Sector Analysis Support (554)

AID 1025-1 (7-71) (FACE SHEET)
NONCAPITAL PROJECT PAPER (PROP)

PD-AAC-462-01

598055A-3

PAGE 1 of ___ PAGES

I. PROJECT IDENTIFICATION

1. ~~PROJECT TITLE~~
Sub-Project Title

External Trade/Sector Analysis Support

APPENDIX ATTACHED
☒ YES 27p ☐ NO

2. PROJECT NO. (M.O. 1095.2)
598-15-995-554a

3. RECIPIENT (specify)
☐ COUNTRY
☒ REGIONAL L.A. ☐ INTERREGIONAL

4. LIFE OF PROJECT
BEGINS FY 1975
ENDS FY 1977

5. SUBMISSION June 1974
☒ ORIGINAL DATE
☐ REV. NO.
CONTR./PASA NO. LA(AI)66-7

II. FUNDING ($000) AND MAN MONTHS (MM) REQUIREMENTS

A. FUNDING BY FISCAL YEAR	B. TOTAL $	C. PERSONNEL (1) $	C. PERSONNEL (2) MM	D. PARTICIPANTS (1) $	D. PARTICIPANTS (2) MM	E. COMMODITIES $	F. OTHER COSTS $	G. PASA/CONTR. (1) $	G. PASA/CONTR. (2) MM	H. LOCAL EXCHANGE CURRENCY RATE $ 1 = ___. (U.S. OWNED) (1) U.S. GRANT LOAN	(2) [illegible] (A) [illegible]	(2) [illegible] (B) [illegible]
1. PRIOR THRU ACTUAL FY												
2. OPTN FY 1975	187	184	67			2	1	187	67			15
3. BUDGET FY 1976	219	218	77				1	219	77			15
4. BUDGET (+1 FY 1977	200	199	66				1	200	66			15
5. BUDGET (2 FY												
6. BUDGET (3 FY												
7. ALL SUBQ. FY												
8. GRAND TOTAL	606	601	210			2	3	606	210			45

9. OTHER DONOR CONTRIBUTIONS

(A) NAME OF DONOR	(B) KIND OF GOODS/SERVICES	(C) AMOUNT

III. ORIGINATING OFFICE CLEARANCE

	TITLE	DATE
1. DRAFTER R. Vanlaeften/R. Misheloff	Economist	5-1-74
2. CLEARANCE OFFICER S. Daines	Economist	5/12-74

IV. PROJECT AUTHORIZATION

1. CONDITIONS OF APPROVAL

2. CLEARANCES

BUR/OFF.	SIGNATURE	DATE	BUR/OFF.	SIGNATURE	DATE
LA/DR/SA	B. Robinson		LA/DP		
LA/DR	C. Stockman		LA/GC		
LA/DR	R. Breen				

3. APPROVAL AAs OR OFFICE DIRECTORS

SIGNATURE	DATE

TITLE Herman Kleine, AA/LA

4. APPROVAL A AID (See M.O. 1025.1 VI C)

SIGNATURE	DATE

ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT

I. Introduction

The analysis of agricultural export demand is an integral part of the A.I.D. assisted sector analysis work ongoing in Latin America. The methodology that is being developed in Colombia is designed to provide information to government officials that will help them decide how to allocate their resources given their desire to achieve certain objectives. The linear programming technique allocates available resources (land, labor, capital) among alternative activities (crops, industries, services) in a way that maximizes a given objective (increasing employment, for example). But the results are meaningful only if realistic constraints are included in the model. Land, for example, is an easily recognizable constraint. Given the existing technology, the amount of wheat that can be grown in Colombia may be limited by the amount of land suitable for growing wheat. Demand can also act as a restraint. For example, it may be physically possible to grow tomatoes on all the land in Colombia, but if the market for tomatoes at renumerative prices is for only a minute fraction of what is possible, there is no point in growing the remainder.

Two markets exist for Colombia's agricultural products--the domestic market and the export market. Domestic demand is made up of the demand of households, businesses, and government. Information about these subsectors was available within Colombia from household consumption surveys, surveys of businesses and manufacturers, government budgets, etc. Information on the channels through which goods flow to and from the agricultural sector was also available from Colombian sources. Both sets of information were incorporated into the Colombian agricultural sector analysis.

