

AGENCY FOR INTERNATIONAL DEVELOPMENT WASHINGTON, D. C. 20523 BIBLIOGRAPHIC INPUT SHEET	FOR AID USE ONLY <i>Dated # 22</i>
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1. SUBJECT CLASSIFICATION	A. PRIMARY Serials	Y-AE10-0000-G732
	B. SECONDARY Agriculture--Agricultural economics--Philippines	

2. TITLE AND SUBTITLE
 Agricultural diversification and trade in the Philippines; annual research report, 1974/1975

3. AUTHOR(S)
 (101) USDA/ERS

4. DOCUMENT DATE 1975	5. NUMBER OF PAGES 19p.	6. ARC NUMBER ARC
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7. REFERENCE ORGANIZATION NAME AND ADDRESS
 USDA/ERS

8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)
 (Research summary)

9. ABSTRACT

10. CONTROL NUMBER PN-RAB-333	11. PRICE OF DOCUMENT
12. DESCRIPTORS Diversification Models Philippines	13. PROJECT NUMBER
	14. CONTRACT NUMBER PASA RA(AJ)13-71 Res.
	15. TYPE OF DOCUMENT

ANNUAL REPORT SUMMARY SHEET

Agricultural Diversification and Trade
PASA RA(AG) 13-71

Project Title and Contact Number

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Principal Investigator and Contractor

U.S. Department of Agriculture, Economic Research Service
Washington, D.C.

Contractor's Address

<u>March 1, 1972 to June 30, 1976</u> Contract Period From-To	<u>July 1, 1974 to June 30, 1975</u> Reporting Period From-To
Total Expenditures and Obligations through Previous Contract Year	<u>\$329,032</u>
Total Expenditures and Obligations For Current Contact Year <u>1/</u>	<u>\$ 94,170</u>

Narrative Summary of Accomplishments and Utilization

The national model is operational and is currently being used for policy analyses. The results of its most recent use, i.e., the analysis of alternative prices of fertilizer, were briefly summarized for use in the Department of Agriculture, Philippines.

The model contains activities for the production of the major fertilizer-using crops (palay, corn and sugarcane) as well as of coconuts, pork, poultry and intermediate processing. There is a set of activities defined for each feasible combination of land type, level of capital intensity (i.e., animal labor, hand tractor, or wheel tractor) and level of fertilization. In all there are 65 palay, 55 corn, 25 sugar and 4 coconut acti-

1/ Includes \$6,000 housing and local travel costs for resident PASA personnel paid by USAID Mission.

vities and 6 livestock. To these are added 89 activities to specify the sloped domestic demand functions for final products and about 50 other activities for intermediate processing, purchasing inputs, etc., for a total of about 301 activities.

There are 100 constraints consisting of 10 cropland-season constraints, bi-monthly constraints on labor by type of capital intensity, various balance equations and an overall constraint on the area of land that can be used for each crop.

The model closely approximates Philippine agriculture in the 1970-72 base period and appears to perform satisfactorily in tracing the impact of fertilizer price changes. The next step is to add about 15 minor crops to the model to broaden the model's use and make projections for resource and demand levels for 1980.

Technical consultants were in Manila twice during the year under report to make an assessment of the linear-programming work of the ADAM Staff. The first visit yielded a shift in the direction of the modelling activities, such that two types of models were developed: the national, and the regional. In the course of the visits also, two primary areas of concern were identified: model development, and personnel development.

On the Philippine side, the project terminated on 31 January 1975 but the funding agency, the National Science Development Board, granted an 18-month extension to last through 31 July 1976. Graduate training for two senior-level researchers who are expected to assume key roles in the modelling efforts when U.S. participation has ended, was initiated during the year.

ANNUAL RESEARCH REPORT

Agricultural Diversification and Trade - PASA RA (AJ) 13-71

A. General Background

Project ADAM 1/ grew out of discussions between representatives of USAID and BAEcon at a regional meeting on agricultural diversification and trade in Manila in 1971. At that time it was expected that rice yields would increase tremendously with adoption of new high yielding varieties and improved technology. It was concluded 2/ that agricultural diversification was necessary in order to find alternative uses for land resources devoted to food grain production as self-sufficiency goals were met and exceeded, to increase farm income and to provide additional foreign exchange.

