farmers. He adds ". . . that efforts exerted on agricultural extension and credit are almost ineffective in high tenancy areas . . . because share tenants do not have the opportunity and have not been accorded the opportunity to become independent, self-reliant individuals and to develop better managerial skills necessary for increased production and income."

As a corollary to the above, Maulit (1966) suggests that the increase in the dimensions of farmer's freedom calls for corresponding measures to be extended to the lessees or owner-cultivators to help them adapt to the new situation. Dalisay (1972) further observed that developmental and supporting services such as extension, credit and research should now be given not only to selected cultivators but to all those covered by the land reform program.

Tenants' severance of ties with their landlords has brought into light the need for alternative sources of credit. When tenant-farmers turn into leaseholders if not into farm owners, they must necessarily give up a multi-purpose credit line from the landlords or private money lenders.

Towards Leasehold and Owner-Cultivatorship

The carrying out of land reform measures gradually gained momentum

especially with the enactment of R.A. 1400, otherwise known as the Land Reform Act of 1955, which laid the basis for the acquisition of large estates at fair value for resale in small holdings to farmers. The Land Authority was given this function, and the Land Bank of the Philippines was set up to finance the acquisition and distribution of agricultural land. Also created were two land reform agencies under the office of the President, namely: the Land Reform Project Administration and its governing body, the National Land Reform Council, and the Land Authority. As the highest policy-making body involved in the land reform program, NLRRC was provided with general executive direction and control over the entire land reform complex.

The first code of agrarian reform (R.A. 3844 enacted in 1963) has speeded up leasehold proclamation and has laid the ground for owner-cultivation. Estrella (1969) describes this first Philippine agricultural land reform code as ". . . a landmark in Philippine history . . . which in one decisive stroke declared share tenancy as contrary to public policy and provided for its abolition."

R.A. 6389 provided for the automatic conversion of agricultural leasehold subject to minimal exceptions, in effect converting the whole country into a land reform area, although it was only in September 1972 that the entire country was officially declared a land reform area. Prior to 1972, NLRRC approval was required before any portion of our country could be considered a land reform area.

Under the land reform code of 1963, ACCFA was abolished and the Agricultural Credit Administration (ACA) created in its stead. ACA's activities are now synchronized with the objectives of the Land Reform Program.

Land Reform - Success or Failure?

Land reform in the country has three main objectives: political stability, social equity and economic productivity. De los Reyes (1972) writes that the Agricultural Land Reform Code of 1963 and the Code of Agrarian Reforms of 1971 place emphasis on all three objectives. In addition, the 1963 code has the following specific objectives: 1) to establish owner-cultivatorship and the economic family-size farm as the basis of Philippine agriculture and as a consequence, divert landlord capital in agriculture to industrial development; 2) to achieve for the small farmers a dignified existence, free from pernicious institutional restraints and practices; 3) to create a truly viable social and economic structure in agriculture conducive to greater productivity and higher farm income; 4) to apply all labor laws equally and without discrimination to both industrial and agricultural wage earners; 5) to provide a more vigorous and systematic land resettlement program and public land distribution; and 6) to make small farmers more independent, self-reliant and responsible citizens, and a source of genuine strength in our democratic society.

The Code of 1971 adds three main specific objectives: 7) to give first priority to measures for the adequate and timely financing of the Agrarian Reform Program . . . ; 8) to involve local government in the implementation of the Agrarian Reform Program; and 9) to evolve a system of land use and classification.

Just how successful has the government been in meeting the above-mentioned objectives?

On program implementation. As of 1971, the Land Reform Program has been implemented in 21 provinces covering 236 municipalities and municipal

districts. This involves 369,465 farmers cultivating a total area of 1,279,328 hectares. A total of 26,000 farmers entered into lease contracts with landowners. The Land Authority has been administering 20 public land settlement projects covering 423,862 hectares with 27,629 settler-families, 76 agricultural landed estates and 49 residential estates. Meanwhile, the Land Bank has acquired 3,200 hectares of private agricultural estates valued at P13 million.

The land-for-the-landless policy received its greatest boost during the incumbency of President Marcos. In this period, the Bureau of Lands has surveyed 926,631 hectares out of 936,631 hectares of public lands. It has also allocated 443,586 cadastral lots in several cities and municipalities. Of the 239,226 applications it has processed, exactly 172,366 land patents have been issued. Again, these land patents directly benefited more than one million individuals.

Ancillary projects are also being carried out by the NIRC.

- 1) The Magalang Project in Magalang, Pampanga is a joint venture of the government, the Filipino Foundation, Inc. and the Municipality of Magalang, which (project) aims at providing both technical and financial assistance to the farmers covered by the project. It calls for the leasing of 756 hectares of farm land to bonafide farmers for a period of 49 years, renewable at the end of the period. The project aims to establish moshav-type cooperatives (Pomeda, 1970).
- 2) Under the Nueva Ecija Land Reform Integrated Development Program (1971), the United States Agency for International Development (USAID) assists NIRA, NFAC and the provincial government of Nueva Ecija in extending commodity assistance and production

credit to farmers. The ACF has been granted \$20 million for the program under U.S. Public Law 480.

- 3) The Malinao Project in Central Palawan is provided with the necessary materials and technical know-how for the formation of the Malinao settlers' cooperative by four institutions -- the Palawan National Agricultural College, the Palawan Economic Development Council, the U.F. College of Agriculture and the Land Authority.
- 4) The Research Center Special Project will serve as training ground for prospective Muslim and Christian settlers, and for students in Agricultural Technology who apply for settlement with the Land Authority.
- 5) Under the Muslim Development Program, cultural minorities are accorded priority by the Land Authority in the allocation of lots.
- 6) The II-MCCF Project in Agusan del Sur is jointly administered by the Land Authority and the National Council of Churches of the Philippines and will have an implementation period of ten years. The MCCF will provide credit for the acquisition of production inputs.
- 7) Involved in the II-Tarlac Rural Development Project is a total farm area of 1,749 hectares in the provinces of Tarlac and Pampanga. The II-Tarlac Rural Development Foundation will finance and develop: 1) a fruit orchard with intercrops; 2) a feeder cattle project for the production of beef cattle; and 3) a vegetable production project. Complementary projects will be carried out on a long-range basis depending upon their financial feasibility.

Critics of the land reform program point out the slowness of its implementation, which have arisen from flaws in legislation, inadequate financing, administrative problems and tradition.

Legislative loopholes. The first programmed effort to change the tenure structure was made only in 1963. Prior to this legislation had provided mere guidelines on proper landlord-tenant relationship. Mandatory provisions toward leasehold and ultimately toward owner-cultivatorship were only enacted into Law in 1963. In that year also, the functions of the implementing agencies were unified into a coordinating body. The fragmentary approach to inject institutional changes (specifically land reform) set back the implementation of the program, leading to the "misuse and dissipation of manpower and fiscal resources . . . of which the government has never had enough in the first place" (Estrella, 1969).

Sandoval and Geon (1971) enumerated the legal problems as follows: 1) delay in the fixation of rentals; 2) need for a reliable policy on bipartisan basis; 3) need for the establishment of barrio committees and strong farmers' associations; 4) illegal ejectment; 5) the desire to maintain current relations due to long family connection of landlord and tenant and 6) the attempt on the part of the landlords to preserve the status quo by offering credit on easier terms.

Ishikawa (1970) shed some explanation on the illegal ejection of tenants by landlords and the ensuing conversion of landlords to commercial farmers. He wrote that

. . . there is a section providing that when the landlord wishes to cultivate his land personally, he can eject the leaseholders of his land after paying a disturbance allowance equivalent to five years' rental (Sec. 36). There is also a section providing that when the landowner cultivates his land, even an excess of 75 hectares is exempted from

expropriation (Section 51). Therefore, the Agricultural Land Reform Code itself is, though not as its prime purpose, certainly encouraging the landlords to convert themselves to commercial farmers to avoid the possible loss incurred by the Land Reform Program.

He, however, cautions us by saying that land reform provisions cannot be an independent factor inducing the ejection of tenants and the conversion of landlords to commercial farmers, as IR-8 and other modern inputs can do.

Administrative problems. The administrative problems were identified as "competition for staff, massive preparatory work, necessary pre-service training of staff for land reform projects, location of the extension service, proliferation of agencies, and the need to stimulate the interest of provincial authorities in national policies" (Sandoval and Gaon, 1971).

Financing. Sandoval and Gaon said that for a period of eight years, the government appropriated a total of ₱1,499,321,051 for land reform operations, but released only ₱396,092,607 or roughly about 26 percent of the total financial requirements. In the case of the Land Bank, only ₱16,629,898 was released out of a total appropriation of ₱914,129,898. The snailpace acquisition of big agricultural estates for redistribution to the tillers may be traced to the critical financial situation of the implementing arms of the land reform program. The Agricultural Credit Administration (ACA) itself admitted that in the year 1970-71, out of 600,000 tenants and farmers in need of ACA assistance, only 55,600 were extended production and other types of loans or at most a mere 20 percent of the total number of farmers in urgent need of credit. Cruz (1959) sadly noted the government's lack of resources to meet the estimated need

of ₱500 million yearly for agricultural credit through cooperatives. The inability of the now defunct NARRA to finance its newly-settled farmers beyond the first year nor secure credit for them from cooperating credit agencies clearly highlights the inadequacy of government resources to cope with the financial requirements of its program (Cook, 1961).

Tradition. Existing attitudes of both the farmers and landlords have negative effects on the implementation of the land reform program. Hicks and McNicolls (1971) say that landlords wish to preserve a larger share in the management, while most of the tenants probably are not keen on taking over more management functions in order to increase their share of the produce. Farmers may not be interested in assuming the larger share of management necessary to improve their income probably because of communal working habits, spending patterns and family ties.

Automatic conversion of agricultural share tenancy to leasehold thus has serious implications. Sandoval and Gaon commented that while this provision favors the tenant, it may work against those who do not become lessees. In case of their refusal to accept the leasehold relationship, the landowner may proceed with their ejection as provided for in the amendment.

Socio-political aspects. The Magsaysay Program of opening up public lands for resettlement of surrendered dissidents, the landless, the deserving farmers is now recognized as one of the factors which led to the downfall of the Communist-led Huk movement (Estrella, 1969).

Farm productivity. The limited number of studies on the effect of change in tenure on productivity preclude conclusive comments, but there are indications of the positiveness of response to land reform as a result

of improved production techniques. There are two such studies assessing the impact of tenurial change on farm productivity - Sandoval and Gaon's (1971) and Hiwatig's (1971).

Sandoval and Gaon appraised 12 land reform districts in Central Luzon thus -

. . . positive increases in rice productivity per hectare . . . to impute the yield increments mainly to the land reform program, however, is highly dubitable since similar increases have also been achieved in non-land reform areas thru the use of improved technology. Nevertheless, the consistently high increases in yield per hectare achieved by the owner-operators and the lessees supported the hypothesis that owner-operators and leasehold operated farms achieve greater increases in productivity as compared with tenant-operated farms. Also, the increase in production even after the first year of land reform implementation tends to negate the general experience in some countries that production usually declines during the early stages of an agrarian reform program . . . over a period of time, it was noted that both shifters (share tenants who shifted to other forms of tenure) and non-shifters (or share-tenants) achieved increases in productivity per hectare of one cavan higher than the shifters. This comparative performance suggests that: first, the modest increases in the level of productivity by all types of tenure are indicating of a slight change in the level of productivity taken advantage of by the farmers in the program areas; second, the slightly lower productivity achieved by the shifters as compared with the non-shifters might be the reflection of an adverse effect of a complete cut-off in the relationship between the landlord and the share-tenant.

Hiwatig provides a new angle to the effect of tenurial change on farm production. The results of his study indicate that the first batch of lessees under the Agricultural Land Reform Code (R.A. No. 3844, approved on August 8, 1963) had higher rice yields per hectare and per farmer than those lessees who were placed under the code five or six years later. The differences in net income were probably due to the better class of tenants or cultivators who shifted to leasehold and to greater assistance or supervision on the part of the land reform technicians.

Among the lessees who shifted from share tenancy later, the background and experience of the cultivators were rather mixed and there was relatively less assistance and/or supervision from the land reform field personnel.

On income redistribution. Sandoval and Gaon said that the lessees benefited from: 1) the reduction of the rental rate which was fixed at 25 percent of the average production of the previous three agricultural years; and 2) from his non-sharing of the increment of his production with the landowners during the following years since he had to pay a fixed rental. They added that the new lessees were monetizing a larger proportion of their share as compared with the share-tenants.

Land Reform Outlook

Recent developments indicate that President Marcos has knotted legislative and administrative loose ends. With the establishment of an Agrarian Land Reform Special Fund through R.A. 6390, the land program is also assured of vital fund support. This fund also provides for the creation of an Agrarian Special Account to be constituted out of a portion of the proceeds of the stabilization tax being collected under R.A. 6125, as amended. The President has also facilitated the deployment of at least 1,000 farm technicians to rural areas to intensify agricultural extension services. Thus, it appears that the present land reform program is now relatively free of the constraints that used to slow down its implementation.

Land Taxation

Land reform measures embrace land taxation. Mogino (1969) says that agricultural land in less developed countries has been used as the basis

of taxation because of ease in administration. He adds that the subject of equity or justice in taxation is one of the most vexing problems of public finance and one of the hardest to place in useful perspective for policy decisions.

Megino further gives an assessment of land taxation in the Philippines, as follows:

Although the old system of land taxation in the Philippines brought in only five percent of the total revenue in 1960, its economic and financial benefits to the local government are far greater. Land tax per hectare increased from about ₱16.00 in 1952 to ₱32.00 in 1960-62. The income in the low-land rice region was even greater, from ₱17.00 per hectare in 1953-57 to ₱29.00 1961-62.

Land Classification, Disposition and Utilization

The Department of Agriculture and Natural Resources (DANR) reports that of the total Philippine land area of 30 million hectares, 12.6 million hectares or approximately 42 percent have already been certified and released as alienable and disposable lands, while about 8.6 million hectares, or roughly 29 percent have been delimited as permanent forest land. The unclassified land area is 8.8 million or about 29 percent of which some 4.8 million hectares equivalent to 16 percent may be later certified and released as additional alienable and disposable lands.

The area of land for which patents have been approved and issued is 3.7 million hectares. Approximately 2.5 million hectares have been judicially registered. Titles and patents to some 2.6 million hectares of public land are still pending approval. On the other hand, around 1.9 million hectares are under conflict either because they are claimed as private property or they are occupied by squatters.

It may be pertinent to mention that the success of the land reform program is dependent not only on infrastructures and such other factors as education and the like. De los Reyes (1972) mentions that only if strong rural institutions are developed can the implementation and continuity of any land reform program be assured.

Agricultural DIVERSIFICATION

Diversification: Concepts, Definitions

Diversification may refer either to the diversification of individual farms or to the diversification of the agricultural sector. At the farm level, it may take the form of multiple cropping, intercropping, crop rotation and livestock integrated farming operation. On a nationwide scale, the rural economy may either be referred to as a highly diversified economy or a monoculture. The latter may also be used to describe a farm.

Multiple cropping, intercropping, crop rotation and monoculture have each been defined in different ways by several authors.

Multiple cropping. Cheng (1960) referred to multiple cropping as a farming pattern of growing two or more crops successively whether of the same or different kinds on the same piece of land during a single year, e.g. double-cropped or triple-cropped with rice. This is essentially similar to the definition given by Dalrymple (1971) who said that multiple cropping is a regular sequence of more than one annual food or feedcrop both planted and harvested in the course of one year. Bradfield (1966) explicitly said that multiple cropping involves the growing of a wide range of carefully selected upland crops in rotation with rice as the principal rainy season crop. This necessitates following and preceding the rice crop with upland crops using a minimum of lapsed time.

Intercropping. Bokingo (1959) defines intercropping as the planting of two or more crops on the same land in one season, usually a perennial crop with annual crops.

Crop rotation. Hernandez (1956) views crop rotation as the alternate planting of grain, grass or legumes and other cultivated crops on the same area of land through a period of years. This is similar to the definition of crop rotation given by Bokingo i.e., the planting of different crops on the same land in succession.

Monoculture. Bokingo (1959) says that agricultural diversification is a function of two things, namely the number of enterprises and the magnitude of income derived from each enterprise. Thus a farm may consist of one principal enterprise together with a number of supplementary and complementary enterprises but unless these other enterprises are in themselves a direct source of income, the farm is said to be specialized. Otherwise, it is a monoculture farm.

Alix (1972) says that monoculture, on the farm level, refers to the growing of one kind of crop year after year; on a nationwide scale, monoculture implies that a country is heavily dependent on a few key, one or two, products.

Diversification Activities

A number of statements have been issued on the relative merits of diversification. Bokingo (1959) said that it provides for reasonable spreading of risks of crop failure, of low price or of other marketing hazards, and labor and returns. Work et al (1955) commented that diversified crop farming may not be the solution to production problems

but it may be one of the answers to cope with the present set-up where the majority of our farming population have limited landholdings and cash capital investments.

The Philippine government has not been quick in adopting diversification as an integral part of its agricultural policies despite its apparent advantages. Until recently it has been preoccupied with achieving rice sufficiency. This can be deduced from the observations made by Lawas (1968) and Korzan (1970) on the stand of the country's decision makers—that they are not going to encourage farmers to change from rice to other crops until there is conclusive evidence that it is to their best interest to do so. Crisostomo et al (1971) noted that the multiple cropping index for the Philippines in 1960 is roughly equivalent to that which was attained in Taiwan in 1938. This is apparent from a previous observation (Hernandez, 1956) that successive planting of one kind of crop on the same area of land still predominates. Crisostomo et al further cited factors that hampered the diversification of the Philippine agricultural sector, namely: (1) lack of water control facilities and irrigation development that are required to grow more than a single crop of rice and, (2) until recently, low population pressure which perpetuated a system of production relying on the extensive use of land.

Diversification in the Philippines may register a quicker pace this time. The closing of the land frontier, since it no longer makes possible extensive land cultivation, together with spectacular gains being made in grain production with the introduction of HYVs, may serve as a push factor in promoting agricultural diversification in the country.

Diversification (by crops)

Rice crop rotation. Several studies reveal that rotating with other crops is more profitable than simply planting rice alone, whether single- or double-cropped. Albano (1969) found that in the upland farms of Batangas in the Southern Tagalog region, farmers planting only palay had the lowest return per hectare compared to those rotating rice with other crops.

In Albay, Lawas' (1971) study of four alternative rice farm cropping patterns discloses that multiple-cropped lowland farms have significantly higher income per hectare than farms growing rice alone. Multiple cropping provides more farm labor employment besides.

Rice/Green Manure Crops. Rice can be rotated with tapilan or mungo (Hernandez, 1956). Such cropping system increases the yield of upland palay from 15.83 percent to 49.6 percent. Hernandez observed that at the beginning, it (crop rotation using tapilan or mungo as green manure) produces less income, but the production per hectare increases as rotation and green manuring continue with the years.

Hsieh (1966) cited Taiwan as an example, where average net returns from the double cropping system amounts to NT\$26,000, thereby implying that the more crops are grown, the higher the income that can be expected.

Casayuran (1968) studied the performance of important food or industrial crops in rotation with lowland rice and found that planting peanut and tapilan in rotation with rice had more beneficial effects than planting with other rotation crops as indicated by higher yields of rice (79.82 cavans for peanut/rice and 76.55 cavans for tapilan/

rice). Peanut production amounted to about two tons of pods per hectare. Tapioca, however, produced vines rather than grains as indicated by the amount of crop residue obtained.

In Cuttak, Kalyani and New Delhi, each having different climatic conditions and soil types, Palma and Deb (1969) observed that continuous cultivation of rice, either singly or in rotation with other crops like potato, tobacco, tomato or chili, has a deteriorating effect on the soil structure. However, when a leguminous crop is grown in rotation with rice, the structure is found to improve significantly. Rotating sugarcane with rice has the same beneficial effect.

This finding seems to be in consonance with Hsieh's observation on the shifts in cropping system in the northern region of Taiwan. Hsieh said, "From a rice-rice or rice-rice-green manure crop pattern, a change was made to a rice-rice-sweet potato system of cultivation. This change increased farm returns per hectare from NT\$22,000 to NT\$29,000".

Cagampang (1964) said that if the planting of soybeans were timed so that the crop matures before the onset of the monsoon rains, it can be grown successfully as a rotational cash^{crop} in heavy lowland soils.