To be complete, the analysis should also include reliable estimates of the external demand for individual commodities. A substantial share of Colombian agricultural production is exported (during 1968-70 net coffee exports averaged 78 percent of total domestic production, for example; net banana exports averaged 44 percent of domestic production; cotton exports 30 percent; tobacco exports 29 percent; and sugar exports 25 percent). If the markets for these exports were eliminated, the demand for individual commodities would decrease substantially. Production patterns would have to change in response to the changing patterns of demand. And for each different demand pattern, there would be a different optimum pattern of resource allocation. In other words, we are limited in what we can say about optimum resource allocation unless reasonable estimates of the amount of Colombian exports which could be absorbed by the international market are available for each important commodity.

Recognizing the importance of better estimates of external demand to Colombia's sector analysis, a small project sub-activity was initiated by the U.S. Department of Agriculture PASA team during fiscal year 1972. The purpose of this effort was to identify priority commodities for export expansion and to develop export projections for these commodities based on an analysis of the major import markets. Groups of commodities initially analyzed included fresh and processed fruits and vegetables, sugar, tropical hardwoods and flowers. Markets covered included the the United States, Japan, the European Economic Community, and the

United Kingdom. Trends in production, consumption, and imports in major (actual and potential) consuming countries were examined, the barriers imposed by tariffs and other trade restrictions were evaluated, and where data was available, an attempt was made to determine whether Colombia (in this case) would have an absolute cost advantage in any of these markets vis-a-vis domestic producers and other foreign competitors.

Three conclusions emerged from this initial project:

1. The world market surveys and world demand projections published from time to time by FAO and USDA provide useful secondary data but little direct help to individual countries interested in evaluating the export potential for their commodities.

   FAO trade projections are based upon projections of supply and demand in individual countries given present price levels. Estimates of Colombian coffee exports, for example, are derived by substracting projected demand from projected supply. The remainder is assumed to be exported if positive (or imported if negative). These types of projections give little help to those interested in evaluating the potential market for Colombian exports, for example, i.e. how much of its exports the world market can absorb at a price level at which the process is still profitable to Colombia. What happens when a country expands its exports beyond the level projected by FAO? How much more coffee can Colombia sell before the price drops and then how far and how fast will it drop? FAO projections provide no answers to these types of questions. Yet answers are crucial for sector analysis work as well as for those responsible for planning and implementing country export expansion programs.

   Most USDA trade projections suffer from the same shortcomings. Some market surveys may include information of use to Latin American countries, although USDA's priority commodities and markets differ from those of most Latin American countries. USDA's ongoing trade research and analysis is of limited benefit because almost all of it is oriented specifically toward identifying export possibilities for U.S. products. In fact all this work is done under the Department's PPBS goal--increasing U.S. agricultural exports.

2. Countries are unable to make good estimates of the present and future demand for their exports with existing techniques.

   Seat of the pants estimates are probably the most common. Extrapolations of historical trends, modified by informed judgement fall into this catogory. More often than not, analysts using this "technique" do not clearly think

through and document all important relationships and assumptions, although they may consider all the important variables in some fashion. Similarly, they often do not have a sound basis for quantitatively evaluating the strengths of assumptions and relationships. Their estimates, therefore, may not be replicable, i.e. no one is likely to get the same answer twice, not even the same analyst.

And because there is no analytical framework, the analyst may be required to work through his entire thought process, whatever it is, in order to evaluate the impact of a small change in the assumed value of any of the relevant factors--production levels of one of the competing exporters, for example.

The next step in sophistication is the single equation estimate. The analyst using this approach has to spell out the expected relationship between a country's export levels and selected explanatory variables. Similar to other demand equations, explanatory variables usually include the domestic price of the commodity, its world price, prices of other related commodities, world income and world population. Equally important variables such as product quality or availability of transportation, being less easily quantifiable, are usually excluded, however. The validity of these relationships is tested and the relationships quantified by regressing historical export levels against the historical values for all the exogenous or explanatory variables. However, the next step, projecting exports, can not be taken unless projections are available for each of the explanatory variables. World population and world income projections can be obtained by summing U.N. individual country projections. But since price depends on both supply and demand, reliable world price projections are impossible outside of some general equilibrium model which incorporates all the world's major suppliers and demanders of each commodity in question. These types of models have not been widely developed and this information is therefore unavailable to individual country analysts.

What is needed then is some technique which: (a) includes all important variables, (b) provides an analytical framework so that results can be replicated and modifications can be made in individual components to reflect modifications without having to start the analysis over again from scratch, (c) incorporates a sufficient number of the world's suppliers and demanders so that world price levels can be projected with some degree of confidence given certain assumptions and (d) enables countries to determine what happens to prices and revenues when they expand their exports.

3. The transfer or export marketing system, especially the transportation component, is one of the major barriers to exports from Colombia, and perhaps other L.A. countries.