It was pointed out that to address the problem effectively it would be necessary to (1) gain an understanding of the internal competitive relationships among significant commodities and to determine diversification potentials; and (2) evaluate the potential demand for selected commodities to compete in national regional, or world markets. Information would be required on farm income, changes in demand, interregional competition and "...Far more specific data on farm level alternatives than is presently available..." including how likely farm practices will change the nature of the farm production response.

The project was initiated in February 1972 after approval by the National Science Development Board (NSDB). USDA/ERS participation was delayed briefly but began on a TDY basis in May 1972.

The Davao Planning Conference in December, 1972, recognized that the expected rate of increase in rice production was not being realized and that a reassessment of the new technology was needed as a part of the study of production alternatives.

Four work phases of Project ADAM were originally programmed for a period of 3 years. Phases I and II were to have been completed during the first year, but the unexpected voluminous amount of literature on agricultural research encountered by the project staff delayed completion of these phases. The second project year had been intended for Phase III alone, but due to the delays earlier, some difficulties encountered in the activities of Phase III itself, and the need to provide additional experience and training for the staff, additional time was required. Approval has been granted for extension of the project by the Philippine agencies involved. USAID participation has been extended.

1/ Agricultural Diversification and Markets

2/ Technical paper, Agricultural Diversification and Trade, 2/24/74

B. Objectives

1. To develop the economic data and analysis needed to identify realistic agricultural production and market opportunities and alternatives at the farm, regional, and national levels and,
2. To obtain an integrated picture of agriculture within which various policy goals can be analyzed. These can be broadly stated as:
 - a. Achieve self-sufficiency in agricultural products at least in regard to staple commodities such as rice and corn;
 - b. Increase national income, raise income of rural people and increase employment in agriculture; and
 - c. Improve foreign exchange position by reducing agricultural imports and increasing agricultural exports.
3. To develop in the Philippines the capacity for continuous analysis and re-evaluation of these opportunities and alternatives as production and market conditions change.

C. Continued Relevance of Objectives

Relevance of objectives was carefully considered at the time of the review of the project in Manila in 1974; and both Philippine and U.S. participants agreed that original objectives still hold. Statements of objectives in Philippine reports differ somewhat in wording from the statement in section B above but do not appear to differ significantly in meaning. Specific policy issues facing the Philippines in 1974 were different from those in 1971 when the project was formulated but the information and analysis framework developed in the ADAM project were found to be appropriate for dealing with changing issues.

D. Accomplishments to Date

1. Prior to July 1974

In general, the project started out slower than was originally planned. Because there were several organizations involved on both U.S. and the Government of the Philippines' side, coordination and agreement on implementing the project required going through channels on each side as well as obtaining the necessary clearances for the resident U.S. technician. Thus, it was 9 months after the Philippine side and 6 months after ERS had obtained final approval that the U.S. resident technician arrived and the Davao conference was held. During this time the Philippine group had made the literature search and reviewed the most relevant works.

The U.S. personnel during this time had some TDY time in the Philippines planning and coordinating the project, and obtaining final approval of arrangements. Computer analysis of the farm level data on fertilizer response from the 1969 Integrated Agricultural Survey (IAS) was done during this time in Washington and a draft write-up prepared.

Following the Davao conference a number of consultations were held by the senior staff of ADAM from the Bureau of Agricultural Economics (BAECON), University of the Philippines, Los Banos (UPLB) and USDA to determine what sub-projects would be undertaken by each. At the same time, data processing facilities were assessed since those available at the beginning of the project were inadequate. Arrangements were completed for use of the University of the Philippines, Diliman Computer shortly before the second project year.

The second year was a transition to the analytical phase, and demanded, in addition to high-quality staff, a continuity of such staff in order to at least ensure the smooth flow of the project activities. Staff departures during the second year, and especially at the beginning of the calendar year, upset the timetable and delayed some phases of Project ADAM activities. However, substantial progress was made in development of the programming model for examining production alternatives, collecting and organizing input data, and completion of several sub-projects that provided background and experience for staff. At the close of the project year above, the preliminary analytical framework had been completed and the model was about 50 percent completed.

2. Current Project Year - July 1974 through June 1975

The third year was primarily utilized for the analytical activities relative to the project's modelling efforts. During this period, technical assistance was sought, in the form of high-level consultants, in the evaluation of the LP model being generated, particularly in assessing the relevance of the work to the project's objectives. Assistance was given in identifying important policy issues, in development of the model and research problem, and in computational problems.