Rice/Cabbage, Gabi, Tobacco and Sweet Potato

Barker (1969) observed that among lowland rice farms in Central Luzon during the crop year 1962-63, farms planted with either cabbage, gabi or tobacco as the second crop had higher returns per hectare compared to farms planted to two rice crops.

Lawas (1971) asserted that rice cropping systems can be further improved by putting in a summer crop, i.e., raising a summer vegetable

or muskmelon between the first and second rice crops. Lawas further observed that since the water supply is still limited, a three-year crop rotation system is now being practiced, wherein the principal crops of rice and sugarcane are planted once in every three years with sweet potato and other miscellaneous upland crops also included in the rotation pattern. Rice and sugarcane are provided with sufficient water during their growth while miscellaneous crops receive no irrigation. He suggested an improved cropping system - miscellaneous crop-rice (first crop) - rice (second crop). This means that there will be six crops in three years instead of the present four or five crops

Abaca intercropped. Abaca intercropped gives more yield.

Arancillo (1956) said that intercropping abaca with kenaf and upland rice led to extra monetary returns. It also brought down the incidence of mosaic disease. This was supplemented by Gaminde's (n.d.) observation that inter-cropping abaca with short-season crops such as upland rice, sweet potato (camote), peanut, mongo, cowpeas, beans, etc. results in reduced maintenance cost and accelerated growth.

Corn intercropped. Despite the non-conclusiveness of the results of studies on intercropping with corn, there is implied evidence that peanut and cowpea, unlike mongo and stringbeans, can be profitably grown with corn.

Boado (1965) observed that greater income is derived when peanut is intercropped with corn. Faustino (1965) considered cowpea and soybeans to be promising intercrops for corn. Gonzales (1966) noted that cropping systems that gave the highest income were peanut-cowpea-corn,

continuous corn, and cowpea-peanut-corn. Berico (1969) found that peanut best suits corn than mongo and soybean. He said, however, that corn properly fertilized and grown continuously on the same land had the same yield as that of corn grown on soils previously cropped to peanut, cowpea or upland rice.

There are several studies noting the incompatibility of corn and the bean family. A study on the mixed cropping of pole bean with green corn (Bolante, 1961) revealed that corn adversely affects the vegetable growth, number of flowers, and bean yield. Sayson (1970) found that intercropping bush sitao with corn results in increased corn yield but decreased sitao output, and as the distance of planting increase, the yield of both crops decrease. Supporting the above-mentioned results is Faustino's (1965) observation that mongo and string beans adversely affected corn yield.

Calamansi intercropped. Deomampo et al (1969) said that vegetable calamansi cropping is seemingly a lucrative venture, finding that it netted a return of ₱761.00 per hectare, a high income potential. The authors however commented that its income-generating capacity may be limited by high capital investment and by the longer time needed to realize an income. The planting system for calamansi requires great labor costs and the crop may not be grown except where soil and climate are favorable enough to give returns above costs.

Sugarcane intercropped. Rivera (1964) said sugarcane not intercropped produced more vigorous and taller canes than those that were intercropped. Plots intercropped with cowpea and bush sitao for green pods had stunted plants owing to the rapid growth of legumes. He

qualified this finding, however, when he said that intercropping with cowpea for pods slightly increased the purity of cane juice, but intercropping with cowpea for seeds and bush sitao for pods and for ~~seeds~~ affected juice purity.

On the other hand, Villarico and Ledesma (1969) argued that intercropping sugarcane with mungo, peanut or soybean did not reduce the cane and sugar yields. Moreover, the return per peso invested in the intercrop was highly profitable.

Lawas (1971) said intercropping sugarcane with mungo, peanut or soybean has been getting more attention, particularly in Negros Occidental.

Fish-vegetables. A unique rotation of fish and vegetables exists in the Candaba Swamp area. During the rainy season, the swamps are converted into fishponds and when the water starts to recede in late October, melons and watermelons are grown.

Crop Management

Agricultural Productivity and Technology

Farm management as defined by Forster (1953) is a study of the ways and means of organizing land, labor and capital and the application of technical knowledge and skill in order that the farm may be made to yield the maximum net economic returns - that is, utilizing all factors of production to the best advantage. Under a given level of prices, it is usually profitable to increase the utilization of the factors with high productivities and to decrease the use of the factors with low productivities.

The Philippines' over-all strategy to raise productivity includes a reconsideration of industrial policies; expansion of the Philippine market through rapid export growth; upgrading of research and development; intensification of dissemination of technological know-how and skills; manpower development; and effective and fullest utilization of capital and natural resources (Sicat, 1970).

Coordination of activities that occur both within and outside the production plant is necessary for maximum economic returns. Market information and analyses of the facts will be helpful in adjusting production (Tiongson et al, 1963).

The introduction and adoption of some technological innovations per se cannot, however, solve the prevailing problem of low productivity, since there are innovations not adapted to certain places due to some limiting factors. Barker et al (1971) found that farmers in Nueva Ecija

who tried straight-row planting as an improved farming technique reverted to the old method. The reason given was surprisingly the high marginal cost of operation ranging from ₱60 - ₱90 per hectare.

An investigation in three municipalities of Laguna in 1966 sought to determine some factors affecting adoption of approved practices. Operator's age, size of farm, and type of landlords were not found to be related to adoption. Irrigation water was, however, an important factor of adoption. High adopters had the highest level of farm income and profit than low adopters of improved practices. The important reasons given by farmers for adopting improved practices were: to increase output, to minimize losses and to facilitate the operation of farm practices. On the other hand, the important reasons for rejecting improved farm practices were lack of capital and failure to recognize the advantages of improved practices, especially in mechanization (Liao et al, 1968).

The foregoing discussion shows that there is ample information concerning agricultural productivity and technology which can be of benefit to Project ADAM in the formation of a coherent and well-integrated program on agricultural diversification and markets.

Mechanization and Cost of Production

Large increases in tractor purchases were noted after 1965 due to the opening of the two CB:IBRD (Central Bank and International Bank for Reconstruction and Development) credit lines for mechanization. The release of the CB:IBRD loan seems to be the biggest single factor influencing the sharp increase in tractor purchases between 1966 and 1970 (Guino and Meyers, 1971), but the de facto devaluation in

February 1970 resulted in a sharp decline in tractor sales, despite the enactment of a second CB:IBRD loan for \$12.5 million covering the period September 1, 1969 to March 31, 1973. However, the promulgation of the minimum wage legislation in April 1965 and in June 1970 may have contributed to the growth in the rate of tractor adoption.

To determine the extent brought about by the rapid development and spread of mechanized farming in crop production several studies were undertaken. These studies also sought to assess their effect on farm income and labor utilization. Bulanadi (1959) found that under the Maligaya and Lasedeco conditions, mechanized farm operations cost less than the old, animal-drawn method. The findings of Domingo and Supan (1958) are parallel to Bulanadi's with regard to the cost of production. The animal-drawn method incurred expenses higher than the mechanized method but it outyielded the mechanized method by 11.5 cavans per hectare or a net income of ₱99.74.

Based on the size of farms and the degree of mechanization, the cost of production of upland rice differs. Madamba (1953) showed that among mechanized farms, cost of production was high in the 16-hectare farm and gradually reduced in the larger ones. The lowest cost of production per cavan was in the 100-hectare farms. Likewise, the animal-power farm proved to have the highest cost of production per hectare as well as per cavan (44 kilos); second was the semi-mechanized farm. A study on farms in Laguna (Alviar, 1969) proved that the more fully employed a tractor is on a greater area, the lesser is the cost per hectare served.

Data comparing sugarcane production by the use of tractor and carabao were obtained from four sugar centrals in the country. In

PASUMIL (del Carmen, Pampanga), VICMICO (Victorias, Negros Occidental), BISCOI (Binalbagan, Negros Occidental) and ASTURIAS Sugar Central (Dumalag, Capiz), the mechanized method of sugarcane production, measured in tons per hectare, proved to be much better than that of sugarcane production by the carabao method (Cruz et al, 1959).

Mechanization and Labor Displacement

. A shift in the seasonal pattern of labor use was observed as mechanization increased (Barker and Mangahas, 1971). Most notable is the decline in labor for land preparation and the increase on irrigated farms in labor for weeding. Only a slight difference was observed between the labor inputs of the tractor and carabao-cultivated farms during the wet season but the situation was reversed during the dry season. Tractor-powered farms recorded a drop of 16 days of labor input. On the other hand, carabao-powered farms showed an increase of 16 days. This drop in labor input of the tractor-powered farm is due to the elimination of plowing in most farms during the dry season. The cost of producing a hectare averaged ₱415 for the tractor groups and ₱400 for the carabao-powered farms (delos Reyes et al, 1963).

For the hand tractor-powered farms, the man-labor utilization averaged 100 days per hectare and 322 man-days per hectare for the animal-powered farms. The cost of production using hand tractor was ₱5.70 per cavan and ₱9.00 per cavan using animal power. The main benefits derived from hand tractors are reduction of costs and reduction of man-labor requirements. However, the use of hand tractor did not show marked yield-increasing effects (Gutierrez, 1968).

On the average it requires 48 man-and-animal-hours or six days

to plow a hectare of land using the carabao. However, it requires 16 hours or two tractor days to plow the same area with the use of 6HP hand tractor. With two men operating a tractor per day, it took actually four man-days to plow a hectare of land (Deomampo, 1969).

It appears then that the tractors and combines used by large farmers and landlords tend to displace landless laborers and tenants, thus aggravating the employment problem. At the extreme this will lead to a bimodal structure of agriculture consisting of a small, efficient, and highly mechanized food-producing sector and a large subsistence sector. As in many tropical Asian countries mechanization in many instances must be complementing rather than substituting for the use of labor (Barker, 1972).

Because of the magnitude of the problem, the need for concerted efforts to encourage labor-intensive technology has been accentuated. The current emphasis is to give considerable attention to the proliferation of high-yielding varieties. Guino and Meyers (1971) observed that high-yielding varieties have a positive effect on the labor input per hectare. Therefore, one can expect higher wage and income in the rice sector. The introduction of the high-yielding varieties of rice has encouraged straight-row planting and the use of mechanical weeders. Furthermore, when the farmer adopts high-yielding varieties, the pay-off from good weed control increases sharply. This was indicated in a survey of farms conducted by IRRI economists in Central Luzon and Laguna which showed that labor use for weeding rose from 8 percent to 17 percent in the period during which high-yielding varieties were adopted. Moreover, the introduction of the new seed-fertilizer technology exacerbates the weed control problem,

particularly in the poorly-irrigated areas where the application of fertilizer stimulates the growth of weeds as well as rice. Thus, labor use in weed control has increased despite the increased use of herbicides and mechanical weeders. This analysis suggests that except in areas where wage rates are very low or farms are extremely small, increased use of mechanical and chemical weed control methods is likely to be output-increasing rather than labor-displacing (Athwal, 1972). On the other hand, Bradfield (1972) believes that multiple cropping or crop diversification can be the answer to the unemployment problem. He said that diversification will allow the farmer to grow three or four crops on this same land each year, and that with the presence of many time-consuming operations which still require hand labor (such as harvesting and marketing, thinning, seeding, weeding, spraying, hauling) investing in a tractor in an area will not aggravate the unemployment situation.

Factors Affecting Adoption of High-Yielding Varieties

Irrigation is a prime consideration in the adoption or acceptance of new varieties. According to Mangahas (1972), the acceptance of new varieties was found to increase in so many rainfed farms when they were originally bred specifically for irrigated condition. This is in contrast with Robertson's (1969) findings which showed that in terms of variety planted, 26 of the rainfed soils supported local varieties and only four had new varieties. Toquero (1969) found that a shift from traditional varieties to IRRI and College varieties occurred after the installation of irrigation facilities.

Among the factors that affect the spread of new rice varieties are communication factors, physical factors, sociological factors,

economic factors, attitude factors and relative advantages of new over local varieties (Liao, 1968). The economic impact of adoption of new rice varieties was considered on the basis of productivity, marketable surplus, consumption and farm income. However, as diffusion of innovations increases, such variables as expertise, farm size, ownership, etc. tend to lose their ability to distinguish between users and non-users of new varieties (Mangahas, 1972).

One of the higher yielding varieties is IR-8 surpassing the other varieties and BPI-76 by a very wide margin. Liao and Barker (1969) revealed that in Binan, Cabuyao and Calamba in Laguna, most of the farmers planted IR-8 during the 1967 wet season but they became sensitive to the low price they received for IR-8 and so shifted to other varieties in the following seasons.

In many ways the new rice technology has contributed to the demise of the farmer's social and geographic isolation since he now has to depend on the outside world for inputs, credit, markets as well as technical advice. Another important development is the emergence of expertise in new farming methods which has been acquired from exposure to technical training in the barric or elsewhere because seminars, rice schools, and training programs for such farmer leaders have become commonplace (Castillo, 1972).

Effects of Irrigation on Yield per Hectare and Income

The shift from rainfed rice production into irrigated rice production entailed marked changes in cultural practices which resulted in increased rice production. Under irrigated conditions, 93 percent were applying fertilizer and two-thirds of these used at least one

bag per hectare. Other changes included a marked swing from the "broadcast" and "ordinary" to the "straight-row" methods of transplanting. The adoption of improved practices was found to be positively significant which further suggests that the adoption brought higher rice yield when irrigation water was sufficient (Liao et al, 1968). Moreover, double-cropping became prevalent averaging 81 percent of the cropland area with Quezon exhibiting the highest percentage (97 percent) and Laguna, the least (75 percent). Production per hectare averaged 59 cavans in Laguna, 79 cavans in Batangas and 85 cavans in Quezon (Tiongson, 1969). And because the possibility of second cropping after irrigation had been installed, a previous net return of ₱163.00 increased to as much as ₱1,569 (Plang, 1971).

With the advent of irrigation, farmers were able to make more intensive use of their land, labor, and capital. High income was found to be associated with high yield. Farms in irrigated areas such as Calamba and Cabuyao produced higher farm incomes due to the fact that irrigated farms produced higher yields than rainfed farms and also due to the greater efficiency in the use of operating capital on irrigated farms (Liao et al, 1968).

Analysis of the sugarcane farms of San Carlos Milling District showed that the irrigated farms were superior to the non-irrigated farms in many respects (Caintic, 1963). The total investment per farm for irrigated farms was about 10 times that of the non-irrigated farms or ₱2,007,706 and ₱252,122, respectively. On a per hectare basis, that is, eliminating the direct effects of size of business, the investment figure was still higher about two times on the irrigated than on the non-irrigated farms. They were ₱11,677 and ₱6,064,

respectively. This big difference is mainly due to land value, ₱19,730 vs. ₱5,141; and cost of irrigation. The investment on tools and equipment including office equipment was about the same on a per hectare basis. The irrigated farms, in addition to having higher investment levels, also incurred higher costs per hectare. This brought about higher returns. The optimum level of irrigation was estimated from data of irrigated farms only. It was determined by solving for the level wherein the marginal return equalled the marginal cost. This was found at 2,350 gallons per hectare (Caintic, 1963).

Statistical analysis using the t-test of paired observations supports the hypothesis that mean irrigated yield is higher than mean rainfed yield, at the one percent level of significance. Although average expenditure per hectare on chemicals and fertilizers was also higher on the irrigated land the difference is not statistically significant at the five percent level (Robertson, 1969). High cost of pump-irrigated rice farms is more than compensated by the higher return as a result of higher production. The higher net gain per farm and hectares of the irrigated over the rainfed and the present return to farm investment in the irrigated farm suggests that it pays to invest in irrigation.

The economic analysis of pump performance revealed some changes attributed to pump use. Data from the Bureau of Agricultural Economics show that Southern Tagalog as well as other regions points to a differential in favor of irrigated over rainfed areas. In 1965-1966, the difference was 9.4 cavans per hectare, and in 1966-1967 it was 2.5 cavans (Toquero, 1968).

For each type of pump system, farm income and capital repayment

feasibility at the different farm projects varied with the following factors: with respect to irrigation input under different levels; and with respect to combinations of pump capacity operation and irrigation input. Under current prices estimates, if water economy were the only consideration at farms served by pump irrigation systems, it is definitely not profitable to produce rice under continuously flooded situation (at or above 9.13 mm. per day irrigation level). Likewise, in cases where the water resources are limited and the systems operation is limited to low pump capacity levels, it is better to produce rice under irrigation levels below the flood situation to maximize benefits in rice production. On the other hand, if it is possible to operate the system at full capacity, it is advisable to produce rice under the shallow flood situations (Reyes, 1969).

Difference in yield of rice between continuous submergence versus intermittent submergences was not significant as shown by the National Irrigation Administration (1971). Majority of the cases showed that best yield of lettuce in underutilized Los Baños clay loam was obtained when the plants were supplied with water not lower than 20 percent of the water-holding capacity of the soil. Sub-irrigation required less frequent cultivation than the over-head surface irrigation method, and sub-irrigated lettuce plants produced better developed roots (Aglibut and Laudencia, 1959).

Problems Associated with Irrigation

Of the total cost of using the system, variable costs accounted for 40 to 77 percent and fixed costs, 60 to 23 percent. Fuel and oil were the biggest variable item, followed by over-hauling. The average

cost of using a pump ranged from ₱116 in Laguna to ₱220 in Batangas (Toquero, 1968). The difference in cost between the two provinces was caused by the difference in the size of pump (BHP). In the economic evaluation of pumps, the least capital investment with the highest cost benefit ratio was attained by the six-inch pump type. Regression analysis shows that an additional expense of ₱0.09 in operating cost was compensated by 0.32 hectare increase in area irrigated for every inch increase in pump size per hour of operation (Tagarino, 1968).

Problems encountered by farmers with regard to the use of the pump system are the inadequate water supply, expensive repairs and maintenance costs. The latter was the common complaint of farmers using diesel engines. Irrigation costs may be more cheaply provided by lowlift pumps. Tubewells, however, can be expected to show a high rate of return both to the private investor and to the economy when the water is used together with the package of high-yielding inputs with new fertilizer-responsive varieties of rice. Also at present, it may be important to maintain the existing relatively high floor price of palay to stimulate farmers to invest in irrigation and the package of high-yielding inputs along with improved seeds. However, as self-sufficiency is attained, this policy should be re-evaluated (Mears, 1968).

Fertilizer

Together with the increase in the income of farmers is the corresponding increase in the cost of production because of additional inputs such as sprays and fertilizers necessary to hasten growth of plants, hence, increase yield. Likewise, the shift to IR-8 has in all cases

been accompanied by marked increase of inputs of fertilizers and chemicals (Barker and Quintana, 1967). Unless plant nutrients are available in sufficient amounts and unless substances that interfere with nutrient uptake are absent, the new high-yielding varieties cannot deliver their full potential (Athwal, 1972).

A pilot project conducted by the NEC (1971) revealed that for production inputs such as fertilizers and chemicals, the equivalent return was found to be ₱4.82. Chemicals used were Endrin at the rate of 0.26 liter per hectare and Gamma H.C., 10.87 kgs. per hectare making a total of 36.13 liters and 1,522.17 kgs. respectively, for the 140-hectare pilot project. These findings are indications that the dry season crop can be increased with the use of high-yielding varieties and economical use of production inputs.

Chemical Pest Control

Among the compounds first tested, entomologists found that lindane was most effective for controlling stem-borers and maggots, the least hazardous and comparatively less expensive. In a series of trials, two applications of lindane to paddy water provided more effective insect control than eight to twelve sprays of such potent compounds to be highly effective against the common species of stem borers, leafhoppers, and whorl maggots. Its low mammalian toxicity made it highly acceptable. Both lindane and diazinon degrade almost completely in about one month after application and thus may not cause any residue problem in the tropics (Athwal, 1972).

Chemical Disease Control

Some work has been carried out to evaluate chemicals for disease control, but the primary method of disease control has been the development of resistant varieties.

The chemical control of rice diseases has not been very successful in the tropics as chemical sprayed on the rice plants is washed off by frequent showers during the monsoon season when most rice is grown. Such chemicals as Blastocidin S and Kasumin have been evaluated, but the results are not encouraging. Recently, newer chemicals such as Benlate, Topsin and NF 48 were found to have good systemic action on rice blast but they are too costly for the tropical rice farmer (Athwal, 1972).

Chemical Weed Control

Although push-type rotary weeder's present an improvement over handweeding, they are slow and hard to operate. The three-row model of the power weeder is four to five times faster than push-type weeder and eight times faster than weeding by hand.