The project presented here is designed specifically to deal with the issues identified during the initial phase. Its purpose is to develop, test, and compare the effectiveness of a few promising techniques for evaluating a country's ability to compete in a given market for agricultural exports and for estimating the future demand for and prices of those exports. By the end of the project, improved techniques for evaluating the external demand for agricultural products and their export marketing systems will have been developed, tested with selected commodities, and evaluated. Mechanisms will also be developed for internalizing project outputs to a degree commensurate with the needs and sophistication of individual Latin American countries. Project outputs will include models (i.e. systems of equations and computer software), estimates of the export demand for selected agricultural commodities and improved techniques. Information with respect to the cost effectiveness of the new techniques, how and when to use them and the types of data and personnel required will be available to all interested Latin American countries.

At this point, a few words about the complicated nature of export demand may help explain why the usual methods of demand analysis are inadequate. First, the demand for Colombian cotton exports, for example, is equal to the sum of many individual country import demands for Colombian cotton. This means that all the important import markets must be analyzed in order to get a comprehensive picture of the demands for Colombian cotton. Each of these countries' demands for cotton imports is a function of both their total demand for cotton and their ability to supply their own needs out of domestic production. This requires an analysis of each major importer's production and consumption levels and the factors influencing them, as well as import levels and trade barriers. Next, whether these cotton imports are purchased from Colombia or from other exporters depends on how much is available from other exporters and at what price as well as how much is available from Colombia and at what price. All of these factors are interrelated; a change in the volume of cotton exports from the Sudan could affect the quantities of Colombian cotton demanded by the European Economic Community and the price offered. The traditional export promotion type of analysis is unable to do more than hint at these types of interrelationships.

While improved estimates of export demand are necessary for a complete and reliable sector analysis, better estimates and estimating techniques have an even broader clientele. These include sector assessment countries as well as those Latin American countries interested primarily (or solely) in increasing their agricultural exports, but which have not yet undertaken overall evaluation of their agricultural sectors. This project is designed to be responsive to all three types of clientele.

II. Goal

Statement of the Goal

The goal of sector analysis as it is being pursued in the Bureau for Latin America, is to help Latin America countries to set feasible, consistent objectives in such areas as employment, crop production, foreign exchange earnings and income distribution, and to allocate resources in a manner consistent with their achievement. This project is an integral part of the sector analysis work and is directed, therefore, toward achievement of the same goal.

B. Measurement of Goal Achievement

The goal will have been achieved once the techniques of agricultural sector analysis--including techniques for estimating external demand--are developed and in use in one or more Latin American countries and have proven themselves useful for planning purposes. Although we could conclude that the goal had been achieved if the agricultural sector analysis came to be fully understood and used successfully by the Government of Colombia alone, it is our contention that these techniques can be useful to other Latin American countries as well.

This project per se will focus on developing improved techniques for estimating the export demand for a few agricultural products of major importance to Colombia. However, these techniques can also be very useful to Ecuador, Guatemala, and other Latin American countries interested in answering the same questions. Moreover, the models (i.e. an analytical framework of equations and computer software) of the international markets for beef, sugar and fish which will be produced as part of the testing process, plus the actual estimates of export demand produced by these models can also be used, with slight modifications, by other Latin American countries.

The final test of the agricultural sector and agricultural export subsector models is not the number of countries which choose to use them for planning purposes, however, but the degree to which they prove useful to the users. This in turn suggests that the final goal will have been achieved only when the capacity of the models to assist countries in specifying development objectives and defining strategies to achieve them has been successfully tested. The testing procedure involves comparing model predicted results with those observable in the real world when countries actually adopt the strategies "recommended" by the models. To put the matter more simply, the models help define both objectives and ways to achieve them, i.e. strategies. If countries will adopt the specified strategies and observable real world phenomena approximate what the model predicted, there

is at least a strong presumption that the models "work" and are useful.

C. Assumptions

1. One or more countries will use the results of the sector analysis and/or adopt sector analysis techniques.

2. These countries have sufficient flexibility to change and/or induce changes in existing resource allocation patterns to permit them to follow the recommended strategies.

The willingness of host country analysts and policy makers to use the techniques developed in conjunction with this project and the broader sector analysis work will depend not only on the quality of the models and the data but also on the predisposition of policy makers and planners to accept results which may not always be consistent with their intuitive judgments. Even when there is a willingness to rely on formal analytical techniques as a basis for developing strategies, there may be political, cultural and institutional constraints to the reallocation of resources which would be difficult to account for analytically.