In general, the overall analytical framework refers to the LP model which is pictured as a macro-level idealization of Philippine agriculture. This provides an integrated picture of Philippine agriculture within which realistic production and market opportunities are identified by simulating competitive market behavior. This meets the objectives of providing for the development of the mechanisms for continuous analysis and re-evaluation (of production opportunities/alternatives).

a. Development of programming model

Two models are being developed - a national model with all resources aggregated to the national level (and referred to after this as the

national model) and a national model disaggregated into the principal regions of country based on soils and climate as well as administrative divisions. This model will be subsequently referred to as the national - regional model. It has been suggested an even more aggregate model be constructed but this has not yet been started.* The development of two models allows flexibility in answering policy questions and providing analysis. The national model being smaller and less complex is easier to manipulate and interpret and requires less computer time.

A matrix generator and report writer have been developed which makes the models easier to adjust and interpret. These are based on the Haverly Mathematical programming system format. The matrix generator program takes the data in raw table form and converts it into the proper matrix format for use in the optimizing routine. The model and matrix generator have been formulated such that either additional commodities and related processing activities or additional regions, can be incorporated in the analysis by simply adding the necessary data tables and dictionary classes. This means that there are some rows and columns that are redundant in the national model but this has no effect on the results.

The report writer on the other hand summarizes the results of the run into tables which are easily interpreted. Again the report writer is constructed so as to report the results as the model is expanded.

In the national model, production and processing activities are provided for major crops which account for 95% of the cropped area in the Philippines. Also included are the major livestock products which depend on outputs from the crop sector. The general relationship of the various activities to each other are shown in Figure I. Production activities are specified for different classes of land by season. Input supplies are given for man and animal labor, tractor services, capital, land available by class by season, fertilizer and chemicals. Farm level output is transformed either into final product form used in consumption or intermediate products which are used in the livestock sector. The demand for final products is represented by a set of downward sloping demand curves for each product. Export and import activities are also included.

The national-regional model uses the same framework as the national model except that all activities are specified on a regional basis and transfer activities are introduced to represent trade between regions.

Overall, most activities were aimed at the completion of the integrated agricultural planning models for the Philippines. The national model is already operational while the other, the national-regional model, which incorporates seven homogenous areas in the country is still in the pretesting stage. It is expected that either or both of the models can be used for studies directed towards the following areas:

* Clark Edwards, Hilarius Fuchs, and Jerry Sharples "The ADAM Project Consultants' Report" Economic Research Service, USDA December 1974 (xerox)

- (1) detailed economic specification of national-regional investment and processing activities in Philippine agriculture and their impact on foreign exchange, net value-added, income and employment.
- (2) establishment of regional/national inter-sectoral linkages between the Philippine agriculture sector and the semi-agricultural sectors, and tracing out the potentials for employment opportunities.
- (3) evaluation of the effects of irrigation policies/improved farm practices and current technological programs 5 years hence (1980) using the base years 1969-1972;
- (4) an investigation of the regional demand for agricultural products in the Philippines, focusing on price/income elasticities/flexibilities, etc., with the use of various functional forms;
- (5) detailed analysis of the nature of supply function of farm inputs (both endogenous and exogenous) utilized in Philippine agriculture; and
- (6) evaluation of any current agricultural policy(ies) and/or development programs in the Philippines using the ADAM models.