A dramatic change in the chemical weed control in tropical Asia was perhaps results obtained with 2, 4-D. When applied 4 days after transplanting this low-cost herbicide gives adequate control of grasses, broadleaved weeds and sedges. The time of application is the key factor in the ability of 2,4-D to control grasses. Using 800 grams of the active ingredient of 2,4-D can control weeds in one hectare of paddy. The cost of treating one hectare is only \$2.50 with the liquid formulation or \$5.50 with the granular formulation as compared with \$12 for hand weeding. The granular form is

better because it can be broadcast directly into paddy water and is less toxic to rice. The use of 2,4-D presents no residue problem because it disappears almost completely within 15 days under aerobic and anaerobic conditions (Athwal, 1972).

Since hand weeding is impractical in direct-seeded rice, chemical control is the obvious alternative. Propanil and Molinate have been found to be highly effective in controlling grassy weeds in direct-seeded rice in Europe and America. But their high cost and the precise water management limited their use in tropical Asia. Application of 1.5 kg./ha. (active ingredient) of benthocarb or of butachlor 6 to 8 days after seeding gave complete control of barnyard grass and water lily in the tropics. The cost per hectare of either of the chemicals is about equal to the cost of hiring labor to handweed transplanted rice. Both of these chemicals applied at lower rates can also control weeds in transplanted rice.

For upland rice, the best weed control was obtained from the application of a Japanese chemical, NTN5006, at 2kg/ha. (active ingredient) before the emergence of weeds when rice seedlings were at the one to two leaf stage. Effective weed control was also obtained with liquid butachlor at 2 kg/ha. applied before weed emergence (Athwal, 1972).



LIVESTOCK AND POULTRY MANAGEMENT

Livestock Management

The development of livestock production calls for government and private-sector allocation of a large part of their resources to the livestock sector to make it a profitable and efficient segment of the agricultural economy. A careful study of the livestock enterprises is then necessary to determine the factors that will contribute to increased productivity.

Livestock population and production. Analysis of the post-war period revealed an over-all increase in the cattle production of the country, with Southern Tagalog showing highest yearly rate of increase. In terms of annual growth rate, however, cattle population in Ilocos, Central Luzon and Western Visayas decreased in 1964, 1963 and 1961, respectively. In carabao population, almost all regions exhibited an upward trend from 1948 to 1959 with the exception of Cagayan Valley, Southern Tagalog and Northern and Eastern Mindanao which showed an increase through 1960. In 1965, Southern and Western Mindanao displaced Central Luzon from its premier position as highest contributor in carabao population. In hog population, almost all the regions except Ilocos and Central Luzon showed positive annual growth rates. Again, Southern and Western Mindanao exhibited the highest rate of change in 1965 (Dayo, 1962).

For 1960 to 1975, projected production rates were 3.6 percent in

cattle, 3.6 percent in carabao, 12.0 percent in hogs, and 6.3 percent in poultry. Meat supply in 1968 totalled 562.79 thousand metric tons of which 97.54 percent was locally produced. Local egg production constituted 99.89 percent of the total egg supply. These figures show a deficiency of roughly 2/3 of the daily requirement of protein from animal origin (BAI, 1970).

Successful livestock raising is to an extent contingent upon farm size, labor efficiency, rates of production and methods of farming operation. The first-size of farm -- is the major factor affecting the income of the livestock farms. Large farms are more efficient in the utilization of existing farm resources. They have also proven most efficient in their marketing operation, hence resulting in greater profits or higher returns (Alunan, 1970). Capital investment and operating costs also have positive relationships to the size of farm (Biong, 1967). Research has also shown that cash expenses per project depend upon the number of animal units.

There are several ways to measure farm size but the most meaningful method, and the most frequently used, is in the number of animal units. Some studies on beef cattle production use animal units as a measure of size; farms with a cattle population of 85 to 160 animal units are classified small; 161 to 500 medium; and those with more than 500, large (Alunan, 1970).

Swine raising. The science of swine raising has undergone revolutionary practices as a result of constant research in the field (Eusebio, 1966). Abarientos' (1962) farm business analysis of a swine project gives some indications of proper farming operations in swine

production. A large portion of the initial capital outlay is absorbed by housing; 20 percent goes to the purchase of stock. Fixed costs include feeds, medicine, transportation and cost of breeding. Feed as the largest item of cost constitutes 75 percent of the livestock as well as poultry production costs. Swine raisers may be able to reduce feed cost by using pasture and feed supplements without impeding growth of swine, as Calimlim and Maneses (1967) showed that swine provided with pasture attained heavier weights than those without access to pasture.

Gross cash receipts are obtained mainly from the sale of weanlings, stock and services of boars. In weanling production, it usually takes only three years to pay for variable investment; in meat production, the period is even less. The turn-over of capital in swine production is short since it is not tied up with capital investment (Abarientos, 1963).

Swine raising is a labor-intensive enterprise. Total labor requirement (both hired and family) amounts to 61.7 days per year or about 3.7 hours per day. Average labor requirement per animal unit is 32 minutes, equivalent to six days per year. Cleaning operations alone require an average of 53 man-days per project, per year, followed by feeding which employs 40 man-days. Watering and other operations employ the least number of days (Horigue, 1967).

Poultry Management

The popularity of broiler production in the Philippines can be attributed to the continuous demand for poultry meat, advances in field management, nutrition and disease control, and, more recently,

the importation of improved breeds to boost production. Coupled with vast areas of unexploited pasture lands, the climate of the country is very favorable for broiler production (Vera, 1971).

Chicken production in the Philippines can be divided into three periods: 1948-1959, 1959-1964 and 1964-1966. The first period is characterized by a rapidly increasing trend with a compounded annual rate of growth of 11.6 percent. The second period depicts a decreasing movement of 14 percent, while the third period exhibits a sharp decline of 12.5 percent. All regions followed the growth rate pattern of chicken production at the national level (Romero, 1968).

Production. Capital investment and operating costs depend upon the number of layers and labor used in poultry farm. Sandoval (1963) showed that farms utilizing only operator and family labor have an average capital investment per farm of ₱3,781 of which 37 percent is invested in land and laying flock. Fernandez and Librero (1962) found that farmers with approximately 100 layers spend about ₱400 in operating costs alone before egg production starts. Costs would be more if one starts with straight-run chicks.

In Atlan, Rasco (1969) showed that the average cost of producing 100 day-old chicks to 12-week-old broilers amounts to ₱271.32 with a net income of ₱23.07. Net income obtained depends upon the prevailing selling prices and age of the chicken being sold. Hillocarta (1963) revealed that from the selling price of ₱3.75 per kilogram liveweight for broilers, a profit of ₱96.75 is obtained from raising 100 day-old chicks if they are sold at 12 weeks old; the profit is reduced to

₱13.26 if the broilers are sold at four weeks of age.

Ilag (1963) measured labor efficiency in a poultry project in terms of number of layers per man, egg production per man and the cost of labor which is supplied by hired laborers and a part-time farm manager.

Egg production as a function of the number of layers gave a good indication of the input-output relationship since the other factors of production were technical complements and highly correlated with the size or number of layers. This variable, therefore, may be used to obtain a satisfactory estimate of egg production. Total egg production (Y) was highly correlated with the group of four independent variables: number of layers (X_1), kilograms of feeds (X_2), capital investment (X_3), and hours of labor (X_4) (Sandoval, 1963).

Insignificant correlation was observed between the size of the hens and number of eggs produced, but egg size was statistically associated with the size of the hens. A correlation study of egg size with fertility, hatchability and chick size using Single Comb White Leghorn by Arboleda et al (1961) showed that fertility and hatchability of eggs are not affected by egg size, but egg size determines the size of the chicks hatched.

Problems Associated with Livestock and Poultry Enterprises

Livestock and poultry producers are confronted with the problems of low productivity, high cost of feeds, high mortality rate and inefficient marketing system. The extension of liberal credit facilities to aid in the development of livestock and poultry enterprises will also help in increasing production of animal protein foods.

AGRICULTURAL MARKETING IN THE PHILIPPINES

There is hunger in the world for several reasons. Important among these are the presence of actual scarcity and the insufficiency of income which does not allow a number of people to consume food at nutritionally accepted levels. Besides these, a large portion of what consumers pay for products is often made up of marketing costs. For these reasons, high marketing costs explain in part why some people do not get enough food.

The significance of marketing is not confined to the considerations mentioned above; it also has an important impact on production. In a situation when markets are not easily accessible and prices for farm produce are not favorable, farmers are unwilling to or discouraged from expanding production, or from utilizing modern technology that will increase their output.

One very important feature of agricultural marketing is the seasonality of crops. As a characteristic of agricultural products, seasonality has a large bearing on marketing margins. Most agricultural products are very perishable and losses are incurred mostly during transport through wastage and shrinkage, resulting in high marketing cost. A few relatively non-perishable products such as squash and upo which can withstand rough roads are bulky to handle (Development Bank of the Philippines, 1971).

Marketing Costs and Margins

Data on marketing costs and margins are used to measure marketing efficiency. Reduction in the cost of maintenance of the standard of

services represented clear increases in efficiency. At the same time, additional marketing services that raise the cost of marketing may also represent greater efficiency if consumers value them more than a corresponding savings in cost.

Total marketing margins are the difference between the price paid to the producer and the price paid by the final consumer. These are generally composed of margins on the basis of specific functions such as local assembly, transporting, processing, wholesaling, and retailing; and according to various cost items such as labor, packaging materials, transportation costs, wastage, sales promotion and costs that may be incurred in the process of transaction.

Another important determining factor of marketing costs is the amount of losses which occur during the assembly, transport, storage, processing, and distribution of agricultural products.

Problems; Suggested Improvements/Solutions

Most marketing losses are due to problems common to marketing of agricultural products.

Mittendorf (1965) noted that seed losses are due to poor storage upon harvesting. This leads to compounded losses because when defective seeds are used for the next crop, the resulting yields are lower in quality. Rodents are responsible for large losses occurring at the farm and during storage.

Ronero (1969) cited marketing problems commonly encountered by farmers. These include the inadequacy of transport facilities, absence of grades and standards, lack of tide-over funds, absence of reliable market information and inefficiency distribution system. Abbott (1958) made

similar observations on the typical problems encountered at all levels of the agricultural marketing process in developing nations.

Canto (1970) named several other problems of the current marketing set-up, including the wide fluctuation of prices, faulty institutional set-up, and the lack of organization among the agricultural producers.

Mittendorf enumerated some methods to prevent losses during the storage. Among them are drying the seeds before and after storage, the simplest of which is with the use of a combination of sun and air; proper insulation of storage houses against moisture penetration; and absence of insect infestation.

The Development Bank of the Philippines suggests the following in order to solve marketing problems: establishment of uniform specifications for agricultural products; improvement of transportation facilities; repeal of certain provisions of the local autonomy law especially the production and marketing of livestock products; adequate police protection against "tong" collections along highways; stimulate the organization of farmer cooperatives; accelerate completion of the CNTFI; and extension of credit facilities, especially commodity loans and advance to farmers in liberal terms.

Planning and programming should be worked out to solve the problems of agricultural marketing (Canto, 1970). Important to this is the setting up of a special agricultural marketing agency under the DARR, such agency to take charge of providing facilities and services for trade and other related functions. (Already in existence is the Agricultural Marketing News Service or AMNEWS at the Bureau of Agricultural Economics, which can undertake this function if given the funds.)

A price stabilization program must include provisions for good marketing facilities as marketing deficiencies can easily defeat such a program in relation to farm products. Likewise, Canto states that a strong marketing research program needs the support of the government and private sectors; and price stabilization requires control over a major part of the supply in commercial channels. These and other suggested improvements could provide the biggest incentives to agricultural development.

Marketing Boards/Orders and other Marketing Tools

The primary objective of marketing boards is to improve the economic status of producers. Farmers may be aided by marketing boards in the process of bargaining with large producers or wholesalers for more favorable prices. Furthermore, marketing boards will improve the market organization, marketing procedures, provide for more orderly marketing of agricultural products, minimize the impact of severe seasonal price fluctuations, and engage in promotional activity to expand market and research to develop new products and market outlets.

Two types of boards may be appropriate for use in this country (Tiongson et al, 1971). The most logical type would be that which provides for a domestic trading monopoly in specific areas or market channels within the country, wherein the board could exercise monopoly trading power for selected items or for groups of closely related items, and provide farmers with selling power in the market place by replacing existing agencies operating under the board's direction.

The second type of board is for export-monopoly trading. The board replaces all private exporters except for domestic firms that act as the board's domestic buying, processing, or selling agents.

Tiongson et al also listed a number of potential areas and commodities for marketing board operations. The Cavite-Laguna area for pineapple and the Bicol area for citrus are good combinations.

Part of the deliberations of the 1972 Congress centered on the establishment of agricultural marketing boards. Should these marketing boards be concretized under the new governmental set-up, they will be organized and established under the Department of Agriculture and Natural Resources or under other research institutions.

Rice and Other Grains

Demand and consumption patterns. Cereals and cereal products represent the major group of food items used by Filipinos. For 1968, the average consumption of cereals per person was 125.9 kilos (DBF, 1971). This total consisted of 87.0 kilos of rice, 24.4 kilos of corn, 14.2 kilos of wheat flour, and 0.3 kilo of other cereals. These rates of usage, however, differ substantially from earlier findings on consumption patterns for cereals. Results of two other surveys by Aragon and Derrah (1971) showed that the annual per capita rate of use for all cereals was 143.7 kilos. Rice and rice products consumption amounted to 107.6 kilos per capita per year; corn and corn products, 16.4 kilos; and wheat and wheat products, 19.7 kilos. The data for rice from both sources, moreover, proved to be two to three times the amount consumed by Cebuans in 1965 which amounted to 34 gantas per person per year (Iuzon, 1965).

Income is one of the many factors that affect demand and consumption patterns. With this assumption, Aragon and Derrah further conducted a cursory examination relating the different factors to cereal consumption and they came out with the findings that consumption of all cereals

increases as income increases, going from a weekly rate of 2,688 kilos per 1,000 persons in the lowest-income group (less than ₱400) to a rate of 2,997 kilos in the highest-income group (₱1,500 and over). Even in the lowest-income group, the total use of the three groups of cereal food (rice, corn, and wheat flour) exceeded that reported at the national average - 139.8 kilos versus 125.6 kilos.

Mears (1971) states that income elasticity of demand for rice declines as per capita income increases. In a separate study, Mears (1970) premised that the income elasticity of demand for rice is probably positive between 0.1 and 0.2. However, its influence on per capita consumption has been slight because of large urban/rural population shifts, unequal distribution of increased income and relative rapid increase of population in corn-eating areas where there was lack of transport and improved marketing facilities. Thus, in these corn-eating areas relative price adjustment can be expected with the probability the rice may be increasingly substituted for corn.

Vitahvisuit (1968) on the other hand, noted that income elasticity of demand for rice in selected regions of the country has a positive relationship between income and size of household. A positive relationship is also detected between rice expenditure and size of household. For the rice-producer region, a one percent change in size of household will result in a 0.75 percent change in rice expenditure. The predicted rice expenditure of the urban area does not differ from that of the rural area. For the non-rice producer, a one-percent change in size of household will result in a 0.72 percent change in the expenditure. The same results also show that the predicted rice expenditure of the urban consumer differs from that of the rural consumer.

Income elasticity of demand for rice is not always positive for all provinces and regions. It varies from place to place and from household to household. Recto and Alviar (1965) studied 587 households (259 in Laguna and 328 in Batangas) and found that income elasticities of demand for rice were negative except for rural households in Laguna, i.e. as income increases, amount spent for food decreases. Urban and rural households had elasticities of -0.3379 and -0.0005 , respectively. However, the elasticities with respect to household size, for both provinces, were positive; 2.8323 for Laguna and 3.3090 for Batangas for urban and rural households.

Another factor that affects consumption patterns and habits is the price of available substitutes. Bangloy and Caramancion (1970) showed that rice consumption decreases as prices of rice substitutes and meat consumption increase. Furthermore, they elaborated that prices of rice and other food items significantly affect rice consumption. Mears, however, holds that price elasticity of rice and substitute products has very little effect especially in rice since the majority are rice-eaters in the Philippines. A substantial change in the choice of variety is likely to occur rather than a substitution of other cereals.

Size of household also affects purchasing patterns and consumption habits of most families, both of urban and rural households. Results in a secular study in 125 households in Padre Garcia, Batangas showed that the quantity of rice purchased is directly related to size of household but is not dependent upon the household income per capita (Recto and Alviar, 1965). More than half of the 125 households surveyed purchase rice either weekly or twice or even thrice a month. And more than half of the households with an annual per capita income of more than ₱50 purchase good-class rice.

The same study revealed that daily rice consumption averages 1.02 gantas per household, or 0.16 ganta per capita, and 0.20/per adult equivalent. Most households use fair-class rice for all occasions. One-third use good varieties in times of scarcity while others mix rice with corn products, for reason of economy. Corn is the most common mixing item or adulterant in a proportion of 1:4 with rice.

Another important finding is that consumption of rice per adult equivalent decreases with an increase in the size of household and tends to decrease as the household income per capita increases.

Credit: its influence on rice marketing practices. Several authors observed that farmers tend to sell their produce right after harvest for various reasons. Quintana et al (1965) revealed that farmers are generally "forced" to dispose of their produce immediately after harvesting because of financial pressures, and Fundador (1966) found that most farmers sold their corn right after harvest in spite of low prices due to the urgent need for cash. A contributory factor to immediate disposal of harvest is the extension of credit to farmers in the off-season months by traders, who earn the "right" of predetermining the price of the farmers' produce.

Landlords occupy a better position and bargaining power than farmers or tenants in marketing their rice or palay. Peredo (1964) noted that the marketing of palay by landlords was less tied up to credit than that of the farmers. A total of 84 percent of farmers, in contrast to only 24 percent of the landlords in Nueva Ecija, commit their palay to merchant-creditors. Advances sales account for only 7 percent of the total amount of palay sold by landlords; that of the farmers amount to 50 percent.

In advanced sales, the farmers and the landlords are committed to pay their debts in palay after harvest. Most landlords are usually able to hold and sell substantial amounts of their palay during off-season months, which the average farmer, burdened as he is with debts, cannot do.

Means of transport in marketing of cereals and other grains.^{2/}

Transport involved in conveying palay, rice, corn and sorghum to the market sites includes primitive and modern means, ranging from human beings to air facilities, and varies according to location, shipping distances, reliability and accessibility to such facilities as roads and ports.

Transport of farm products starts from the farm and ends up at the consumers' place. The means of transport between the farm and the roads differ and depend upon the location of the farm. Carabao-drawn sleds or paragos are used in places where there are no good roads. Where mechanized vehicles are scarce, carabao-pulled carts are utilized. Bamboo rafts, bancas, and other small water-borne crafts are used for farms located near a river.

For long and short hauls on highways, transportation means range from motorized tricycles, calesas or horse-driven rigs to public utility jeeps and auto-calesas. Jeepneys, buses, and trailers are commonly used for inter-town and intra- and inter-provincial movements on provincial highways, while bancas, batels (sailboats) and kuapits (motor launches) transport rice and palay between regional or nearby ports. In Northern

^{2/} Adapted in part from Mears, I.A. and H.H. Agabin. Transport and rice marketing in the Philippines. Discussion Paper No. 72-12. IEDR. 1972. 50 p.

Samar, Sardido et al (1965) reported that animal-drawn and motor vehicles are the most common types of farm-to-buyer transportation used for palay.

On the other hand, trucks, rail and inter-island vessels are used for long distance grain transport. Trucks which are used in hauling rice are usually operated by cone millers and other rice traders. Trucks have become popular due to the defects in the country's railroad transportation system. Serviceable PNP box cars are limited in number; train schedules are unreliable; and there is competition among shippers for other cargoes, leading to the practice of paying "grease money" or "tong" to obtain a box allocation, at times amounting to as high as ₱50.00 per box. Thus, road transport improved, became faster, and more convenient than rail transport for shorter hauls.

Though trucking rates are regulated throughout the Philippines by Public Service Commission codes, actual charges often vary from place to place. Alcasid (1971) pointed out that transportation costs are not the same for all areas in Cotabato. In farms located outside General Santos City, a commercial center, the transportation amounts to ₱0.0172 per sack of corn; in those located within the city, it is ₱0.125 per sack. In other places, added costs are included in the transportation charges. Macatiag (1967) noted that in Plaridel, hauling costs include costs for hired vehicles and unpaid animal and human labor. This took only a little over than 1/10 of the total costs.

Railroad and shipping rates, unlike trucking rates, both remain stable throughout the year. Formal rate structures suggest that rail transport costs are lower than trucks for distances exceeding 100 kilometers, and water transport costs are normally used over longer distances

because of high intangible costs of shipping by rail and sea.