b. Other related studies

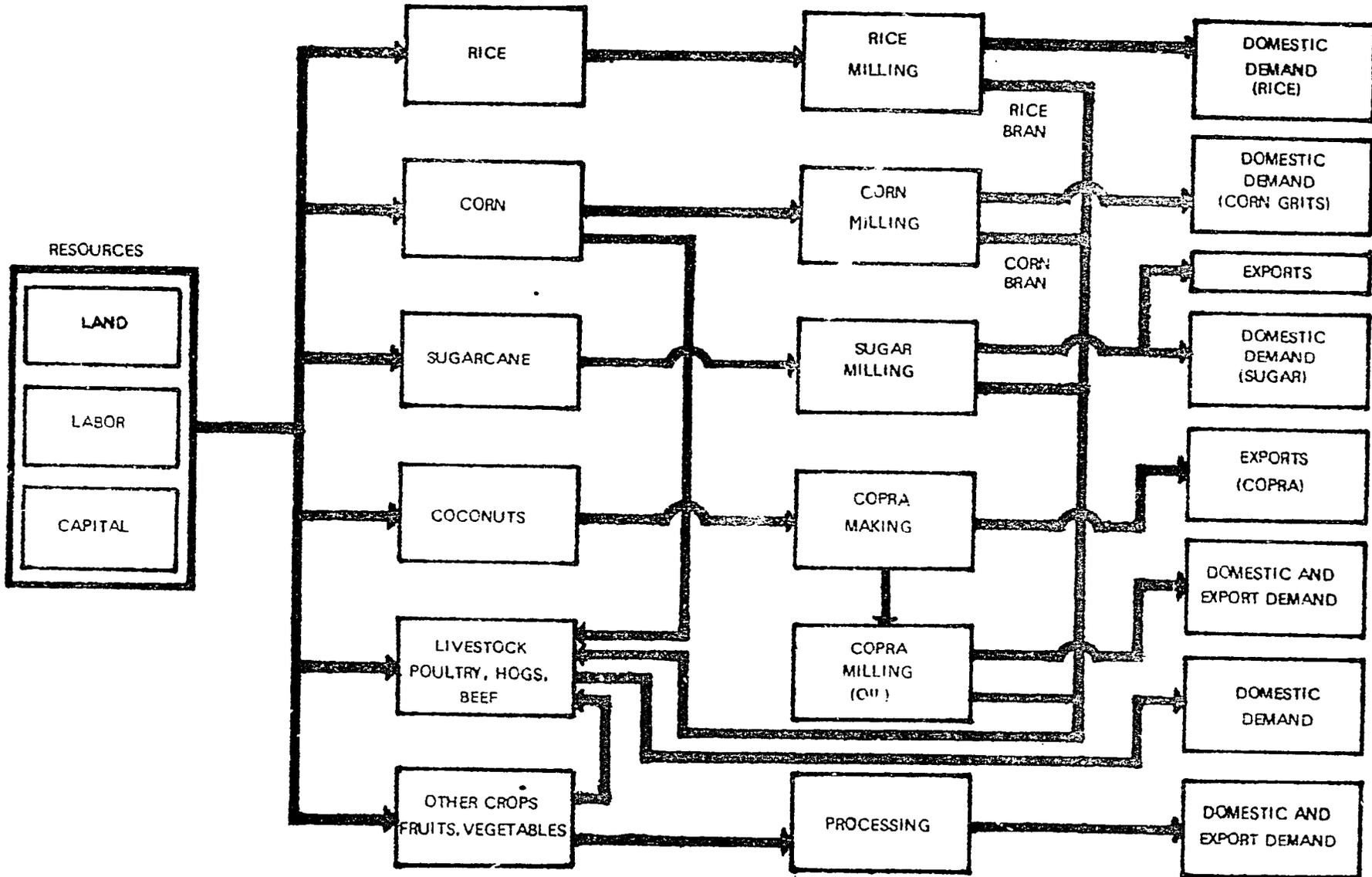
The project staff worked on a number of research areas, both at U.P. Los Banos and at BAEcon in Quezon City, which may be considered independent areas of work, but which served, in the main, as component parts of the integrated research activity under the umbrella scheme of ADAM research.

- (1) The study on the optimum economic farm size for upland conditions was completed by Mr. Florentino Atienza and presented as a professional paper in a recent conference sponsored by the Center for Policy and Development Studies. (This is the continuation of the study in the optimum economic farm size for lowland conditions which was completed in the last project-year.) The study developed an LP model for different levels of technology in order to determine the most efficient combination of crops and resources (and determine the farm size) which maximize the total net returns for the farm family.
- (2) Currently in process is Miss Josefina Ferrer's thesis on alternative methods of estimating of demand for selected agricultural products in the Philippines (the products include rice, pork, beef, poultry, meat, fresh fish, fruit vegetables and leafy vegetables). Specifically, the study will determine the variables which influence the demand for rice, pork, beef,

poultry meat and vegetables; formulate a demand function which best estimates the demand for these products; estimate the price and income elasticities of these products; and make projections of the demand up to 1980.

- (3) At the U.P. at Los Banos, research work continued on supply response studies of agricultural products; these are being done on both regional and national levels. At this time, price elasticities on sugarcane, palay, and vegetables have been completed. A study on process and price margins for livestock, poultry and eggs was also completed and is now in preliminary draft. The analysis includes trends in farm and retail price (of chicken, inahin and tandang); seasonal variations in the farm and retail prices; and the relationship between margin and prices of the above. Other research work at U.P.L.B. providing results that will be used in developing the LP model are national and regional long-term trends in crops production, area and yield; and in prices and price margins of domestic and export crops.
- (4) Analysis of the agricultural patterns for eleven regions (covering land resources, human resources, capital resources, income and consumption characteristics and farm structure) have been completed. The analysis has been completed and drafts prepared for publication of 11 regional reports and a national summary.
- (5) The project staff also completed an intensive analysis on fertilizer supply and demand. This made use of an econometric model of fertilizer demand and supply response that will help to forecast future demand for fertilizer and response of rice, corn and sugarcane to fertilizer application. The study also developed linear programming models of representative farm situations to look at optimal fertilizer uses at different levels of technology.
- (6) The field survey for the rice marketing study in the Bicol area, conducted as part of the dissertation work of Mr. Ismael R. Getubig, Jr. on a cooperative arrangement with the East-West Center, was completed in November 1974. Partial analysis has been made; at this time of writing, Mr. Getubig is completing analysis at the East-West Center.
- (7) Research activities at Los Banos included the analysis of agricultural wage rates for all regions in the Philippines; this was completed within the period under report.

ADAM NATIONAL MODEL



3. Evaluation of Progress Against Targets

In early May, targets for the current year were evaluated and several modifications were found necessary in the original four targets. The original targets and their modifications are listed below.

1. "Have a base period solution for the national model that reasonably approximates reality in the base period, i.e., gives realistic estimates of quantities and prices of products supplies and realistic estimates of national resource use." This target was reached by July 1 for the model containing about 4 crops and 2 livestock products. Other commodities were being added as this report was written.
2. "Use the national model with base period data to analyze changes in or elimination of the fertilizer subsidy to food grain production and have a professional working paper completed reporting the results." Using a smaller version of the national model (minor crops and most livestock omitted), this objective had already been reached. More work on fertilizer questions will be completed by July 1. With more detail having been added to the national model on fertilizer production response, it will be used to evaluate the implications of government fertilizer stocks reduction and several fertilizer pricing policies. This research was used by policy-makers in the formulation in May of a new fertilizer policy. A summary of results was prepared for policy analysis and the working paper will be revised.
3. "Have a national model with 1980 data running and in the testing phase. Projections of 1980 data demand curves for products and 1980 supplies of resources will be completed." Because of the expansion of the work on the second target, this target was not met by July 1. Substantial progress has been made in projecting the data base to 1980 but the target date of September 1 is more realistic for having initial projections made of input supplies and product demand and having separate test runs made with the model.
4. "A national model containing regions (called the regional model) will be specified containing these regions where data are adequate plus a remaining region which is the aggregation of the rest of the country. This will be running and in the testing phase." This target should be achieved for a prototype model containing 4 to 6 major crops and 2 or 3 regions by the end of July. The prototype model will be used to analyze data problems and conceptual problems that arise when the national model is divided into regions. Also, production coefficients have been defined for approximately 19 crops and livestock commodities for all regions.

An additional target was added.

5. "Prepare a revised technical report describing the national model and the methods used to project input supplies, product demands and coefficients to 1980." (This is still in progress but should be completed by the end of July.)

E. Dissemination and Use of Research Results

Research results are issued in limited numbers by BAEcon in a series of working papers or as unnumbered papers. Project ADAM staff has participated in and presented papers to several professional meetings in the Philippines, including the National Congress for Agricultural Research sponsored by the Philippine Council for Agricultural Research, the NSDB Evaluation Seminar, the National Economic and Development Authority, and the UPLB Center for Policy and Development Studies.

Linkages have been established with several academic or research institutions through consultants or staff assignments. These include: The University of the Philippines at Los Banos, where several project personnel or joint-staff members are stationed; the University of the Philippines School of Economics through a consulting arrangement; the National Research Council of the Philippines, also through a consultant.

Less formal but meaningful linkages have been established with the International Rice Research Institute and through graduate student programs with the Food Institute of the East-West Center and the University of Tennessee. Although these will be most useful in providing inputs and technical guidance during the early stages of the project, it is expected that, at later stages as more results are available from the project, these linkages will provide major channels for dissemination for the coming year.