Situation and outlook: warehouses and rice mills. Honrado (1969) revealed that the total requirement for warehousing in 1967-68 was 49.6 million sacks of palay against an existing capacity of only 33.1 million sacks of palay for the same period. Tapnio (1969) reported a total of 2,712 commercial warehouses all over the country with a total capacity of 39.6 million sacks of palay. These figures show that the total actual capacity for warehousing is still 20 percent short of the total requirement.

Tapnio reported further that more than half of existing warehouses are in a state of dilapidation, poorly maintained, ill-ventilated and unfit for long-term storage. There is widespread evidence of rats, insect infestation and birds due to improper warehouse-keeping.

Warehouses owned by middlemen, RCA and FACOMIS, although located in strategic places (Quintana et al., 1965), were found to be inadequate and additional warehouses are needed in the regions of Central Luzon, Bicol, Cagayan Valley, and Western Visayas (Honrado, 1969).

On the economic side, warehouses and mills are classified based on ownership. A survey involving 23 warehouses revealed that 15 were privately owned; the rest were semi-government entities controlled by FACOMIS. Results also showed that average milling capacity and milling recovery for the 17 cono mills surveyed were higher in FACOMIS operated mills (58.3 percent) than in privately-operated ones (57.7 percent).

The main sources of income of warehouses are warehousing fees, milling charges, sale of by-products, and drying services (Honrado, 1969).

Drilon (1971) views the outlook of warehousing and rice milling as bright for the Philippines. However, the establishment of modern rice

processing plants requires considerable capital outlays both for putting up physical facilities and maintaining their operations in the country. Assuming that additional processing plant capacities of a total of 135 tons are to be financed by the World Bank loan of \$14.16 M (₱86.96 M), a peso credit program that may reach ₱100 to ₱160 M would be needed to enable the firms handling the additional plant capacities to operate viably. Lastly, the success of such a processing plant would depend on the ability of the manager to control a network of factors relevant to its operations.

Marketing practices. In a study on palay marketing practices of farmers at a land reform district in Plaridel, Bulacan, Macatiag (1967) noted that the common market outlets used are: landlord, wholesaler, millers and FICOM. More than one-third of the total volume sold during the 1962-63 wet season palay was channeled through the wholesalers. One-fifth of the volume sold went either to the landlords or FICOM/S. The millers absorbed almost 2/3 of the palay sold for the 1965-66 wet season; the wholesalers took about one-fourth and the rest went to FICOM/S.

In Bangued, Abra, the biggest volume of corn is disposed of through the wholesalers, with only a smaller volume going to local retailers and neighboring farmers. Among the three groups, neighbors pay the highest price and retailers the lowest (Paredes, 1969). Alcasid (1971) reported that most of the products of corn farmers are sold to local dealers and millers.

Landlords in Nueva Ecija tend to sell a higher percentage of their crop direct to transient non-millers/millers. Farmers channel six percent of their palay to transient non-millers/millers, and landlords, 49 percent. An analysis of sources of palay of transient non-millers and

millers further indicate the dependence of farmers on the marketing facilities of the middlemen. Non-millers reported that 84 percent of their palay stock come from farmers and 12 percent from landlords. Seventy-two percent of the total volume of palay bought by millers come from farmers and 16 percent from landlords (Peredo, 1964).

In Northern Samar, common palay buyers chosen by farmers are town merchants, local stores, and local buyers, in that order. Higher price is the most common reason for the choice. For copra, local buyers and copra sub-agents are the farmers' common outlets. Credit accommodation, proximity and convenience are the common reasons for their choice .
(Sardido et al, 1965)

Marketing problems and solutions. Corn producers are aware of the deficiencies of the marketing system. The tying-up of credit and marketing hampers the development of sound meaningful marketing programs on the farm level. The wholesaling aspects of corn marketing are affected by the inadequacy of transportation facilities as a major problem. On the retail level, on the other hand, retailers complain of the inaccurate weight and measurements of corn grits purchased from the wholesaler millers or processors.

Other problems common to almost all regions on the marketing of feedgrains are: lack of marketing knowledge; the subsistence level or basis of production; lack of market information, specifically on prices and movement of commodities and markets, and lack of funds to tide the farmer over during time of slack prices for their produce. In addition to these problems, Antiporda and Kuelga (1971) noted other difficulties encountered by most farmers. Low prices are offered for farmer's produce

yet no other alternative exists for the farmer, since he can neither wait for nor seek better prices. The absence of mechanical dryers and warehouses ultimately leads to unfavorable farm prices, and transportation problems are always a marketing difficulty.

Cotabato corn farmers meet three main problems in marketing their produce: an inefficient marketing system; price fluctuations; and poor transportation system (Alcasid, 1971).

Marketing problems may be alleviated by a number of measures: organization of closely knit farmers' associations; effective extension services supported by a well coordinated research on all phases of the industry; the establishment of warehouses in strategic places in corn-producing regions, improvement of the transportation system from the farm to the market; and the provision of credit for production and marketing (Austria, 1969).

Coconuts/Copra

Marketing methods. Coconuts are sold either as nuts or processed into copra or oil. As described by Darrah and Tiongson (1969), farmers dispose of their products in one of three ways. These are by selling the unharvested nuts on a contract basis, by selling the husked nuts; or alternatively, they process the nuts into copra and then sell the copra.

When coconuts are sold on a contract basis, the buyer usually makes a survey of the coconut plantation, pays an agreed price for the estimated quantity that may be harvested, and bears the cost of harvesting, hauling and selling the nuts.

The second method is for the buyer to pay for the husked nuts, usually on a per 1,000 nut basis, which have been assembled at the farm or at

a convenient place by the roadside. The farmer harvests, piles, husks and transports the nuts to the selling point. This is the usual procedure followed in selling nuts to processors or desiccated coconuts to copra producers. Quite often, the farmer delivers the husked nuts to the processors. In this case, the transportation cost is included in the over-all negotiation. These coconut manufacturers usually give cash advances to the farmers which often results in a contract for sale, since the farmers are forced to sell their crop to these dealers in return for the credit extended.

In the third method, the coconuts are processed into copra before they are sold directly to oil processing plants, copra exporters or local buyers who act as agents for the big-time oil processors or exporters. This manner of selling involves all the services in marketing copra such as harvesting, piling, husking, splitting coconuts, processing and transporting from the farm to ultimate buyer's place.

Market outlets. Farmers producing copra sell primarily to barrio buyers or poblacion buyers, but they may sell to dealers, exporters, or extractors (Rocha, 1968). In Sorsogon, market outlets consist of local dealers who handle 45 percent and wholesalers with 24 percent. The rest goes to exporters. Suiza (1968), however, reported that market outlets in Samar for copra are composed of local stores accounting for 20 percent; and 11 percent and 69 percent for barrio middlemen and other middlemen, respectively. In Allen, Samar, about 51 percent of the copra sales in 1962 are sold to local stores, and 25 percent to copra sub-agents (Espino, 1962). In Surigao del Sur, local assemblers dominate other outlets (Carlota, 1965).

Market outlets have their own system and structure in performing their functions. Copra dealers are mostly located in the major terminal markets, have their own bodegas, and often speculate on price increases by holding the copra for a period of time (Darrah and Tiongson, 1969), while exporters usually maintain offices or business connections in the major world markets and are thus in good position to know world market conditions.

Marketing patterns vary widely from region to region or from province to province as affected by the nature of production and the availability of major copra marketing agencies. In Southern Luzon, large copra dealers do not exist; thus the pattern is from farmers to barrio buyer to exporter or extractor. The same system prevails in the Bicol area though barrio buyers are usually involved. Cebu is unique in that eight exporters, several dealers, and one extractor operate in the provinces, but copra production is relatively small. Much of the raw material comes from Samar, Leyte and other nearby provinces. In most of the Mindanao provinces, where large plantations exist, middlemen are bypassed and copra moves directly from the plantations to the exporters (Darrah and Tiongson, 1967).

Conversion of nuts to copra. The quality of copra produced depends largely on the drying methods used by the producers. The purpose of drying coconut is to reduce the moisture content to a certain level (5-6 percent); otherwise the copra will be of inferior quality. Two drying methods are frequently used by copra producers; the sun-drying method which is the simplest (done by splitting unhusked coconuts, turning the nuts meat side up and left to dry); and the "tarahan" or open-kiln drying

method. The coconut meat in the latter is dried by means of artificial heat. In some regions, coconut meat is heated directly by smoke and hot gases from fuel. Though considered a faster process compared to other methods, the copra produced is usually sooty, scorched, or unevenly dried. However, the artificial drying is much preferred by farmers since the other method - sun-drying - is contingent on the weather.

In some areas, a combination of the two methods is used. Some farmers partially dry copra in the open-kiln dryer or "tapahan" before drying them out in the sun.

A study on the marketing practices of coconut farmers in Allen, Samar (Españo, 1962) revealed that about 62 to 75 percent of the farmers employ the "tapahan" (locally known as "topoken") method of drying copra; only 15.52 percent use the sun-drying method. In Quezon, (Lapid, 1968) farmers use only the "tapahan" method of drying though drying kilns were of various designs and constructions.

A survey report of the Philippine Coconut Administration (Hicks, 1965) showed about 88 percent of the farmers employing the "tapahan" method and sun-drying, 10 percent. Only 2 percent use a combination of these two methods.

Whatever the drying method used, good-quality copra can only be produced from fully mature nuts. Soft copra with a low percentage of oil and that deteriorates easily is produced from unripe coconuts. Slow drying produces good-quality copra, hence a drying time of at least 16 hours is recommended (Tiongson, 1964).

Marketing problems. Studies have reported inefficiencies in copra marketing practices. Romero (1967) stated that marketing problems and situations are: monopoly power of the buyers at point of production;

lack of adequate financing and up-to-date information; the ability of the buyer to depress prices under the guise of deductions for poor quality and/or excessive moisture; inadequate roads and communication system; and middlemen financed by exporters and oil millers handle the warehousing facilities and even the copra sacks. These are among the factors which restrict the producer's range of marketing, and which, in Zamboanga del Norte specifically, greatly affect the marketing of copra by the farmers (Imatong, 1960).

Among the above-mentioned problems the following are often met by farmers: fluctuating prices, lack of market information, lack of definite grading system, poor barrio roads, poor transportation and lack of credit (Espino, 1962).

Livestock and Poultry

The marketing system for meat animals and poultry in the Philippines is by far the most neglected or perhaps underdeveloped of all major products of the country (Summers, 1969). This situation has been brought about by the marketing problems facing both the livestock and poultry raisers. These inadequacies and inefficiencies in marketing are felt in all its phases: from the procurement of animals at the farm, transporting these animals to the market areas, abattoir or processing plants, and even up to ultimate consumption. Sandoval (1969) associated some of these inadequacies with lack of storage and processing facilities. In the case of market organizations, operational deficiencies were attributed to lack of grading and enforcements of standards and measures, poor marketing facilities and inadequate price supports. Also pointed out were the presence of so many intermediaries along the trade channels, even at the municipal livestock auction centers.

Demand/supply of livestock and poultry. Nutrition standards call for an annual per capita consumption of at least 41.45 kilos of meat and meat products. Such requirements would entail a total supply annually of at least 217,980 carabaos; 1,390,930 head of beef cattle; 14,857,380 hogs; and 131,126,810 chickens. These figures far exceed even the highest number of livestock and poultry population ever attained in the country, highlighting the limited supply of meat products which have led to our massive importation of these items.

The nature of studies on demand and/or consumption patterns and supply now available in the country are of a very limited scale, some being a duplication of others. Hence they only present a vague picture of the actual situation in the country today. This review therefore has depended quite heavily on the few available comprehensive studies on demand for livestock products.

The most recent studies on consumption patterns were on meat; dairy products; poultry and eggs, all of which were conducted on a nation-wide scale and showed the weekly rate of consumption of the said products, and the consumption patterns in relation to income (Oliva et al, 1971a; 1971b; Dosayla et al, 1971).

Studies reveal that the weekly rate of consumption of poultry and meat averages just over 117 kilos per 1,000 people. This is equivalent to an annual rate of 6.5 kilos per capita. Dosayla et al (1971) noted that as income increases, the weekly rate of egg usage also increase. The same observation holds also in the case of dairy products consumption. For meat consumption, as income increases, the rate of usage of beef and carabeef increases sharply, going from a weekly rate of 55 kilos per 1,000 people in the lowest income group (less than ₱400/

capita) to 234 kilos in the highest income group (P1,500 and over per capita), or an increase of about 4 times (Oliva et al., 1971a). The same trend is noted for canned and processed meat with an increase of nearly six times.

Substitutes also affect the changes in the demand curve. Torres (1967) named three food items as beef substitutes: pork, poultry and fish. Of these, only two yielded economically meaningful price elasticities of demand; fish with -1.06 and pork with -2.31.

Antiporta (1970) reported that the coefficients of price elasticity of demand for beef and broilers are positive and do not have much significance. He further stressed that such coefficients signify increasing quantity demanded despite increasing prices - a relationship that violates normal consumer behavior. The coefficients corresponding to pork and fish, however, have negative signs and are statistically significant (Torres, 1967). The elasticity for pork varies from -.51 to 2.52, which indicates that for the latter a one-percent increase in price will result in a 2.5 percent decrease in the quantity of pork purchases (Antiporta, 1970).

The foregoing figures have important implications especially on the units making up the industry. If the demand for pork is indeed elastic, an increase in its price should bring a proportionately greater reduction in the quantity purchased.

Among the commodities included in the study (beef, pork, broiler, and fish), there were two pairs of complementary goods. Torres pointed out that such a relationship is out of normal economic thinking. He explained that substitutability between pork and beef may hold true under the conditions of relative abundance but they may complement one

another when meat is inadequate.

Studies conducted on livestock and poultry supply revealed that the supply movement has exhibited some degree of instability. Romero (1968) found that prices at the farm level in all regions exhibited an upward trend from 1959 to 1966. The gap existing between these two prices was found to be increasing with time in almost all regions.

Slaughterhouses and meat processing plants. Secular studies on slaughterhouses have been undertaken to determine the marketing practices involved, the operating procedures, the kinds of livestock slaughtered, and the role slaughterhouses play in the retailing of meat. Four such studies are among those included in the bibliography of Project ADAM, two of them conducted at the provincial level and the other two at the city level. The provincial studies were undertaken in the provinces of Nueva Ecija (Cabanatuan and San Jose Cities and Muñoz) and Batangas (Tanauan, Rosario, Ibaan, Cuenca, Balayan, Bauan, Lobo, Nasugbu, Taal and Lemery), while those on the city level were undertaken in San Pablo City (Laguna) and in the city of Manila (covering the national abattoir in Marulas, Bulacan and Manila Slaughterhouse, Vitas, Tondo).

In general, animals slaughtered in the Greater Manila Area are hogs, carabao, and cattle in the order (Brosas, 1969), while in the provinces including the city of San Pablo, the animals slaughtered, in chronological order, include hogs, cattle and carabao (Heyes, Jr., 1971; Paje, 1969; Avanzado, 1966).

Among the problems identified were the lack of classification

~~of animals~~; lack of well-trained meat inspectors and/or veterinarians; presence of outsiders during working hours; improper disposal of condemned carcasses; and unsanitary surroundings (Reyes, Jr., 1971; Paje, 1969; Avanzado, 1966).

Investigations have been conducted on the establishment of modern livestock processing plants at strategic locations and the role of processing plants in this respect. Alunan (1970) pointed out that marketing of both livestock and poultry can be greatly improved through the development of modern livestock processing plants in important production areas and through marketing of dressed carcasses and meat rather than live animals. Furthermore, production-oriented meat processing plants would narrow the gap existing between the producer's price and the consumer's price with much of the savings that can be derived from a reduction in marketing costs initially going to the producers (Collado et al, 1971).

As of 1967, there were 20 meat processing plants in operation, each with a complement of 20 or more workers directly concerned with actual meat processing. The biggest plant has a capacity of 400 head of large cattle and 500 head of swine for slaughter (Quintana, 1967). In addition, there are several small local product manufacturers who cater to small local brands for specific meat products.

The different processed meat products are classified into five categories. These are fresh meat, chilled meat, frozen meat, canned meat, and uncanned meat (Yu, 1969). Uncanned meat products manufactured by food processors include ham, bacon, cured meat, cured pork, etc. Canned meat manufactured by the big firms include sausage, potted

meat, beef spread, corned beef, beef loaf, etc. Marketing of canned meat products is carried out through wholesalers who distribute them to the different retail stores throughout the country (Quintana, 1970).

In spite of local production of canned meat products, the country has to resort to importation so as to augment the supply requirements of both the consumer and the processing plants. In 1966, the importation of red meat was registered at 84 thousand metric tons (Torres, 1967). Canned meat products accounted for about 80 percent of all imported meats valued at more than 10 million pesos. Accordingly, classified by kind of meat imports, beef consisted of about 75 percent of the aggregate imports with less than one percent each to poultry and pork. It was observed that while beef imports showed consistent increases, that of poultry and pork gradually decreased through the years.

The primary sources of imported beef include Australia, New Zealand, Argentina, and the United States. Pork comes from Denmark, and mutton from New Zealand. Canned meat is imported from Argentina, Australia and France (Quintana, 1970; Antiporta, 1970).

Like other agricultural products, marketing of processed meat has its own setbacks. Among these are: 1) prejudice against locally processed meat products; 2) shortage of raw materials; and 3) high price of raw materials. Yu (1969) pointed out that the low patronage of the locally processed meat products does not lie primarily on quality but on the prejudice of the consuming public against locally produced products. Majority of the consuming public prefer imported canned meat products in the belief that imported ones are much better in quality. Yu added a contributory factor - this is

the lack of sales promotion drive on the part of local producers. Foreign brands are extensively advertised since the producer usually can afford bigger promotion expenses. Added to this, imported canned beef is subject only to an 8 percent ad valorem duty under the present Tariff and Customs Code.

On the other hand, contributing significantly to the increase of prices of meat products at consumer level are: the shortage in supply of red meat; and high price of local beef as raw materials for processing. Yu (1969) mentions that if the country were to obtain the beef from the local cattle industry to fill in the nutritional requirements of our people, the cattle population would be completely depleted within a year.

Concomitant to the two major problems on meat processing is the establishment of meat processing plants in strategic places. The UPCA Department of Agricultural Economics conducted a study to identify cities appropriate as locations for modern processing plants (Collado et al, 1971). Mentioned as most logical sites for modern processing plants include Bacolod, Batangas, Cagayan de Oro, Cebu, Dagupan, Davao, General Santos, Iloilo, and Naga. The establishment of modern processing plants will enable the producer to reduce costs incurred in marketing their animals, thus contributing initially to their savings.

Processing plants, however, involve large capital outlays. The estimated capital requirement for the establishment alone of the proposed plant aggregated to ₱4 million; and operating capital would amount to ₱9 million (Alunan et al, 1971). The plant as proposed will have a capacity to slaughter 400 head of hogs and 80 of cattle

per day. This is estimated to operate at 50 percent capacity and should reach full capacity within 10 years. The most logical initial outlet for the processed products considered is the Greater Manila area.

Transporting Livestock and Processed Products

Various types of meat animals are produced in every geographical area of the Philippines. The pattern of production shows that both cattle and carabao are far greater in number in areas with lesser consumers and processors than areas where most consumers are situated and processing plants are located (Summers, 1970). Bureau of Agricultural Economics (B/Econ) data show that about 28 percent of the cattle and carabao population are in Mindanao, 27 percent in the Visayas, while less than 10 percent are in Central Luzon. On the other hand, about 31 percent of the hogs are raised in Central Luzon and Southern Tagalog, 27 percent in the Visayas and only about 18 percent in Mindanao. With these data and situation, therefore, it is expected that various ways and means of transferring the animals to market are employed.

Transporting livestock from the farm to the market area, abattoir, or processing plants is far more difficult than moving other agricultural products. Depending on the geographical site and the availability of facilities, livestock and poultry are commonly transported by any or a combination of the following means: trucks, rail, trailers, ships or lorries. In cases of nearby farms, animals are led or driven to the markets from the farm.

Austria (1969) reported that, in most cases, due to the unavailability of a good transport system, animals are driven to the wharves where it takes several days before they can be loaded aboard a steamer for

Manila. This delay in the movement of animals causes heavy losses in weight due to shrinkage and in some cases deaths. This is particularly noticeable among animals coming from as far as Mindanao.

Furthermore, whatever the means of transportation (be they by land, sea or air) animals are not provided with comfortable quarters while journeying from the farm to the abattoir, resulting in serious injury and even mortality (Antiporda, 1970).