A listing of Project Adam Papers is included as Appendix A. Some uses made of project papers include:

1. The 9-volume annotated bibliography of selected studies on agricultural diversification and markets was used as reference materials by the Philippine Council for Agricultural Research (PCAR) in connection with the First National Congress on Agricultural Research held on February 17-22, 1973, attended by about 200 delegates. (500 copies produced)
2. A Preliminary Analysis of Philippine Agriculture was distributed to the 200 delegates to the First National Congress on Agricultural Research as a basic material for the 5-day deliberations. (300 copies produced)
3. The review of literature (Planning for Agricultural Development) is reportedly being used as a reference material in some schools. (200 copies produced)

4. The 7-volume Regional Agricultural Patterns in the Philippines is being used as reference material in some schools and the Department of Agriculture's office. (100 copies produced)
5. The working paper on Determining the Optimum Economic Family-Size Farms for Land Reform Areas appeared in the Journal of Agricultural Economics and Development, Vol. IV(2): 107-129, July 1974. It was presented in a symposium in agricultural policy and development sponsored by the Philippine Agricultural Economics Association held on March 1, 1974 in U.P., Los Banos and in the two-day Second Agricultural Policy Conference sponsored by the U.P. Center for Policy from June 10-12, 1975 attended by economists and government policy makers. (60 copies produced)

F. Work Plans - July 1, 1975 to July 1, 1976

The target plans for FY-1976 are outlined below, together with the expected time schedule. A proposed budget for the USDA PASA is presented following the work plan statement.

The following plans were made for the period July 1, 1975 to the end of project ADAM (July 1, 1976) and a Pert-CPM chart proposed to evaluate progress.

1. By September 1, 1975, the national model containing 1980 projections will be satisfactorily operating. Reasonable results will be obtained given one set of 1980 estimates of demand, supply of inputs and technology levels.
 2. Between September 1 and November 1, the 1980 national model will be used for analyzing the impact on the agricultural sector of alternative growth rates of demand as reflected in alternative growth rates of population and income. Various rates of growth in technology will also be examined. Two major policy questions to be analyzed will be: "Under what conditions will the Philippines be able to be self-sufficient in food production - especially in rice and corn production", and "If self-sufficiency is achieved, what are the possibilities for farm product diversifications."
- A professional paper discussing the 1980 national model will be prepared and the results should be ready by June 1976.
3. The national model containing regions (regional model) will be expanded from the base period prototype to include approximately 19 crops, livestock and commodities for all eleven regions. This model will be satisfactorily operating by January 1, 1976. The regional model will be described and evaluated in the final report but no major policy analysis is planned prior to the termination of the ADAM project. This model could serve as a starting point for further work by BAEcon, as a Ph. D. thesis, or both.

4. Three theses will be completed. An M.S. thesis by JOSEFINA FERRER on alternative methods of estimation of demand for agricultural products in the Philippines, will be completed by October 1975. A Ph.D. thesis will be completed by LEONARDO GONZALES in the Spring of 1976. He will use the national model to examine the impact of alternative fertilizer policies on Philippine agriculture. An M.S. by GAVIBALDI LEONARDO evaluating alternative irrigation and mechanization policies for 1980 and beyond using the ADAM framework. Research reports are expected from each thesis.
5. A "polished" draft of the final report on the ADAM project will be completed by April 1, 1976.
6. A USDA economist will consult with the ADAM staff 3-4 weeks in November 1975 to help analyze policy implications and interpret results using the 1980 model.

Financial Report FY 1975
Agricultural Diversification and Trade PASA RA(AJ)13-71

Expenditures and Contractor Resources

Total expenditures on the project from all sources in FY 1975 are estimated to have been the equivalent of \$161,170. This included peso expenditures by Philippine agencies equivalent to \$66,000. Of this amount, almost 75 percent was for personal services, about 7 percent for travel, 5 percent for supplies and materials, and the remaining 13 percent for unspecified sundry expenses. The USAID Philippine mission provided about \$6,000 to cover housing costs for resident PASA personnel and local travel costs. About \$89,170 was provided under USAID/TAB/PASA for salary and benefit costs for one professional economist, 6-7 manmonths of TDY personnel plus travel and overhead costs for these employees.

Progress on the project has continued to be hampered by turnover and inadequate number of top staff on the Philippine side. However, additional funds would not have solved this problem without an accompanying arrangement to increase the salaries of the staff that were, and still are, held at extremely low levels by Civil Service regulations.

ERS GRA 4-74 PASA BUDGET PLAN By Object Class	PARTICIPATING AGENCY SERVICE AGREEMENT WITH: U. S. DEPARTMENT OF AGRICULTURE PHILIPPINES BUDGET PLAN FOR FY 76	AMOUNT \$99,493	PASA CONTROL NO.	PAGE 1 of 1 PAGES
		APPROPRIATION	RA(AG)13-71	
		ALLOTMENT	PROJECT NO.	

POSITION	CLASS GRADE	FC GRADE	RATE	MAN-DAYS	SALARY	DIFFERENTIAL	TOTAL	PERSONNEL BENEFITS	INT'L. TRAVEL	TRANSPORTATION OF THINGS	TOTAL
Ag. Econ. - Kunkel	10/03		23,270	66	5,907	590	6,497	508	2/3,350	3/5,500	15,855
	11/01		25,451	79	1/7,733	773	10,052	797	0	0	10,849
	11/01		25,451	117	1/11,452	1,145	13,284	1,043	0	0	14,327
Ag. Econ. - Edwards	15/07		35,782	34	1/4,679	137	5,779	485	4/3,205	0	9,469
Director - W. A. Faught	15/08		36,000	19	2,630	0	3,156	271	5/5,270	0	8,697
	15/08		36,000	19	1/2,630	0	3,171	272	0	0	3,443
Gil Rodriguez 6/			0/D	0	0	0	0	0	1,955	0	1,955

1/ Salary increase 6%.

2/ Return travel for Kunkel & family (wife & 2 children-ages 5 & 2) end of tour (may be reserved for Mission use).

3/ Moving of HHE, auto, un. baggage, storage and removal.

4/ One trip to the Philippines, per diem, and \$50 misc. (reserved for Mission use except \$150.)

5/ Two trips to the Philippines, per diem, and \$50 misc. ea. trip (no reserve for Mission use.)

6/ No salary, one trip to Philippines.

7/ Computer time.

	SUB TOTAL	64,595
21 Domestic Travel		0
23 Rent, Comm, Util		0
24 Print & Repro		0
26 Supp & Mat		0
31 Equipment		0
25 Other		7/15,000
Overhead	25	19,898
GRAND TOTAL		99,493

REVISED-8/29/75

Other Publications/Research Reports

- ALIX, J. C. 1973. A preliminary analysis of Philippine agriculture. Paper presented at the First National Congress on Agricultural Research of the Philippine Council for Agricultural Research, Los Banos, Laguna, Feb. 12, 1973. 68p. 300

The paper presents a descriptive analysis of how Philippine agriculture has grown over the years, and an overview (an evaluation) of the present state of agriculture in the country.

- ATIENZA, F. M. and D. E. Kunkel. 1973. Determining the optimum economic family-size farms for land reform areas. Preliminary Report. Bureau of Agricultural Economics. 41p. 60

The report contains an analysis of findings on the economic family size farms for land reform areas for specified technology levels. The optimum combination of resources and cropping activities and comparisons of farm technologies were made.

- ATKINSON, L. J. and D. E. Kunkel. 1973. Some explanatory notes on the nature of the green revolution in the Philippines. Working Paper No. 2. Bureau of Agricultural Economics, 25p. 30

An analysis of the 1970 farm survey data from the BAEcon's Integrated Agricultural Surveys, on the relationships between fertilizer and rice yields; the study used only a subsample of the survey data collected.

- _____. 1974. HYV in the Philippines: Progress of the seed fertilizer revolution. (Preliminary draft). Bureau of Agricultural Economics. Quezon City. 61p. 30

An extended revision of Working Paper No. 2 on the "Green Revolution" discussion; the paper discusses the 1972 BAEcon- IAS data. The analysis indicates significant deviations of rice yields from normality and indicate positive skewness.

FOOTE, R. J. 1974. Philippine agricultural sector models - selection of variables from the computer runs and discussion of results. Bureau of Agricultural Economics, Quezon City, 27p.

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This report discusses the processes involved in initial formulations for the agricultural sector models developed. The models were designed for three purposes: to generate a system of equations which can be used with other analysis and information as a guide for policy decisions related to agriculture; to determine the extent to which available data are satisfactory and areas where new data are needed; to assist Filipino technicians to increase their knowledge on economic analysis. The methods of 3-stage and 2-stage least squares regression analysis were used.

_____. 1974. Agricultural sector models for the Philippines; formulations and data. Bureau of Agricultural Economics, Quezon City, 14p.