The lack of adequate transportation facilities leaves provincial producers at the mercy of middlemen who seem to be the only buyers at ports of call. Nubla (1969) stressed that after a few days of waiting and added expenses for animal feed and care while the animals are enroute to the market, not to mention animal shrinkage, the producer is forced to sell at very marginal profits, at times with none at all, when the boat officials require the unloading of the animals. The same observation also holds true with chickens (Austria, 1969).

Marketing of Chilled Carcasses

Alunan and Darrah (1970) studied the marketing of live cattle and hogs versus chilled carcasses from distant areas. Their analysis revealed that the total cost of shipping live hogs to Manila ranges from ₱20 - ₱57 per head from Ilcilo - Masbate to ₱48.63 per head from Davao. With the exception of Cagayan de Oro, the cost per head declines as the shipping time to Manila decreases. Shippers in Cagayan de Oro incur relatively high costs in procuring hogs from the Bukidnon area which raises their total cost above that for Cotabato.

The analysis for hog shipments shows that the potential savings available through marketing chilled carcasses instead of live hogs are

substantial. The savings per kilo dressed weight range from ₱0.15 to ₱0.64 or 33 to 59 percent.

Mindanao firms ship a total of nearly 4,500 head of live animals per shipment. During transport, shrinkage less amounts to seven percent or an average of 23 kilos per cattle. The basis used for determining weight losses are 327 kilos farm weight and 304 kilos Manila weight. Animals shipped from the Visayas usually have a shrinkage of 19 kilos or 7.2 percent based on the average farm weight of 244 kilos. Shipping costs for Mindanao shippers average ₱112 per head while, for Visayas shippers, shipping costs average ₱96.00 per head.

Alunan and Darrah further noted that processing cattle right in the production area and allowing three percent shrinkage for cooling and transporting to Manila markedly reduce shipping costs compared to transporting live cattle from Mindanao to Manila. The process saves an amount equal to ₱0.26 per kilo or approximately 30 percent of the shipping cost. From the Visayas, the total cost of shipping chilled beef carcass was computed to be ₱51.25, on a dressed weight basis. The cost was equivalent to ₱0.41 per kilo, a saving of ₱0.26 per kilo or 39 percent (Noble, 1969).

Fanggat (1969) reported that cattle farmers in Batangas incur transporting costs of ₱5.80 per head for an average distance of 18.7 kilometers. He further noted that transportation fees for small farms are greater than those for large and medium farms by about ₱1.20. There was no given explanation to this, but it can be surmised that the number of animals transported would account for the difference in cost.

Practices and Problems

Practices in marketing livestock vary from area to area. In some

areas, most of the livestock are sold to buyers who go to the farms; in other areas most of the animals are sold through market centers, while in other areas the producers ship their own livestock to market. However, no single method or system of selling exists exclusively in any area of the country. Thus, there is a multiple number of livestock marketing systems within the country (Summers, 1969).

Livestock buyers also vary according to their needs for or use of the animals and their proximity to the source. In general terms, Quintana (1970) reported that sales from average farms and households with livestock are made mostly on local basis either to other farmers and/or livestock dealers, and retailers. Sales of work animals are made to other farmers and dealers while sales of animals for slaughter are made mostly to dealers and retailers. In the case of hogs a considerable number are sold directly to consumers.

Cattle marketing outlets. Darrah and Tiengson (1969) reported that the major market outlet for cattle or large animals is the livestock dealer, who accounts for two-thirds of the sales in Mindanao (Ablan, 1967). Butchers rank second with 19 percent of sales, and other farmers rank third with 13 percent. Butchers are the most important outlets for the smaller farms, while dealers are more important to the large farms.

Moreover, Darrah and Tiengson further revealed that sales to livestock dealers are made by more than 75 percent of the farms, 20 percent to consumers, and only few farms to retailers. As the size of farm increases, the importance of sales to dealer increases and sales to other outlets decreases.

Swine marketing outlets. The major market outlet in Betangas for swine are local dealers accounting for exactly two-fifths of the total sales (Villegas, 1969). A substantial number was absorbed by swine raisers and butchers. Mentioned as other minor outlets were out-of-town hog buyers, wholesalers and cooperatives.

In general, the important reasons given for selling to specific buyers are higher prices offered, immediate payment, and convenience. For small farms, friendship or family kinship is the second most important reason (Zablan, 1967).

Villegas (1969) on the other hand, observed that the price was a major determinant among swine raisers in the choice of market outlets. He furthermore revealed that eighty-six percent of the hogs are sold on cash, and the rest on installment or on credit.

Poultry marketing outlets. Market outlets for poultry and eggs differ considerably from the market outlets used by livestock producers. For small poultry producers, the market outlets are the processing plants, public and supermarkets, restaurants and hotels, and local consumers (Quintana, 1970).

Summers (1971) also reported that an estimated 30 percent of poultry products are sold direct either live or dressed. He also mentioned other institutional buyers such as hotels, restaurants or hospitals. Wholesale buyers constitute the major market outlet for dressed birds. They in turn distribute dressed birds to restaurants and supermarkets (Austin, 1969). In the case of egg marketing, farms with small commercial flocks depend heavily upon feed dealers as an outlet for wholesale-retailers, hatcheries, feed dealers, and other large buyers of eggs (Quintana, 1970).

Selling methods. Summers (1969) observed that most animals are sold by the head basis in almost all parts of the country. This corroborates the findings of Derrah and Tiongson (1969) and those of Villegas (1969). The per head basis is generally the method adopted by both the small and medium swine raisers. There are, however, questions arising from this practice. Example: a piglet is sold for 60 or 70 pesos per head, but does this show the actual price? What is the actual price in terms of kilos? One piglet may weigh 16 kilos, another 20 kilos but may be priced similarly. Is this rational on the part of the producer? Would the use of scales in weighing the animals give fair prices to both the producers and the consumers, or would this also greatly affect the buyers? These are some of the questions for which Project ADIM should try to get the answers, and/or for which it may suggest some plans towards the solution of this aspect of marketing.

Some of the other problems in the marketing of livestock and poultry are lack of market information, low slaughter weights, inadequate transportation facilities, slaughterhouses, and refrigerated storage facilities, not to mention inadequate financing (Quintana, 1970). Tong collection also adds to cost incurred and reduces the profit of the producers while increasing the cost to the consumers (Nubla, 1969).

A number of persons of authority on livestock and poultry production and marketing suggest the establishment of auction markets in strategic places. Nubla thought this necessary, together with the improvement and/or construction of feeder roads leading to the barrios. Auction markets, since bidding is public and competitive, will eliminate the pressures applied on livestock marketing by some livestock buyer syndicates. The establishment of public auction markets will give the farmers a fair price and lessen the price manipulation of middlemen (Korzan, 1970; Summers, 1970; Darrah and Tiongson, 1969).

AGRICULTURAL MACHINERY AND FERTILIZER PRODUCTS:

STATUS AND DISTRIBUTION SYSTEMS

Agricultural Machinery

The agricultural machinery situation in the Philippines may correctly be assessed as inadequate in terms of number. Central Bank (1971) reports that no facilities for the local manufacture of tractors, except for some tractor parts, exist in the country today. There are however eleven establishments engaged in the assembly of tractors; three of these firms have installed complete machine shops and auxiliary facilities for the manufacture of parts and repair of tractors.

Presently, there are ten firms serving as distributors for foreign-made power tillers. Small workshops buy the prime tractors. Two firms are engaged in the assembly of power tillers from completely knocked-down (CKD) parts with an aggregate capacity 7,000 units per year.

Lantin (1971) says that rice processing machinery used in the Philippines is mostly imported. There are four companies manufacturing rice hullers and at least one manufacturing cono-type rice mills. Cono-type rice mills in the country number more than 3,000.

Central Bank likewise reports that the Philippines imported a total of 4,448 threshers from 1963-68, and a total of 1,652 hullers and cleaners during the same period. In 1968, 3,844 hullers were imported as compared to only 278 in 1967, an increase of 1,282 percent. For hullers and cleaners, a total of 636 were imported in 1968 as against a mere total of 31 in 1967, showing an increase of 1,951 percent. This showed a

sharp increase after the country incurred a decrease of 97 percent in 1967 imports when the Philippines imported only 31 hullers and cleaners for the whole year.

Though the country has resorted to importations of grain hullers, cleaners and threshers, the demand for the country's local manufacture of such agricultural machinery as tractors and power tillers is still very low. The rated capacity of farm machinery assemblers is very much in excess of the present Philippine demand and

The large size assemblers by Philippine standards, are operating at only 30 percent of their rated output. This very big discrepancy between installed capacity and actual output is due to the sluggish advancement of farm mechanization in the country.

The increase or decrease of farm output greatly influences the demand and supply of agricultural machinery. Demand becomes erratic, that is, it may increase or decrease depending on the yield of the crops. This is so, because farmers are capable of making investments only at times when the rise in their income is more than enough to satisfy their necessities of life. Moreover, once acquired it will take many years before the price of the piece of equipment is recovered.

Modern grain processing projects employ almost fully mechanized handling of grains, unlike that in small rice milling enterprises wherein handling and most other operations are done by hand. This is exemplified by an integrated rice processing project in Bay, Laguna

This corporation and other private large firms enter into contract with large farms producing the kind of crop needed by the firm. This assures the producers of a ready market. They are not hampered by fluctuating prices of consumer goods. There are other integrated processing firms which grow the crops complementary to their needs.

This partly supports the firm in times of shortage of raw materials.

Likewise, small farms under contract with such companies are compelled to produce high quality products or are provided with incentives to increase production because of assured prices and markets. For example, a seed corporation in Laguna has provided incentives to farmers in Laguna and even in other provinces such as Nueva Ecija, where it has a branch at Cabanatuan City, to produce high quality and high producing varieties specified by the company. The farmer's eagerness to comply with the requirements pegged by processors prompts them to acquire at least one power tiller to improve and intensify their production. Such a desire ~~is~~^{is} important in the attainment of mechanization of his farm and in the initial processing of his products.

Government Program and Policies Affecting Mechanization

To set up the production of agricultural crops, the government has set up some programs to promote farm mechanization of farms, whether small or large, as it is now aware of the importance and benefits that could be derived from it for the realization of the goal of food self-sufficiency.

One of these is the launching of the World Bank Farm Mechanization Program. This was initiated for the purpose of extending medium and long-term loans to small farmers. The World Bank granted a loan \$5 million for this purpose through the rural banks.

Under the program, farm machinery and implements such as tractors (hand tractors and attachments) for land improvement and cultivation; farm implements for planting, spraying, mowing, harvesting and dusting, equipment and materials for livestock and poultry raising and fish

culture; may be acquired by eligible borrowers defined under the regulations.

Very recently, the World Bank again extended a substantial loan in support of the grain processing industry. This is one of mechanically-related industries which are provided with investment incentives. Included under this are grain dryers, rice mills, and equipment necessary for grain handling, storage, and marketing.

Other types of credit in the form of relatively smaller loans are available from the ACA. Farmers can avail of these loans for purchase not only of machinery but also of other production inputs such as fertilizers, chemicals or seeds.

These credit institutions, however, require the farmer to put up collaterals for the amount borrowed. Thus, in spite of less strict procedures, many farmers are still unable to meet credit requirements. Perhaps minimization of red tape or of excessive bureaucracy in government lending facilities might solve this limitation.

The Fertilizer Industry

Background and present situation. Fertilizer production and distribution began as a government monopoly with the building of the Maria Cristina Plant in Mindanao in 1951 by the National Power Corporation. Two years later (1953), a private-sector superphosphate and complex fertilizer plant with a rated annual capacity of 24,000 metric tons, was established at Manila. The Maria Cristina Plant became a private entity in 1960. A third fertilizer plant was set up in mid 1966, at Limay, Bataan and a fourth at Toledo City, Cebu.

The combined rated capacity of the four companies total 7,000,000

metric tons of fertilizer materials. Output of these plants make up 90 percent of total fertilizer production.

Although the fertilizer industry has made significant monetary contributions through revenue sources, it found itself operating at only 37 percent of the rated capacity in 1970. Data from the Fertilizer Institute of the Philippines show that the industry as a whole has never operated at more than 47 percent of its rated capacity. This low utilization of domestic capacity appeared to be due to continued competition from direct imports particularly in the sugar industry; difficulties relating to plant operation, and the failure of plant capacity to match, product by product, the local demand.

Domestic consumption. Fertilizer consumption in the Philippines rose during the period 1954 to 1970 from 20,000 to 170,000 metric tons of plant nutrients. According to Barker (1969), the use of chemical fertilizer in the Philippines since 1950 has been growing at an annual rate of about nine percent based on the quantity of fertilizer imported and produced locally. In 1950, the bulk of the fertilizer was ammonium sulfate. At present, mixed fertilizers and urea make up a considerable share of the total.

Secularly, the regions of the country varied greatly in the use of fertilizer. Projections from FIP show that the highest use of fertilizer is in Southern Tagalog especially in Batangas and Cavite provinces. The Western Visayas region, indicated the second highest usage, much of the amount going to sugarcane plantations, and third in rank is Central Luzon. Other regions use less because of fewer distribution facilities and greater distance to markets for farm products

(Shields and Gray, 1971).

Government activities affecting fertilizer demand. A number of agencies are promoting the use of fertilizer in the country (De Guia, 1970). The Rice and Corn Production Coordinating Council (RCPCC), now the National Food and Agriculture Council (NFAC) is the agency responsible for the implementation and coordination of the food productivity campaign of the government which expands from the region down to the rural areas. The Council also concentrates its efforts on numerous priority provinces and gives incentives and aids to the farmers through extension work and thereby promotes the use of fertilizer to increase farm output.

The Agricultural Credit Administration (ACA) is a government agency entrusted with the task of extending loans to farmers or agriculturists for use in fertilizer purchase. This credit extension is designed to help the small farmers avail of some fertilizer for their use in the farm and to accelerate the adoption of fertilizer practices.

The Agricultural Loan Fund is under the supervision of the Department of Rural Banks, Central Bank of the Philippines (DRB-CB). It extends loans to small farmers for use in the purchase of inputs such as fertilizer. The ALF loaning system differs from that of the ACA in one aspect - it does away with the collateral requirement.

The Cooperative Administrative Office (CAO) on the other hand, encourages cooperatives which can produce and sell fertilizer at lower prices.

The Development Bank of the Philippines (DBP) also extends crop loans covering other farm inputs and perhaps subsistence, but is only

limited to palay, corn and vegetables.

The Philippine National Bank (PNB) is a semi-government entity which also extends financial aid not only to crop producers but also to members of the SPCMA.

The urgency of the need to accelerate fertilizer adoption among farmers has prompted the government sector to promote bills that affect and promote fertilizer distribution.

Under Republic Act 1609, the Agricultural Credit Administration (then ACCFA) appropriated ₱45,513,000 for the purchase and distribution of fertilizer over a period of seven crop years (1956/57 to 1962/63). Purchases were made principally from domestic cooperatives. The subsidy represented more than 50 percent of the commercial retail price (Barker, 1969).

Barker also cited Republic Act 2084 which provided for the distribution of fertilizer specifically to rice and corn farmers at 50 percent subsidy. In 1964, ACA terminated its fertilizer subsidy program, but continued to sell fertilizer through cooperatives at rates slightly below the current commercial rates. The passage of Republic Act 3050 in June 1961 removed import duties on fertilizer cooperatives. This tariff which amounts to 20 percent of the cost and freight value to the Philippines was however reinstated for cooperatives in 1965, but imports made by cooperatives are currently exempt from the seven percent advanced sales tax required of all private importation and domestic production.

Fertilizer distribution system. The extent of fertilizer use among the Filipino planters is still limited and shows the need to further develop and promote its use on farms. Shields and Gray (1971)

indicated that less than 50 percent of the planters in the country are currently using fertilizers. Rates of use are below recommended levels. To step up the use of fertilizer, both the government and private sector have exerted efforts in promotional extension campaigns. Hand in hand with these efforts, an efficient distribution system of fertilizer should be organized to provide the farmers with the needed supply of fertilizer at the proper time, place, quantity, price and payment terms.

There are basically three types of private enterprises that are engaged in fertilizer distribution: local producers, trading firms and cooperatives. Added to these private distributors is a government agency, the Agricultural Credit Administration (ACA), which has taken an active hand in fertilizer distribution through its registered farmers cooperative (de Guia, 1970).^{1/} However, the methods employed by each company and by the government differ considerably.

The distribution pattern adopted by each company depends on its individual marketing set-up. Only one company leaves its marketing and distribution to a sister marketing organization with a corporate identity of its own. The rest of the local producers have marketing departments within their own organization. These local producers deal primarily with their dealers and distributors, directly with large customers such as plantations, planters' association and cooperatives. Distributors, on the other hand, sell to retail dealers who in turn sell to farmers (Barker, 1969).

^{1/} De Guia noted that there is some overlapping among these categories, but the distinctions are made with respect to the distribution function in the context of the overall purpose of the firm.

Among planters' cooperatives, the Sugar Producers Cooperatives Marketing Association (SPCMA) is the most active and moves the largest tonnage to its affiliated associations and association planter member (Shields and Gray, 1971). The cooperative also maintains warehousing facilities for fertilizer initially stored for distribution to member associations.

The Agricultural Credit Administration (ACA) system of distribution differs considerably from that of the local producers and the planters cooperatives. ACA distributes fertilizer through its authorized farmers cooperatives (FACOMAS).

De Guia observed that the distribution system of ACA consists of three central depots, 9 sub-terminals, and 275 local warehouses (there were only 155 local warehouses reported in 1969, which increased by 54 percent in 1970.^{2/} As of 1971, there were 25 authorized distribut (FACOMAS) and 311 designated outlets. Serving as liaison officers among the FACOMAS, the outlets and warehouses are 125 district fertilizer agents. The Agricultural Credit Administration (ACA) through these district fertilizer agents, also sells fertilizer directly to farmers for cash^{3/}

The terminal warehouses of ACA are located in three (3) strategic place , Iloilo (Western Visayas); Polo (near Manila); and in Cebu. These terminal warehouses serve as the sub-terminal or district warehouses within their respective spheres.

^{2/}Computed from the data reported by Barker in 1969 and de Guia in 1970.

^{3/} For a more vivid description of ACA's distribution system, see Barker's paper, the Philippine Fertilizer Industry: Growth and Change. 1969.

Distribution facilities. Likewise, local fertilizer producers also maintain plant-site warehousing facilities. In addition, they operate warehouses in major cities and towns accessible to major transportation routes. These warehouses serve as the supply points for regional distributors and dealers.

Transport and movement. The movement of a bag of fertilizer from the plant-site warehouse or terminal warehouses to the farm comprises the biggest bulk of the distribution costs. Each of these processes adds up to the costs of fertilizer up to the consumer level.

De Guia traces fertilizer movement in this manner -

A bag of fertilizer leaving plant will probably be loaded on a truck, hauled to a port where it is unloaded, then reloaded on a seagoing vessel. The same bag, upon reaching a designated port-of-call, will again be unloaded to the pier, perhaps to be reloaded upon a large barge for towing to an adjoining island which has no deep-water bays to ocean liners to dock. Unloaded from the barge, it is once again onto trucks to be hauled to a warehouse to be unloaded and piled. Beyond these could be many more changes before the bag is found on the farmer's carabao-drawn cart.

The usual mode of transport utilized in the movement fertilizer to the different islands of the country are barges and commercial inter-island vessels or, in some cases, a combination of the two. Freight costs are less by means of barges than by means of commercial inter-island vessels due to large shipments.

For inland movements, cargo trucks are the most popularly used. Dealers withdrawing from the warehouse employ cargo trucks for bulk withdrawals and jeeps, for small-volume withdrawals.

Shields and Gray (1971) indicated that the rates in a given region consider the demand for cargo space, competition among trucking companies, opportunities for backhaul arrangement, etc.

Railways are also used in limited places of the country like Bicol region and in Panay.

Another distribution cost incurred by producers, dealers of distributors is for handling. Handling cost occurs during the transfer of fertilizers from barge to truck, truck to barge, dockside to truck, truck to warehouse stock piling. They, however, vary from region to region, with average rates ranging from ₱7.00 to ₱8.00.

If fertilizer producers, dealers and distributors incur so much cost in the process of marketing their products, they also incur expenditures during the same process. De Guia identified them as the promotional expenses per unit of output.

Problems of the Fertilizer Industry

Pricing of fertilizer. The domestic price of fertilizer is related to the input cost. According to Barker, domestic producers must pay an advanced sales tax on all sales putting them at a relative disadvantage in making sales to cooperatives.