30

The report discusses the data used in, and the formulations of, two agricultural sector models; for the Philippines. One model was run for a number of crops and the second model limited to the 5 most important crops/products. Both models are designed to complement the previously complete macro-model for the Philippines.

_____. 1973. A macro-model for the Philippines for 1955-1969 in 1955 prices. Bureau of Agricultural Economics, Quezon City, 4p.

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Discusses a macro-model (patterned after one developed for Taiwan) using two exogenous variables: exports and government expenditures for consumption. Data from the Encarnacion econometric models are used, with some modifications.

_____. 1974. Macro-model for the Philippines in 1955 prices - results for 1970-72. Bureau of Agricultural Economics, Quezon City, 6p.

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This report discusses ways on how to use the new data in the model and presents results for the three available years outside of the period of fit. The general conclusion is that the model as originally formulated gives reasonably calculated values for GDP, YD and C for 1970-72.

GONZALES, L. A. et. al. 1974. The fertilizer subsidy of the Philippines: a preliminary analysis. Working Paper No. 7. Bureau of Agricultural Economics, Quezon City. 50

KUNKEL, D. E. 1974. A programming model for Philippine agriculture. Bureau of Agricultural Economics, Quezon City. 50

The paper is a descriptive presentation of the programming model developed for Philippine agriculture, which (model) gives a set of activities for 7 regions delineated according to agro-climatic conditions. The model analyses the agricultural sector in sufficient detail so as to obtain feasible adjustments in production patterns, resource requirements, marketing and processing needs by region.

_____, L. A. Gonzales and J. M. Sharples. 1975. Some theoretical underpinnings of sectoral policy and planning Bureau of Agricultural Economics, Quezon City, 35p. 50

PAJE, M. P., D. E. Kunkel and A. C. Alcasid. 1974. The fertilizer supply situation and marketing system in the Philippines. Working Paper No. 4. Bureau of Agricultural Economics, Quezon City, 115p. 100

The paper deals with two aspects of the fertilizer industry in the Philippines during the period 1954-1972; supply situation and marketing system. Importation and domestic production for the indicated years are included as with corresponding breakdown of fertilizer components imported into the country.

PAULINO, L. A. 1974. Narrative report on Project ADAM (NSDB-BAEcon7202Ag). Bureau of Agricultural Economics, Quezon City, 46p. 50

A report on the activities and accomplishments of Project ADAM during its second project-year (February 1, 1973 to January 31, 1974).

PROJECT ADAM. 1974. The Agricultural machinery situation in the Philippines. Working Paper No. 6. Bureau of Agricultural Economics, Quezon City, 47p. 60

An overview of the state of the agricultural machinery in the Philippines, with emphasis on the distribution/marketing aspects.

- PROJECT ADAM. 1974. Regional agricultural patterns in the Philippines: Central Luzon, Working Paper No. 5 (Part I). Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Central Visayas, Working Paper No. 5 (Part II), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Ilocos Region, Working Paper No. 5 (Part III), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Eastern Visayas, Working Paper No. 5 (Part IV), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Northern Mindanao, Working Paper No. 5 (Part V), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Cagayan Valley, Working Paper No. 5 (Part VI), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1974. Regional agricultural patterns in the Philippines: Southern Mindanao, Working Paper No. 5 (Part VII), Bureau of Agricultural Economics, Quezon City. 100
- _____. 1973. Planning for agricultural development: a review of literature. Working Paper No. 3. Bureau of Agricultural Economics, Quezon City, 189p. 200

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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A presentation of the reports, comments and discussions at the 2nd series on the evaluation seminar on Project ADAM held on June 17, 1973.

_____. 1972. An annotated bibliography of selected studies on agricultural diversification and markets in the Philippines. Working Paper No. IA. (Parts I and II). Bureau of Agricultural Economics, Quezon City. 500

A seven-volume annotated bibliography of research studies relevant to agricultural diversification and markets in the Philippines, on seven classification as follows: agricultural economics and rural sociology; agronomy and horticulture; animal husbandry, forestry, fisheries and human nutrition; and fertilizers, entomology and plant pathology, agricultural botany, agricultural engineering and others; agronomy/horticulture; agricultural economics (Marketing); and non-Philippine studies.

RODRIGUEZ, G. R. 1974. Fertilizer demand in the Philippines, 1952-1980. Unpublished M.B.A. thesis, Ateneo University.

This uses an econometric approach to analyze demand for the supply response to fertilizer and forecasts future demand for fertilizers.