Prices paid by farmers for fertilizers differ from place to place. Shields and Gray observed that prices of fertilizer are higher in those areas farther from the primary distribution cities. For example, the total mark-up in Nueva Ecija from the port to dealer represent 23 percent of the dealer price. whereas, in more remote areas like Cagayan Valley, the mark-up represents about 35 percent of the dealer price (Barker, 1969). This is perhaps due to freight rates incurred which tend to increase prices at the consumption level. This fact is ironic, since most of these farmers that are affected are the poor ones for whose assistance the programs of the government (extension and promotion)

are designed.

Other problems are: heavy handling costs which emanates from the geographical conditions of the country; the inadequate physical infrastructures which increase the cost of land transport and inter-island freight rates; the burdensome municipal taxes;^{4/} the limited and seasonal demand in some areas which affects the maintenance of large inventories by private companies, thus, they cannot effect savings through big volume shipments; the inability of the dealers to hold large inventories because of limited dealer capitalization; and the existence of institutional competition;. To the last problem confronting the industry, this is specifically directed to ACA sales of reparation imports which allegedly infured the sales of local producers.

De Guia (1970) furthermore mentioned the shortage of credit, high warehousing costs, duplication of distribution routes and price distortions especially at the consumer or farm level.

^{4/} De Guia reported that dealers being separate entities from warehouse distributors must pay their own municipal sales tax that the wholesalers incurs in selling the fertilizer to them.

AGRICULTURAL CREDIT IN THE PHILIPPINES

Credit Agencies

Primary credit activities in the Philippines are being carried out by the Development Bank of the Philippines (DBP), the Philippine National Bank (PNB), the Agricultural Credit Administration (ACA), the rural banks, commercial banks and insurance companies, and the landlords, middlemen, and merchants who dominate the scene.

The Development Bank of the Philippines (DBP) replaced the Rehabilitation Finance Corporation (RFC) which had been created by R.A. No. 85 in 1947 to take care of the rehabilitation, development and expansion of agriculture, commerce and industry, the reconstruction of property damaged by the war, and the diversification of the national economy. The DBP has almost the same objectives as those of the RFC, i.e. to provide credit facilities for the development and expansion of agriculture and industry, for the diversification of the national economy and for promoting the establishment of private development banks in provinces and cities. The charter of the DBP has set loaning percentages as follows: 45 percent for industrial loans, 35 percent for agricultural, and 20 percent for real estate, government and other loans. It has also provided that 25 percent of the investible funds of the GSIS and the SSS be invested on bonds issued by the DBP.

The Philippine National Bank (PNB) was established in 1931 following the approval of R.A. 3895. It extends agricultural time, crop, commodity,

and long-term loans to farmers besides giving rural banks financial assistance, especially in areas where it has no branches.

The Agricultural Credit Administration (ACA), formerly ACCFA, has the dual role of providing liberal credit to farmers and promoting the growth of cooperatives (FACOMAS). Credit from ACA is either given directly to farmers or channelled thru the FACOMAS. A promise to pay and a pledge to deliver a certain amount of produce to the local cooperative (FACOMA) are the only securities required by the ACA. The agency has evolved a liberal and reasonable scheme of extending credit to farmers. Besides maintaining a low level of interest rates for loans it has extended, it has also adopted a policy of refinancing borrowers who fail to pay back their loans on time due to fortuitous events or force majeure and of still giving them priority over other borrowers. ACA released ₱46 million in FY 1969-1970. The bulk of the loans it granted was for production purposes (₱31 million). Commodity, marketing and facility loans made up ₱15 million of the total credit granted by ACA for the same period. The total loans granted by ACA from 1960 to 1970 amounted to ₱179 million.

The development of FACOMAS as marketing institutions and agricultural input-suppliers has been neglected due to the preoccupation of the ACA and the FACOMA management with the credit function. As the Economic Development Foundation (EDF) puts it, "Farmer-members regard the cooperatives as essentially credit rather than marketing associations."

Landlords and monopolistic credit conditions prevail and pervade every nook and corner of the farming sector. Landlords and private

money lenders are the primary sources of credit in almost all rural areas in country. Rivera and McMillan (1952) pointed out the almost exclusive monopoly of middlemen, merchants and landlords as sources of credit. Gapud (1959) also mentioned this fact in his survey of 5,144 farmers in seven regions of the Philippines in 1955.

A case study conducted by Alcazar in 1961 provides a miniature description of the monopolistic credit condition in the rural areas. The same author also observed that the rice industry in Bo. Cagamutan, Leganes, Iloilo is likewise being financed by landlords and private money lenders.

On the basis of trends, Tablante (1965) predicted that private money lenders would remain as dominant sources of agricultural credit. A survey conducted by the Bureau of Agricultural Economics for the crop year ending June 1967 showed that the proportion of farms which obtained credit from institutional sources to all farms reporting the use of credit was 22 percent in the case of the farmers who are designated as co-operators of the Rice and Corn Program and 25.2 percent in the case of the non-cooperator farmers. The proportion of all reporting farms which obtained loans from landlords is 28.2 percent for cooperators and 41.8 percent for non-cooperators.

Romero (1967) reported that for the same year 71 percent of the farmers obtained loans from private individuals and only 29 percent borrowed from recognized credit institutions. On the other hand, Pamunco (1968) observed that private lenders and landlords still remain the primary sources of credit. In 1971, the Department of Agriculture and Natural Resources (D.A.N.R.) estimated that 20 to 50 percent of the agricultural credit requirements of the small farmers are still

met by local money lenders. This was supplemented by a report that landlords remain the most dominant source of rice financing in the Philippines (Hears and Agabin, 1971) and by some sectoral studies like those of Almario (1971) and Buluan (1967). Watanabe, Asian Development Bank President, made a similar observation when he said that the share of non-institutional agricultural credit range between 40 and 95 percent in most developing Asian countries (1971).

R.A. 720 (Rural Banks Act) was passed in 1952 providing for the creation, organization and operations of a system of rural banks throughout the country designed to give easy credit facilities on reasonable terms to small farmers, merchants, industries and cooperative. The rural bank program was derived in such a way as to make rural banking as simple as possible and adapted to the set ways and low levels of education of the rural people (Tablante, 1965). Rural banks have also the secondary purpose of familiarizing rural folks in the use of banking facilities.

The rural banking system also facilitated the granting of CB-AGLF and CB-IBRD loans to the farmers. The AGLF plan was carried out in support for the Four-Year Rice and Corn Self-Sufficiency Program of 1966.

Rural banks and development banks may be designated agents of the ACA under the Land Reform Code.

Landlords and Other Private Money Lenders

Farmers seem to prefer landlords and other private money lenders to established government agencies and private institutions for credit. Most frequently cited reason for this preference is convenience (Alcazar, 1961).

Loans from these sources require little and no paper work at all. As observed, some farmers are not fully aware of the procedures to be followed in securing a loan from bank (if not the presence of the credit institutions itself). Farmers' knowledge of the location of the credit agencies have a significant bearing on their credit preferences and practices especially in cases when it is indicated that the majority do not seem to know where the said establishments are located. In Maghaling, Kanangga, Leyte for example, Manulat (1954) reported that 56 percent of the farmers were either mistaken about or did not know the exact location of the nearest bank. A significant portion of farmers who generally have limited education are simply awed and discouraged by the large number of credit instruments and documents which are a part of a loan procedure. Clemente (1967) indicated that some farmers even when offered low-interest bearing loans requiring no collaterals like those under the AGLF program would not prefer such loans because of the "too-much-paper-work" requirement attached to their procurement, plus of course, the concomitant delayed approval of the loans.

Tablante (1965) gives a more detailed explanation of why landlords and private money lenders are the farmers' major credit source:

Having a low income as a result of small size of his farm, low production, inefficient use of farm labor, poor farm organization characterized by non-cult ure, one crop system of farming, and loss of income thru middlemen-control of agricultural marketing, it follows that the farmer will have little or no savings to use as capital to improve his farm business operations, and a vicious cycle is established from which he can hardly extricate himself. He, therefore has to rely heavily on credit for his capital requirement; and yet for lack of acceptable mortgageable property and because of the facilities of institutionalized sources of credit. Under the circumstances, the private money lender becomes his major source of loans.

Datey (1970) added that rural banks tend to place too much emphasis on the feasibility of the projects to be financed.

De Guzman (1957) said that rural banks have a tendency to favor landowners in the granting of agricultural loans, understandably because of the substantial security they can offer. This finding was verified by Aquino (1955) in his study of five rural banks in Visayas and Mindanao. He found that banks tend to give larger loans to the landlords, perhaps because of their ownership of land. So did Avellanosa (1971) in his assessment of the lending operations of the rural banks of Digos, Davao del Sur.

In this regard, rural banks and other established credit institutions have a basis for their preference. Where payment of credit so largely depends on crop returns and when the security offered is inadequate or none has been offered, many loan accounts become overdue, resulting in losses. It has often been mentioned that poor repayment is the most difficult problem that rural bankers, FACOMA and ACA creditors face at present. There are examples supporting this assertion. Sacay (1961) said that the continuance of the "crop loan program of ACCFA is being threatened by the farmers' failure to pay their loans." For a while the ACCFA-FACOMA tandem served as a show case for rural progress in the country until 1960 when the ACCFA suffered financial losses due to delinquent loans (Cruz, 1972). As a consequence, FACOMA operations likewise suffered set-backs and failures. After 1959, some 300 of the 536 FACOMAS organized under the aegis of the ACCFA ran out of operating funds, lost membership support and verged on total collapse.

Tablante (1965) noted that many people in the rural areas take

the attitude that they do not have to repay loans coming from the government. The AGF Loan Program of the Central Bank is also confronted with difficulties because of the non-payment of matured loans (Clemente, 1969).

Some Weaknesses of Credit Institutions

The failure of credit agencies to substantially cut into the lending share of the landlords and other private money lenders may also be partly attributed to some of their built-in weaknesses.

ACA/FACOMAS. FACOMAS do not function effectively because of weak membership support and cooperative management, in addition to limited funding. Farmers have not yet regarded cooperatives as tools for them to become self-dependent but simply as providers of credit and marketing services. Perhaps tradition has something to do with weak membership support, which appears to be the bane of the cooperatives. Cruz (1972) said that perhaps the Spanish rule in the country left long-lasting influences in the minds of the subjects, making transition from a traditional community to a modern, profit-sharing cooperative effort a very difficult process.

The weak membership support of FACOMAS can be gleaned from its roster of inactive members. As of June, 1970 inactive FACOMA members numbered 258,470, greater than its active member totalling 108,652 (DaEcon, 1971). Cooperative membership, education and employee training have received very little attention. Cooperative education services of government agencies and private organization remain largely uncoordinated.

The failure of FACOMAS to meet the needs of their members also has stemmed from their limited finances and facilities. Delorino

(1970) said that a number of functions of the ACA and farmers' cooperatives are not backed by funds. The operation of the FACOMAS is dependent on that of ACA (formerly ACCFA). It is a fact that ACA (ACCFA) has been crippled by the non-release of the appropriated funds for its operation. Cruz (1972) documented this when he noted that the government release of the ACCFA's revolving capital was consistently low, its highest being 40 percent only of the ₱110 million authorized by law. An example of the financial difficulties met by cooperatives can be gleaned from the case of the Catubig-Las Navas in Catubig, Samar.

Noble et al (1965) described the operation of the FACOMA as follows:

The major problem of the association was the lack of a warehouse where its members can deposit their farm produce while waiting for better prices. Limited funds for merchandising activities due to the small amount granted by the ACCFA crippled the FACOMA the needs of its members.

Loans for the FACOMAS take considerable time to be processed, to be approved and to be finally released to borrowers. Tablante (1965) reported delayed releases for their loans. Three-fourths of those experiencing late releases reported borrowing outside. Almario (1971) made a comparative study of the length of time ACA, rural banks and private lenders need to approve and release loans and found that on the average, it takes 15 days before ACA loans are released from the date of application; rural banks, four; and private individuals, two days.

Rural banks. The organization, management and control of the rural banks, although far better than that of the other government agencies, has flaws nevertheless. Datey (1970) describes these weaknesses as follows:

Most rural banks are family-owned and controlled. Thus, competence of the management depends entirely on the calibre of the family members. Moreover, the families who run these rural banks usually have multifarious business interests which prevent them from effectively controlling their enterprises.

The weaknesses of the rural banking system are reflected in the operation problems of the Philippine National Cooperative Bank (PNCB). Dalisay (1965) enumerated the key problems of the PNCB as follows: inadequate capital, the managers of the bank are technically incompetent, lack of independence in decision-making and in the selection of the bank staff members, and not enough government support.

Quintana (1966) cited another reason why small farm holders depend on private money lenders when he said that these borrowers often wish to avoid the red tape involved in borrowing from rural banks. Limited capital may also explain why the rural banking system has not succeeded in really cutting into the credit share of the landlords, merchants and middlemen.

Lack of Credit Facilities

The farmers' seeming preference for landlords and private money lenders may have also been caused by the lack of alternative credit sources in the rural areas. Tablante (1965) has underscored the need for institutional sources of credit in the rural areas in his analysis of the agricultural credit problem in the Philippines. Malayo (1969) however, qualified this need when he says that

There are already sufficient credit institutions providing possibilities to agriculture...Tenants though hardly have access to these credit institutions which require real or chattel mortgages. Such that there remains a need for the government to expand credit facilities that will provide timely credit at the grass root levels.

Perhaps related to this is Tablante's opinion which runs as follows: "The modern credit institutions are quite remote from the type of socio-economic organization existing in the rural areas where the relationships are personal and traditional rather than business-like, where written records are rarely kept, where transactions are generally sealed by oral promises based on trust and honesty rather than sophisticated or elaborate legal documentation."

The Present Credit Structure: An Assessment

At the 7th Agricultural Credit Conference not too long ago, the present credit structure in the country was assessed as having "... all of the basic principles necessary in a good system of agricultural credit. Loans are small, easily obtained at frequent intervals and requires very little security. However, this agricultural credit system, as it operates today, has many undesirable features, one of which is that the farmer has no opportunity to sell his product to the highest market outlet."

Takashashi (1971) says, "Landlords ruthlessly collect debts out of the tenant's share of crops Thus, the farmer-borrowers have only one market outlet which gives way to a semi-monopoly marketing system with all of its disadvantages (like low prices to producers)."

The system also chains the small farmers to the usurious practices of the local private money lenders; interest rates from these sources are reported to go up to 50 or even further up to 300 percent. Mears (1971) commented that "In recent years, most of the millers and traders may have been able to borrow at interest rates of not over 14 percent but about half of them faced higher rates, some in excess of

200 percent."

Pamuceno (1968) states that "Farmers who borrow from private lenders and landlords in Sta. Barbara, Pangasinan are charged more than 50 percent interest rate."

De Guzman (1956) gives a more comprehensive review of interest charges by private creditors who

...charge an average interest rate of about 55 percent per annum. Including those loans for which no interest was charged, the average was still 28 percent, more than twice the legal minimum. About 53 percent of the loans granted by landlords had no interest but 25 percent had interest rates ranging from 20 to more than 300 percent per annum. One fourth of the loans had interest rates higher than 20 percent. The average computed interest for 224 fully repaid loans, was 98 percent per annum. One-third of these loans had 14 percent interest; the rest were charged with varying rates ranging between 100 and 300 percent per annum.

The interest rates imposed by the private money-lenders are no doubt higher than those imposed by the institutional sources of credit which ranged from eight to twelve percent. Gapud (1959) optimistically expects however, that with the increase in the number of banks, the interest rates charged by private money lenders will go down to a level approximating the maximum charged by banking institutions.

The present credit situation with the non-institutional sources of credit remaining largely if not totally unregulated leads to ineffective use of credit. Borrowers are prone to use the loans for consumption rather than for productive services. In the Philippines where savings are practically nil, farmers live a hand-to-mouth existence, justifying the assertion that they borrow mainly for consumption purposes.

Discussing the dissipation of productive credit, Tablante asserts

that

Unlike the commercial farm operators of developed countries who use credit to finance productive endeavors, our farmers have a tendency to use borrowed funds for consumption purposes. A survey of rice farmers in Nueva Ecija in 1958 revealed that only 29 percent of the money borrowed was spent for farm operations, while 71 percent was used for family living and household expenses. About 95 percent of all farmers in another study used their short-term loan proceeds for subsistence. In another study, 68 percent of loans incurred by FACOMA members went for living expenses.

Muere (1965) adds that

Thirty percent of the loans was used for family living expenses and 10 percent for non-farming purposes.

There are also case studies showing that misapplication of loans is prevalent in the country's agricultural sector. Vitoria (1969) revealed that about 21 percent of the agricultural loans granted by credit institutions in Baliuag, Bulacan was misapplied, i.e. used for paying shareloans, buying luxuries, donations, fiestas and other social activities. Similarly, a study of the small agricultural loan operations of the DBP Cabanatuan City Branch (Gapud, 1960) showed that about 47 percent of the borrowers included in this research project misapplied either completely or practically the loans obtained for non-productive purposes.

Non-payment of loans is partly caused by the non-channelling of extended credit to production.

The present credit situation in the Philippines apparently leaves much room for improvement. And it is solely on the government, the rural bankers and other institutions that may want to pitch in, that the "social function" of easing the credit situation is imposed.

Supervised Credit: an answer

As mentioned earlier in this review, the present credit situation in the country calls for reforms and/or adoption of new and desirable credit policies. Supervised credit has often been discussed in this connection. Supervised credit is defined as follows:

...the granting of loans to a farmer in an adequate amount, at the right time when it is needed, coupled with appropriate technical assistance. It brings about the granting of loans in staggered releases as the specific needs arise, with such releases more often being "in kind" with the utilization of purchase orders. It also implies that end-user borrowers must agree to abide with technical recommendations that may be imposed on them from time to time by qualified production technicians. This system is enforced not only before and during the granting of a loan but throughout the complete life of the loan. The practices it embodies are usually presented in several chronological steps which among others, include the careful analysis of the project to be financed, preparation of the farm and credit plan including the feasibility of the project study, the granting of loans to end-user borrower after determining the credit worthiness of both projects and borrowers, periodic on-the-spot inspection and follow-ups by the agricultural technicians, evaluation of the projects.

This is synonymous to the definition of supervised credit given by Tablante (1965):

In a technical sense, supervised agricultural credit refers to a particular system of credit provision which integrates adequate and timely credit with intensive supervision in the form of practical farm and home management guidance provided by technically trained personnel. Thru credit, the farmer is provided the capital to acquire needed resource for farm operations, and thru technical guidance, he is given the know-how to help him become soundly established in a profitable, well-balanced system of farming.

Gapud (1969) definitely pointed out that supervised credit has positive effects on land and labor used, farm output and crop yield, farm business, and credit practices. In his study of 26 DBP farmer-borrowers for crop years 1963 to 1966, he found that: the average size of farms slightly increased from eight hectares in the first crop year

to 8.3 hectares in the third year; the value of the operator's total farm capital steadily increased from 1963 to 1966 due mainly to the acquisition by farmers of additional land and other assets; and only one of the 26 farmer-borrowers misapplied the loan granted him. Supervised credit may also help minimize loan delinquency. With properly regulated loans, the chances for dissipation of productive credit is lessened. As pointed out by Tablante (1965) lack of supervision is one of the major factors which cause misapplication and poor repayment (the other one being late releases). Gapud found that the most important cause of non-repayment of loans was the borrowers' preference to use their income for family living expenses. He therefore, suggested that for supervised credit to be effective its purposes must be modified so as to include a reasonable portion of the loan for consumption purposes.

The gains to be derived from supervised credit have prompted those engaged in credit activities to adopt it as an integral part of their loaning program. A few rural banks have already been following a supervised credit program covering integrated multi-purpose projects undertaken by small farmers who are preferably bonafide members of agricultural cooperatives (Datey, 1970).

Datey added that the mounting pressure on agricultural resources to support a rapidly expanding population dictates the addition of more rural banks to the existing chain that shall ultimately blanket the entire country with sufficient financial facilities.

In this regard, it is worthwhile to mention a suggestion for rural banks to establish mini-agencies within the hub of the borrowers' activities. This will facilitate proper credit supervision and will increase the repayment capacity of the borrowers. Sacay (1962) said

that the distance of farm from credit institutions, in this case the FACOMA, has a significant effect on repayment. As the distance of the farm from the FACOMA increased, repayment decreased. The government may also look into the feasibility of subscribing to the capital stock of the rural banks to broaden the latter's equity base. Delorino (1969) suggested that during the initial operation of banks, the ACA should provide them with counterpart funds for loaning purposes.

Extensive extension services to improve if not absolutely change the spending patterns of the Filipino will probably be most helpful in easing tight credit conditions, i.e. savings by government agencies and private institutions will really be used for productive endeavors. Oppenfeld (1957) very well described the spending patterns of the Filipino:

...a reduction of expenses of social event, baptismal, wedding, funeral and fiestas parties in favor of investment leading to farm improvement is really unthinkable. Anthropologists tell us that no Filipino farmer wants to require the reputation of being stingy. Family ties also exert pressure on a farmers savings. Any excess income is soon transferred to a needy relative instead of being set aside for farm investment.

What may be changed by the educational extension service is the stance taken by farmers: that they do not have to repay loans coming from the Government (Tablante, 1965). The benefits derived from cooperative efforts apparently have yet to be savored by Filipino farmers. The cooperative movement even after two decades still finds itself in the doldrums. Of the 602 farmer cooperative associations listed as existing in 1967, less than one-third are considered active by the ACA (1970). There is, therefore, a need to intensify present efforts to develop cooperatives and promote their growth, Corpuz (1971) sugges-

ted that the funds now allocated for various price support schemes in the developing countries of Asia may be more productively used for the promotion and development of viable farmer cooperatives ~~or~~ for providing additional capital for financial institutions serving the agricultural sector.

Dionglay (1968) suggested that commodity loans by ACA be extended in the form of fertilizer instead of cash to avoid misapplication of loans. With the present scarcity of capital, such policy may reduce the actual financial outlay of farmer during the farming season.

A vital force for the development of the rural economy is the credit union. Sacay et al (1972) envision it as a major institution for rural development. The credit union, however, has found itself in the doldrums because of insufficiency of operating capital. The Sacaya et al paper suggests that the government subsidize the credit union and give it some powers to create money for the purpose for which it is established.

Delorino (1969) rightly stated that a program of general education on the principles and workings of cooperatives would go a long way in promoting the growth of cooperatives, especially when such is included in the curricula of all schools and colleges from elementary to college. Through the program, the farmers can be made to understand the necessity of prompt payment of their obligations so that they can be served.

Crop insurance may also partly minimize the risks emanating from natural hazards and price fluctuation, thus reducing in a way credit cost.



INTERNATIONAL TRADE

The Philippines' balance of payments has been almost always on the deficit-end. Imports continue to bear heavily on export gains. From the period 1950 to 1970, there were only two instances when exports exceeded imports - in 1956 when exports were valued at \$529.5 million (F.O.B. value) as against imports of \$523.5 million, and in 1963 when exports figures reached \$727.1 million as against imports of \$618.1 million (Central Bank, 1971).

The lopsided state of Philippine foreign trade has brought to light the weaknesses of the country's industrial and export sectors. More than 50 percent of the Philippine industries are relatively import-dependent. This has serious repercussions on the national economy as shown during the years 1962 and 1970 (CRC, 1971) when devaluation drastically affected various sectors of the economy.

The structure of Philippine exports, which has been referred to as colonial in character, has also been criticized for the unhealthy concentration of export receipts in primary products with limited markets such as sugar, coconut, copper, abaca, tobacco, logs, and lumber. The Board of Investments (BOI) underscores this fact when it stated

...that we have been selling traditional products to traditional markets has been an old complaint against our export sector. It has been considered as a weakness because it is a case of placing a few bets on a few horses.

Based on Central Bank statistics, 42 percent of the country's exports go to the United States; 39 percent to Japan. The dependence

of the Philippines on too limited markets has caused serious dislocations in the export sector. The country has no choice but to share the brunt of recessions in the U.S. and Japan. This issue is made more critical with the forthcoming termination of the Laurel-Langley Agreement in 1974.

Philippine international trade faces a number of problems, and priority problem areas call for immediate action on the part of the government. First, there may be a need to restructure Philippine economy from one which is fundamentally dependent on agriculture and related industries to one that will maximize and optimize the contributions of the manufacturing sector to overall development. Second, we have to take immediate steps to broaden the base of Philippine foreign trade. Third, our country has to adopt some form of import exchange controls to shore up our sagging foreign exchange reserves to prop the economy into further development by maximizing the use of scarce foreign exchange reserves for economic growth. And lastly, the termination of the Laurel-Langley Agreement in 1974 will lead to a crop of problems which may have serious repercussions on our economy unless we are prepared for the consequences (DCI, 1969).

The government has not been sparing in its efforts to solve these problems. Even prior to Presidential Proclamation No. 1081, measures had been enacted to change the composition of Philippine exports and expand foreign trade markets, among others (Puyat, 1968). In 1971, new production came to about 18 percent of the country's total exports. This seems close to the 20 to 25 percent share which BOI considers as the ideal target at present (CRC, 1971). Locsin (1972) reports on this as follows:

The government's encouragement of ventures in fields other than the traditional is starting to be reflected in the composition of the Philippines exports. Non-traditional exports comprised about 22 percent of the total exports in the first 11 months of 1971 compared to only 10.83 percent for the whole of 1970. Government policies seek to stimulate exports of processed goods and discourage raw material exports like logs. This accounts in part for the decline in the share of total exports of traditional products.

The market for Philippine exports may be expanded further, thus widening the base of our foreign trade, by trading with socialist countries. This, however, should be viewed along with a counter-suggestion to adopt a market concentration policy, i.e. limiting exports to a few primary products to the U.S. market (Atmosfera, 1969).

The sugar industry in particular is expected to suffer most from the forthcoming termination of the Laurel-Langley Agreement. Ledesma (n.d.) expressed optimism that the Philippines can maintain its traditional sugar foothold in the U.S. market. Yet, others view the termination of the Philippines' preferential trade agreement with the U.S. as a means to pave the way for the more rapid entry of Philippine products and crops into other export market, and also for the much awaited diversification of Philippine agriculture.

A number of measures have been implemented to correct the country's trade imbalance. They take the form of import surcharges, subsidies, tax concessions, quantitative restrictions for non-essential consumer and producer goods (the latter referring specifically to materials and machinery for virtually over-crowded industries), selective credit or adoption of a scale of priorities for the issuance of letters of credit, etc. Whether these measures are effective in smoothing out the country's balance of payments difficulties is still under question.

The limitations placed on this review does not make possible even a historical description of foreign exchange controls so far utilized, or even a superficial assessment of their individual impact on Philippine external trade. Studies on tariff are practically non-existent except for one study which attempted to evolve a realistic measure of effective rate of protection offered by a given tariff structure, and showed that a negative protection occasioned by unrealistically high tariff walls . . . in effect penalizes instead of subsidizes industries (Fortez, 1968). This study suggests that to maximize efficiency among import-competing industries, the tariff structure should be so differentiated as to protect the relatively more efficient and discourage the marginal or less efficient ones.

Traditional Export Products

Of the total Philippine coconut production, about 84 percent is exported in the form of copra (47.20 percent) coconut oil copra cake (31.0 percent), dessicated coconut (6.2 percent) and coir and shell charcoal (less than 0.5 percent). These bring approximately \$210 million per year (Sison, 1970).

Abella (1967) reported that export of copra from 1920 to 1940 increased by 6.85 percent annually and by 1.45 percent between 1949 and 1965. From 1946, exports of coconut oil progressed by 13.80 percent annually; those of dessicated coconut increased by 3.96 percent from 1952 to 1965. Exports of copra meal tended to exhibit a rising trend which progressed at the rate of 10.67 percent annually between 1946 to 1965. Veeruthma (1967) reported that copra, dessicated coconut, coconut oil and copra meal exports increased annually at the rate of

13.11 and 97 percent, respectively, during the post-war period.

For the past year, coconut exports have been subject to changing price and production levels. Lately, they have suffered from record-low prices, provoked partly by coconut over-production, as in 1949. During the tail-end of the 1960 the industry suffered set-backs in the production sector. Reyes (1970) said Philippine export tonnages dropped from between 400,000 to 450,000 tons during the drought years 1967 and 1969. The world market during this period had no alternative but to switch to the use of other oils and fats. Nevertheless, despite these set-backs the coconut still substantially boosts Philippine foreign trade earnings. What it could not gain in prices, it compensates in volume, or vice-versa. CRC (1972) reported that earnings from coconut oil and copra increased by 7 percent and 43 percent, respectively in 1971 despite a downward trend in world prices for the products. This was made possible by the exceptional coconut harvest for that year.

A significant change in coconut trade is the shift of emphasis from copra to coconut oil and dessicated coconut; and from the traditional raw material exports to processed and semi-processed ones.

The demand for Philippine coconut products in the world^{market} has met with a number of constraints. One of them is the existence of competing fats and oils (Ramiro, 1970). Declining soap production principally in the U.S. first posed a threat to the foreign trade demand for coconut but was later found to have minor effect on copra demand because of minimal amount of coconut oil used in the manufacture of soap (Caramancion, 1967). As the supply of oilseeds in the world faces a diminution, Philippine copra is expected to gain a stronger foothold in the world market. Abella (1967) concluded that the

rising production of copra, coconut oil, dessicated coconut and copra meal will not likely glut the market, since FAO demand projections allow for increased consumption of all kinds of fats and oils to meet the bigger demand arising from population expansion and elevation of the standards of living.

The Philippine copra faces competition from that of Celebes, Sumatra, New Guinea, Borneo, Ceylon and India.

The forthcoming termination of the Laurel-Langley Agreement which, among others, provided for a progressively declining duty-free quota for the Philippine coconut oil and for a gradually increasing proportion of the duty imposed on dessicated coconut and copra meal from countries other than the Philippines in the U.S. market creates new problems and challenges for the industry. By 1971, all the coconut oil exports of the Philippines to the U.S. will be subject to a one percent tariff or approximately \$22 per ton. For a country that depends to a large degree on the coconut industry, the tariff could have severe consequences (Librero, 1971).

Sugar Exports. Macapagal (1962) listed two main problems of the sugar industry, namely: 1) the threat of the institution of a global sugar system by the U.S. in her imports of the commodity; and 2) the expiration of the Laurel-Langley Trade Agreement in July, 1974. Either of the two can bring about the abandonment of premium prices for Philippine sugar exports and consequently a substantial reduction in our foreign exchange earnings. Non-filling of the U.S. quota alone, as Philippine experience has shown, can result in 100-million dollar losses than three years.

In 1971 sugar regained its position as number one Philippine export product. CRC (1972) attributed this to the hiked market price for the commodity and to volume increases. The increased price was brought about by the reduced production of sugar beets in Puerto Rico and the increased demand in the U.S. resulting from the recovery of its economy. The price of sugar is expected to remain at high levels, if not further increase, with the unabated decline of hectareage planted to sugar in Puerto Rico and the mainland (United States).

Abaca exports. Based on Central Bank statistics, abaca now only exports a mere 1.7 percent of its 1951 exports. For a product which had once enjoyed a "virtual monopoly of the world fiber supply and had consistently been the country's third top dollar earner" (Madrid, 1970), these figures are saddening.

To rehabilitate and develop the abaca industry, the Abaca Corporation of the Philippines (ABACORP) was set to operating in 1967. ABACORP extends facility and commodity loans to abaca farmers and assists in the industrialization program of the government. The latter opens a potential alternative market for abaca. Industrialization means the establishment of paper factories which use abaca stems for raw materials in strategic production centers in the country. Madrid commented that industrialization may just be the answer to the rehabilitation of the abaca industry.

The National Cottage Industries Development Authority (NACIDA) works hand in hand with ABACORP in boosting the abaca industry. The world market apparently welcomes Philippine handicrafts such that expansion of the country's cottage industries is endorsed.

The market potentials of abaca processed goods then are deemed most promising. The problems of the industry seem not to lie so much on the entry of synthetic fibers but on the poor management of abaca farms as well as on the lack of production incentives to growers. An important factor may be the fact that export markets for abaca have not been fully exploited.

The Fiber Inspection Service of the Department of Agriculture and Natural Resources (FIS-DANR), now the Board of Fiber Inspection Service (R.A. 3099), did well in helping farmers increase their yield. It provided farmers up-to-date price quotations and statistical information on abaca production and marketing (Apostol, 1965).

Copper exports. Hicks (1968) had expected that the extractive inputs of the Philippines, specifically copper, would expand its share faster than any of the country's traditional agricultural exports, and it did. In 1970, NEC Chairman Gerardo Sicat said that among the local industries, Philippine mining grew fastest at the annual rate of 21.1 percent. As of 1971, the massive expansion programs of the copper industry are already becoming operational (CRC, 1972).

The gains in the production sector appear reflected in the performance of copper in external tradings. In 1969, DANR said that copper shared 15.6 percent of the country's foreign exchange earnings by plowing in \$133 million (F.O.B. value).

Production-wise, the copper industry has been performing above par. But value-wise, it has contributed little to the soaring up of the country's international reserves. Gains in copper production are being negated by fluctuation in copper prices.

In 1971 the industry earned only as much dollars as it earned in 1970-- at a level slightly below \$200 million. CRC observed that considering that the country's exports increased by slightly more than eight percent in 1971, the copper industry cannot claim to have contributed a cent to this rate of increase, and attributed this to prices. In 1970, the average price for the metal could be placed at 55 cents per pound. This had been due to the relative glut in the world market, partly occasioned by the recession in the U.S. and the definite slowdown of the Japanese economy.

Thus, it is difficult to assess the prospects of the Philippine copper trade. It depends to a considerable extent on the world market situation which is at present being swayed heavily by developments in the U.S. and the Japanese economy. It is quite certain though that the mining industry as a whole will continue to expand to its maximum potential.

Forest products. Logs, lumber, plywood and veneer constitute the bulk of Philippine exports. Together they shared 29.9 percent of the total foreign earnings of the country in 1969 (DAIR, 1972). Logs and lumber are the most potent dollar-earners. Plywood and veneer are just starting to make a dent in the world market.

The income potential and growth of logs and lumber tempt observers to view foreign exchange earnings from these sources with much optimism. Barker et al (1971) placed the growth rate of log exports between 1955 and 1965 at 11.5 percent. A review of available literature on the Philippine foreign trade, specifically that concerning logs and lumber, however, cautions us to regard it with ~~wire~~ feelings. Philippine logs and lumber are too dependent on the Japanese market, secondarily on Taiwan's and South Korea's and indirectly on the U.S. market. The impact of these

market limitations was demonstrated in 1970. In 1971, the Center of Research and Communication reported that earnings from logs and lumber took a drop of almost \$60 million or a decrease of some 23 percent. This was due to the depressed Japanese market. Clearly, the fate of the country's log exports is not totally within the control of the local woodmen.

The rampant smuggling of logs from the country, resulting in the uncontrolled denudation of Philippine forests, should also be duly considered in assessing the prospect of logs and lumber exports. As implied earlier, it is better to appraise the potential foreign exchange earnings from logs and lumber, plywood and veneer with an equal dose of pessimism and optimism. For logs and lumber, the future world trade is rather unstable, as is true probably for all primary export products. But for Philippine plywood and veneer, the reverse seems to hold true with the demand structure of advanced countries. The Presidential Committee on Wood Industries Development (1972) reported that wood processing is clearly preferable to log exporting from the standpoint of greater income and employment opportunities attached to the former activity. At present, the Philippines exports wood raw materials to Taiwan and South Korea for processing into plywood for re-export to U.S., and imports Indonesia logs for processing and eventually, for re-export to the world market.

The Philippines could have done better with the necessary motivation. There are currently no sufficient incentives to the processing of wood in the country. PCWID said that present policies make it difficult for the wood industry "to secure the foreign exchange it needs to replenish necessary operational supplies, machinery and equipment. Also, the seven percent sales tax imposed on logs, lumber and other forest products

sold locally for further processing deters many wood processors from expanding their present operations. It also prevents loggers from integrating forward into wood processing."

PCWID recommends the following for the development of the wood processing industry: 1) a reasonable scheme designed to insure the availability at all times of critical spare parts and equipment, preferably on deferred payment; 2) eliminate the export tax on locally manufactured wood products intended for foreign markets; 3) restore tax incentives formerly provided under R.A. 5186 (Investment Incentive Act), i.e. double deduction of shipping costs and promotional expenses, and special tax credits based on taxes paid on raw materials used for manufacturing products that are subsequently exported; 4) increase the export tax sold to foreign buyers; 5) establish an import-export center for processing duty-free log imports from Indonesia for consignment to export market; and 6) develop alternative market outlets for the Philippine wood products by assigning qualified personnel to the embassy staff in selected countries or through the use of trade missions to specific potential markets.

The government would do well to adopt a system of incentives for local processing and disincentives for log exporting.

Tobacco. Cigar leaf tobacco accounted for 1.3 percent of the Philippine foreign exchange earnings, in 1969, according to DANR statistics. Tobacco exports for that year were valued at \$11 million (F.O.B. value).

Included in the export development program of DANR are proposals to: 1) concentrate development activities to areas suitable to the growing of high quality cigar filler and wrapper leaf tobacco; 2) provide sufficient easy-term credit thru rural banks and other

institutions for activities related to high quality cigar filler and wrapper leaf tobacco production, processing and marketing; and

3) increase the tobacco inspection fee from the pre-war rate of ₱0.005 per kilo to ₱0.01 to help fund inspection, quality control activities and export trade promotions.

Potential Export Products

Fruits and vegetables. The Department of Trade and Tourism said that Philippine exportation of fruits and vegetables in preserved form is already lucrative but there is still much that can be achieved in terms of foreign exchange earnings. The country's exports of processed fruits and vegetables are expected to increase considerably within the next five to ten years as local producers realize their plan to integrate fruits and vegetables processing operations and to expand their plantation and factor facilities.

1. Pineapple. From 1949-1966, canned pineapple ranked eighth in the list of top Philippine exports. This was accounted for primarily by the Philippine Packing Corporation. With the entry of Dole (Phils.) Inc., in 1965, canned pineapple would probably assume a greater role in Philippine export trade. As of 1969, it was fifth in DANR's list top Philippine dollar earners. It contributed \$17 million (F.O.B. value) to the country's foreign exchange coffers in that year.

2. Bananas. A consistent dollar earner for the Philippines has been the banana fruit, which has found substantial markets in such countries as Japan, the United States, and other countries where tropical fruits are highly in demand. Its potential as a lucrative export product has been recognized by both local and foreign

capitalists, such that there is no lack of capital for the industry. Today there are a number of banana plantations in the country, the larger ones of which are located in Mindanao. From an initial commercial shipment of 140 metric tons of the fruit made to Japan in 1960 (Dangilan, 1961), the country has made large strides in export capacity; during crop year 1970-1971, the Philippines exported a total of 244,700 metric tons of the fruit, with an aggregate value of 13.5 million dollars - a big jump from the previous crop year's exports of 82,000 metric tons. It is expected that the Philippine banana exports will reach 2.26 million metric tons in 1975 (DAMI, 1971).

The Philippines intends to further develop the banana industry into its fullest potential and has accordingly moved to protect it. One of its recent moves was the institution of quotas for the different banana plantations now in operation, the quotas based on productive capacity and other factors. This is intended to prevent a glut in the banana market, thus preventing drastic fluctuation in prices.

3. Mango. Like the banana, the mango fruit is a potential dollar-earner for the country. Philippine mangoes are highly acceptable as export fruit products in other countries. Japan, Hongkong, the United States and others are among the target markets for mango.

Fishery products. Fishery products would probably alter the composition of top Philippine exports in the near future. The Philippine Fisheries Commission (now the Bureau of Fisheries) is pursuing the aggressive development of marine fishing as well as the expansion of foreign markets for shrimp, ~~capis~~ and other seashells.

In 1967, the Philippines started marketing fish products abroad. The fish exports amounted to ₱1.8 million as reported by the DANR.

Japan is a potential market for Philippine shrimp. The Philippine King prawn or "suppo" is considered as one of the most palatable prawns in Japan.

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Appendix A
T A B L E S

Table 1. Scope of some of the major studies related to growth of agriculture in the Philippines.

Study	Scope
Hooley Study	<p>Attempted to complete the total and partial productivity indexes of agriculture for the census years from 1903 to 1961. The output estimates were based primarily on crop output as reported in the censuses of 1902, 1918, 1938 and 1961. These were then expressed in value-added terms at the 1938 prices. In addition to crop output, estimates of livestock slaughtering were included which, together constituted agricultural output. The inputs considered were land, labor, machinery, and work animals. These were combined on the basis of value expressed in constant prices. Farm land was valued at the average assessed value per hectare as reported in the 1938 real property census, labor at the rate of ₱1.00 per day and 200 work days per year, and work animals and farm machinery at 1938 prices.</p>
Lawas Study	<p>Attempted to estimate the contribution of technology between the period 1948-1960; employed a Cobb-Douglas type of aggregate production function, with the production coefficients estimated by means of the relative factor shares technique. Assuming a neutral technological change, that is, that the production coefficients (relative factor shares) computed for 1948 were injected into the input variables of 1960. Thus, except for a parameter defining the level of technology, the two production functions are similar. The contribution of technological progress to farm output was estimated from the changes in the scale parameter of the two productions.</p>
Hooley and Ruttan Study	<p>Attempted to explain the difference between the Hooley and Lawas findings by making a distinction between irrigated and non-irrigated land as Lawas does. Their study points out that the difference can be accounted for largely by the fact that a additional land area added to production was largely non-irrigated and these additions received a greater weight in Hooley's calculations.</p>

Study	Scope
Hicks and McNicolls Study	Computed the output/land and output/labor ratios from 1950 to 1966 on an annual basis.
Paris Study	Covered the period 1948 to 1967. Constructed annual series indices of output, factor inputs, partial and total productivity ratios. Output was measured as the sum of agricultural crops and livestock in gross value terms. Labor was measured in man-hours; land as the value of land rentals; agricultural machinery as the sum of imputed interest and depreciation; work animals as the value multiplied by the rate and interest; and operating capital as the sum of the values of commercial fertilizer, agricultural chemicals, animal and poultry feed and irrigation fees. All values were expressed in terms of the average of 1955, 1960 and 1965 prices.
Crisostomo and/or Crisostomo and Barker Study	Covered the period 1948 to 1967 and in some cases to 1969. Determined the growth of agricultural production by commodity groups by using trend analysis. Calculated the trends in inputs and total productivity including the trends in partial productivities using the production function approach.

Table 2. Analytical approach used in the studies related to growth of agriculture in the Philippines.

Study	Analytical Approach
Crisostomo	The first part of the study uses trend analysis to establish the relationship between relative factor use and factor productivity. The second part uses production function analysis to quantify the relative contribution of the various sources of output and productivity growth.
Paris	Uses the productivity ratio approach in which changes in productivity are determined by movement in the ratio of output to any or all associated inputs in real terms.
Lawas	Measured land input as the marginal factor cost, computed by multiplying an imputed rate on interest to the capital value of land. In determining the sources of farm output growth, two Cobb-Douglas type aggregate production functions were derived by the relative factor share technique for 1948 and 1960. The sources of farm output growth were estimated from the relative changes of the factors, the changes in the intercept and the productivity coefficients of resources included in the production function.
Hicks and McNicolls	Computed the index of crop production based on a limited number of crops representing about 90 percent of estimated total crop value and using as weights the average production values over the 1958-62 period. Crop output represented agricultural output. Land input were collected from the DANR. The labor input used were PSSM estimates of total employed persons in agriculture, adjust for the forestry component which was included in the non-agricultural sector.
Hooley	Vague as to whether imputed rate of interest is applied as a measure of return to land. It is not clear how land, machinery and work animals were weighted or aggregated. It cannot be determined whether some measure of returns (interest rates) were applied on the value of land, machinery and work animals to obtain the stream of services of the inputs.

Table 3. Long-term trends in agricultural output in the Philippines based on the studies related to growth of Philippine agriculture.

Study	Long-term trends in agricultural output
Crisostomo	<p>From 1948/50 to 1967/69, agricultural output increased at an average annual rate of about 4.1 percent. Two distinct phases can be observed: a) a relatively fast growth rate up to 1954/56 (postwar recovery), and b) a growth rate of 3.2 percent from 1954/56 to 1967/69 which is close to the population growth rate.</p> <p><u>First phase-</u> (1954/56)- high growth rate is explained by a) postwar, reconstruction activities, and b) expanded demand for exports. <u>Second phase-</u> characterized by accelerating growth rate. The growth of 6.0 percent in 1948/50 to 1954/56 was followed by a sharp cut to 1.7 percent in 1954/56 to 1957/59. However, it started to rise again to 3.4 percent in 1957/59 to 1964/66 and 4.3 percent in 1964/66 to 1967/69.</p>
Paris	<p>The index of total output increased from 56.7 to 123.3 or an increase of 177.6 percent. The index of crop output increased from 54.8 to 125.5. Livestock output index increased from 63.9 to 155.9. Agricultural output increased annually at a constant rate of 3.5 index point: 1958-55, crop output grew at faster rate; 1955-60, rate of growth greatly diminished; 1960-67, rate of growth improved; 1968-60, rate of growth of crop output was 5.1 percent per year as contrasted to 3.3 percent from 1960 to 1967. The overall rate of growth was 4.4 percent per annum.</p>
Lawas	<p>From 1948 to 1960, the annual weighted rates of change in conventional inputs was 3.02 percent. The percent rate of output was 3.40 percent per year. The difference was 0.38 percent. In the same period about 88.82 percent of the rate of change in agricultural output was explained by change in total conventional inputs. The breakdown of this total contribution to the rate of output growth are as follows: non-irrigated land, 41.18%; current expenses, 15.29%; labor service, 14.41%; irrigated land, 9.41%; farm building service, 5.88%; farm equipment service 2.65 percent.</p>

Study	Long-term trends in agricultural output
Hicks and McNicolls	Land productivity increased by 16 percent and labor productivity by 19 percent over the whole period. In terms of annual rates of increase, land productivity increased at 0.8 percent and labor productivity at 1.0 percent per year.
Hooley	In general, total productivity declined by about 15 percent between 1902 to 1961. Labor productivity has either been constant or has risen slightly and land productivity declined continuously. Output per machinery and output per animal, likewise declined continuously.

Table 4. Trends in agricultural inputs in the Philippines based on studies related to growth of Philippine agriculture.

Study	Trends in agricultural input growth
<u>Labor</u>	
Crisostomo	Labor employed in agriculture rose by 4.7 percent over the whole period or at an annual rate of 2.0 percent. The growth rate appears to be zero towards the end of the period. The average annual growth rate from 1948/50 to 1963/67 was 2.5 percent.
Paris	The index of labor input increased from 68.6 in 1948 to 119.8 in 1967 or an increase of 74.6 percent during the whole period. From 1948 to 1960, labor input grew at an average annual rate of 3.2 percent; it diminished in 1960 to 1967. The overall rate of increase of labor input was 3.0 percent per year.
Lawas	Labor productivity is expected to increase at a compound rate of 1.5 percent per year during the period from 1960 to 1975. It would require approximately two times the total labor input utilized in agricultural production in 1960 to meet the total agricultural output requirement in 1975.
<u>Land</u>	
Crisostomo	Land increased at an average annual rate of 3.8 percent up to 1959 but since then has been growing at a slow pace of only 1 percent. Proportion of irrigated area increased from 24 to 48 percent from 1958 to 1969. Effective crop area was 6 percent more than cultivated land area in 1948 and 36 percent more in 1960 because of the effect of multiple cropping.
Paris	Cultivated land area grew from 62.2 in 1948 to 113.5 in 1967 or an increase of 81.8 percent for the whole period. From 1948 to 1960, the rate of growth was 4.1 percent per year. From 1960 to 1967, the annual rate of growth was 1.8 percent.

Table 4 (cont'd)

Study	Trends in agricultural input growth
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Lawas The projected land input requirement was about 95 million hectares in 1975. This is approximately 132 times the 1960 total land input. This means that land areas utilized in crop and livestock production would have to increase at a compound rate of about 2 percent during the period from 1960 to 1975.

Capital

Crisostomo Fixed capital grew at a fast rate (6.9 percent) throughout the period under review. From 1947 to 1960, irrigation grew at an annual average growth rate of 3.7 percent. Cultivated area grew at a proximately the same rate. After 1960, irrigated area grew at an annual average of 5.4 percent. Chemical fertilizer supply grew at an annual rate of 11 percent. From 1948 to 1952, most fertilizer chemicals were imported.

Paris Farm equipment increased by 400.3 percent and operating capital by 1,305.2 percent. Work animals, increased only by 132.0 percent. Total capital increased only 591.4 percent. Fixed capital grew at 7.1 percent per year while operating capital grew at 16.8 percent per year. The overall rate of growth of capital was 10.7 percent per year.

Lawas For non-land capital and current expenses, the amount required to meet the agricultural output in 1975 would tend to decrease as technological change increases. If there is no change in agricultural technology during the period from 1960 to 1975, non-land capital and current expenses required by agriculture would be about 5 times and four times their 1960 levels, respectively.

Total inputs

Crisostomo Non-farm current input showed the highest growth rate (11.2 percent) over the whole period. Non-farm current input consists of imported feeds, chemical fertilizer, agricultural chemicals and

Table 4 (cont'd)

Study	Trends in agricultural input growth
Paris	<p>irrigation feed, but chemical fertilizer comprises about 80 percent of this input category.</p> <p>The index of total input was 61.9 in 1948 and rose to 124.2 in 1967. In terms of percentage growth, the overall increase was 100.2 percent or an average annual growth rate of 3.8 percent per year. From 1948 to 1960, rate of growth was about 4.1 percent; 1960-67 slackened to 3.1 percent. The growth of total input was very small to influence significantly the rate of increase of total inputs.</p>
Lawas	<p>The input requirements in 1975 tend to vary inversely with the rates of technological change. With a moderate rate of technological change during the period from 1960 to 1975, to meet the production requirements would require the levels of the 1960 agricultural resources to increase at an annual compound rate of about 2.8 percent for non-irrigated land, 4.3% for irrigated area, 5.2 percent for labor, 6% for non-land capital and 4% for current expenses.</p>

Table 5. Sources of growth of agricultural output in the Philippines based on studies related to Philippine agriculture.

Study	Source of Output Growth
Crisostomo	<p>Over the whole 20-year period, output per unit of input increased at an average rate of 1.1 percent. This represents a relative contribution of about 27 percent to growth in output of residual factors such as technological progress, quality changes, organization changes, and all the other factors that were not explicitly specified as inputs. Labor and land were the predominant factors, contributing 32 percent and 24 percent, respectively, to output growth. Although the growth rates of fixed capital and non-farm current input were much higher, their small factor shares resulted only in 7 percent and 10 percent contribution, respectively, to growth in output.</p>
Paris,	<p>Over the whole period (using Mills method), 89.2 percent of the change in output was attributed to the changes in productivity. Most of the productivity increases occurred between 1948 and 1955 in which 37.0 percent of the increase in output was attributed to the increase in productivity.</p> <p>From 1948 to 1967 (using Denison's method), the increases in output attributed to inputs was 93.4 percent and only 6.6 percent was attributed to change in productivity. With respect to inputs, labor accounted for 32.6 percent; fixed capital, 6.5 percent; operating capital, 17.4 percent; and miscellaneous inputs, 13.6 percent. It could be concluded that most of the increases in output was due to the increase in inputs and only a small portion was explained by increase in productivity.</p>
Lawas	<p>The sources of farm output growth were as follows: 41.18 percent of non-irrigated land; 15.29 percent for current expenses; 14.41 percent for irrigated land, and 7.93 percent for non-land capital. The change in farm output growth were attained mostly from the changes in conventional inputs during the period from 1948 to 1960.</p>

Table 6. Annual rates of growth of agricultural commodity in the Philippines based on the studies related to growth of Philippine agriculture.

Study	Annual rates of growth of agricultural commodities
Crisostomo	<p>From 1948 to 1969, agricultural output increased at an annual rate of about 4.1 percent. The 3.2 percent annual growth rate of output in the second phase (1955-68) is about comparable to the population growth. Growth of agricultural output in the late 1960's was 4.3 percent per annum.</p>
Paris	<p><u>Crop</u>- 1948 to 1955, crop output grew at a faster rate; 1955 to 1960, rate of growth greatly diminished; 1960 to 1967, rate of growth improved.</p> <p>Over the whole period, 1948 to 1960, rate of growth of crop output was 5.1 percent per year as contrasted to 3.3 percent from 1960 to 1967. The overall rate of growth was 4.4 percent per annum.</p> <p><u>Livestock</u>- 1948 to 1955, grew at a relatively rapid rate; 1955 to 1960, growth declined; 1960 to 1967, grew to a modest rate of 2.1 percent. Over the period 1948 to 1960, livestock output grew at an average annual rate of 3.1 percent as against 2.1 percent 1960 to 1967.</p> <p><u>Total agricultural output</u>- 1948 to 1955, grew at a relatively rapid rate; 1955 to 1960, growth diminished; 1960 to 1967 grew at a modest rate. For the period 1948 to 1960, annual rate of increase was 4.9 percent as compared to 3.0 percent from 1960 to 1967. The overall rate of increase was 4.2 percent.</p>
Lawas	<p>Agricultural output increased at an annual compound rate of 3.4 percent during the period from 1948 to 1960. The population growth rate was 3.2 percent during the same period. On a per capita basis, the agricultural output remained almost unchanged from 1948 to 1960.</p>

Table 7. Conclusions and implications of the studies related to growth of agriculture in the Philippines.

Study	Conclusion and Implications
Crisostomo	<p>Agricultural output increased at an annual rate of 4.1 percent from 1958/60 to 1967/69. The two major inputs, labor and land, increased at an annual rate of about 2.5 percent over the whole period. The growth rates of both inputs have declined through the years. The positive marginal products of land, fixed capital, and non-farm current input imply that growth in output can be accomplished by increasing these inputs. The greatest return will be forthcoming from increases in land input which could be attained by increasing effective crop area through irrigation.</p>
Paris	<p>The general conclusion is that there was a slight increase in productivity from 1948 to 1967. Most of the increases occurred during the earlier periods especially from 1948 to 1955. Over the whole period, output increased by 117 percent while inputs increased by 100.2 percent. With almost equal major trades of output and inputs increase, productivity increased by only 8.8 percent from 1948 to 1967.</p>
Lawas	<p>A small rise in total productivity of agriculture occurred during the period to 1948 to 1960. About 11 percent of the total output growth was accounted for by technology.</p>
Hicks and McNicolls	<p>Land productivity had increased by 0.8 per annum and labor productivity by 1.0 percent per annum.</p>
Hooley	<p>Total productivity declined by about 15 percent between 1902 and 1961. Labor productivity has either been constant or has risen slightly and land productivity declined continuously. Output per machinery and output per animal likewise declined continuously. While agricultural output had increased four-fold in the first six decades of this century, the growth in output was traceable to expansion in inputs rather than an increase in efficiency with which inputs were used. Hence, total productivity showed a small decline.</p>

= 186 =

Appendix B
A U T H O R I N D E X

AUTHOR INDEX

- Abarientos, 77, 78
 Abbott, 82
 Abella, 24, 143, 145
 Ablan, 109
 Albano, 57
 Alcasid, 90, 93, 94
 Alcazar, 126, 127
 Alix, 21, 55
 Almaric, 127, 131
 Alunan, 77, 103
 Alunan and Darrah, 107
 Alunan et al, 105
 Alviar, 64
 Amatong, 98
 Anao, 18
 Antiporta, 100, 101, 104, 106
 Antiporta and Huelgas, 18, 94
 Aquino, 129
 Apostol, 147
 Aragon and Darrah, 85
 Arboleda et al, 80
 Arzodon, 19
 Athwal, 67, 72, 73, 74, 75
 Atmosfera, 142
 Austria, 94, 106, 107
 Avanzado, 102
 Avellanosa, 129
 BAEcon, 130
 BAI, 77
 Bangloy and Caramancion, 87
 Banogon, 17
 Baskinas, 40
 Barker, 58, 66, 116, 118, 119, 122
 Barker and Mangahas, 65
 Barker and Quintana, 35, 37, 72
 Barker et al, 62, 149
 Beachell et al, 33
 Berico, 59
 Biong, 77
 Boado, 59
 Bokingo, 55
 Bolante, 60
 BPI, 24
 Bradfield, 54, 67
 Bratton, 16
 Brosas, 102
 Bulanadi, 64
 Buluan, 127
 Caibigan, 29
 Caintic, 70
 Gagampang, 58
 Calimlim and Maneses, 78
 Canto, 83
 Caramancion, 23, 145
 Carlota, 96
 Casayuran, 57
 Castillo, 68
 Celestino, 34
 Central Bank, 112
 Cheng, 54
 Clemente, 126, 129
 Collado, et al, 103, 105
 Cook, 16, 40
 Comdas, 28
 Corcolon, 30
 Corpus, 139
 Cornall, 39
 CSC, 17, 140, 141, 144
 Crisostomo and Barker, 36
 Crisostomo et al, 56
 Cruz, 49, 129, 130
 Dalisay, 6
 Dalrymple, 54
 DANR, 126, 148, 152
 Dangilan, 152
 Darrah and Tiongson, 94, 96, 109, 111
 Datey, 131, 137
 Dayo, 76
 Delos Reyes, 41, 45, 53
 Delos Reyes et al, 65
 Deomampo, 66
 Deomampo et al, 60
 Delorino, 130, 38
 De Guia, 116, 119, 121, 123
 De Guzman, 129, 134
 DCI, 141
 DRP, 81, 85
 Dionglay, 24, 139
 Domingo and Supan, 64
 Dosayla et al, 100
 Drilon, 92
 Drilon and Goldberg, 16
 DTT, 30
 Espano, 97, 98
 Estrella, 48, 50
 Eusebio, 77
 FAO, 17
 Fernandez and Librero, 79
 Fortez, 143
 Forster, 62

- Fundador, 88
Gaminde, 59
Gapud, 126, 134-136
Gonzales, 59
Guino and Meyers, 63, 66
Gutierrez, 65
Hayami and Ruttan, 4
Hernandez, 55, 57
Hicks, 147
Hicks and McNicolls, 23, 50
Hiwatig, 50-51
Honrado, 34, 91
Horigue, 78
Hoselitz, 40, 42
Hsieh, 78
Hsueh, 23, 40
Ilag, 79
IRRI, 35
Ishikawa, 36, 37, 48
Johnston and Mellors, 4
Klotharal, 41
Korzan, 56, 111
Labadan and Viado, 20
Lantin, 112
Lapid, 97
Lawas, 16, 56-58, 61
Ledesma, 142
Librero, 145
Liao, 67
Liao et al., 7, 63, 68
Locsin, 141
Luna, 26
Luzon, 85
Macapagal, 146
Macaspac, 10
Macatiag, 90, 92
Madamba, 31, 64
Malayo, 132
Manc, 25
Mangahas, 67, 68
Manulat, 128
Maulit, 16, 19, 43
Mears, 72, 86, 133
Mears and Agabin, 89, 127
Megino, 42, 52, 53
Mttendorf, 82, 83
Motelibano, 19
Muere, 135
NIA, 71
NIST, 25
Noble et al., 131
Nubla, 106, 108, 111
Nyberg, 23
Oña and Hsieh, 16
Oliva et al., 100
Paje, 102
Palma and Deb, 58
Paris, 6
Pamuceno, 126, 134
Paulino, 7, 10, 11
PCWID, 149
Peredo, 88, 93
Plang, 69
Pomeda, 46
Puyat, 141
Quintana, E. 103, 104, 108, 110, 111, 132
Quintana, E. et al., 88, 91
Quintana, V., 7
Ramiro, 145
Raup, 41
RCA, 18
Rasco, 79
Recto and Alviar, 87, 88
Research and Planning Board, 29
Reyes, Jr. 102
Reyes, 144
Rillocarta, 79
Rivera, 60
Rivera and McMillan, 126
Robertson, 67, 70
Rocha, 1968
Romera, 82
Romero, R., 79, 126
Romero, T., 101
Sacay, 43, 129
Sacay et al., 139
Sandoval, 8, 79, 80, 99
Sandoval and Gaon, 48-52
Sardido et al., 90, 93
Sayson, 60
SEADAG, 37
Shields and Gray, 116, 118, 121
Sison, 143
Street, 26
Suiza, 96
Summers, 98, 105, 108, 110, 111
Swangwatana, 16
Tablante, 126-129, 131, 132, 135, 137
Takahashi, 133
Tagarino, 71
Tanco, 6
Tapnio, 91
Tiongson, 69, 98
Tiongson and Concolon, 19
Tiongson et al., 82, 84, 85
Tomaso, 33

Toquero, 67, 72
Torres, 100, 103
Veeruthna, 143
Vera, 79
Villarico and Ledesma, 60
Villogas, 109, 110
Viloria, 135
Vithavisuit, 86.
Watanabe, 127
Wickham, 11
Work et al, 56
Yu, 103, 104
Zablan, 109