III. Project Purpose

A. Statement of Purpose

1. To develop techniques for determining what pattern(s) of resource allocation is consistent with achievement of each prespecified sector and macro objective, and to quantify the trade-offs between the different objectives.

2. To develop, test, and compare the effectiveness of different techniques for evaluating a country's ability to compete in a given market for agricultural exports and for estimating the future demand for and prices of its agricultural exports.

3. To provide estimates of potential exports and price levels to the Colombian and other sector analysis groups for incorporation into overall sector models.

4. To develop mechanisms for internalizing the techniques and data output of the project to a degree commensurate with the needs and sophistication of individual Latin American countries.

B. End of Project Status

1. Methodological documents produced describing in detail how each component of analysis (linear programming, input-output, etc.) is constructed and how work on the

external sector is incorporated into overall agricultural sector models following full field testing.

2. Improved techniques for evaluating the external demand for agricultural products and their export marketing systems developed, tested using selected agricultural commodities, and evaluated. This will include developing and comparing more than one trade and export marketing system model. The models will be fully described in working documents.

3. Mechanisms developed by which the outputs of the project can be internalized. Depending upon needs and sophistication, interested countries will be able to acquire:

   a. Knowledge of and ability to use outputs of models developed and tested as part of the project.

   b. Ability to run, modify and replicate these models.

   c. Knowledge of cost effectiveness of new techniques for analyzing export demand and export marketing systems and how and when to use them.

4. Estimates of potential export levels and prices made available to sector analysis groups for use as constraints in full sector models.

The sector analysis process undertaken in Colombia has involved two more or less sequential steps: (1) the development and testing of techniques, and (2) the internalization of these techniques. The bulk of the first task is completed and work has begun on internalization. The one important missing element is a satisfactory technique for estimating external demand. A major purpose of this project is to develop, test and incorporate such a technique into the overall sector models.

Internalization of the techniques is another purpose of this project. The discussion under #3 above suggests that there are different levels of internalization. The ability to use the actual estimates developed by this project is one. In this sense, we expect internalization in Colombia by the end of the project. We also expect the Colombians to be able to fully absorb the techniques as they are developed, through periodic consultations primarily. Therefore, we have not budgeted for a distinct internalization phase. The fact that

a sector analysis group is already functioning and has a few years experience working with sector models suggests that these expectations are probably realistic.

All techniques and results from the test models will be documented and widely disseminated in an effort to promote understanding and use of methodology developed not only for Colombia but for other Latin American countries as well. This is budgeted for. Additionally, USDA's analysts could also be made available for TDY assignments to assist personnel in interested Latin America countries with the use of the new techniques--how and when to use them, what types of data and trained personnel are required to use them, their cost effectiveness. Limited internalization activities of this kind are not budgeted for in this project, but necessary services could be purchased either by A.I.D. missions or by a country itself.

Lastly, in an effort to acquaint Latin American policy makers and analysts with the project and with types of services which could be made available, we are tentatively proposing a seminar to be held during the final year of the project and to be sponsored by a regional organization such as IICA or ROCAP. Although we have no assurance at this time that either of these agencies would be interested in such a proposal, we have included in our budget funding for USDA analysts to help prepare and attend such a session. In addition to the aforementioned purposes, such a session would provide a convenient forum for a final review of the project and its outputs.

C. Assumptions

1. Agricultural sector analysis continues to be a priority undertaking for A.I.D., the Colombian government, and other Latin American countries.

2. Good estimates of external demand for agricultural commodities are needed to ensure that reliable patterns of resource allocation result from sector analysis.

A substantial share of Colombian agricultural output is exported. The same holds true for many other Latin American countries. A satisfactory procedure for deriving export demand for at least the more important exports is therefore necessary if the agriculture sector models are to yield the best possible results.

For each demand pattern, there is a different optimum pattern of allocating resources (optimum in the sense of being consistent with achievement of a given prespecified objective). Each such pattern implies a different set of policies (credit, pricing, subsidies, etc.) to ensure that resources are in fact optimally allocated. It is, therefore,

clear that it is difficult to make conclusive statements about optimum resource allocation and government policies and programs unless reasonable estimates of demand for each major commodity can be generated. A methodology for estimating domestic demand is in place. The modest efforts we have made to date to estimate external demand have not been adequate. (See Introduction for a more detailed discussion of this point.)

3. Better estimates of export demand and better estimating techniques have a broader clientele than sector analysis countries--i.e. sector assessment countries as well as those countries interested primarily in improving estimates of their agricultural exports but not yet interested in overall evaluation of their agricultural sectors.

Better estimates and better techniques to achieve them are viewed as important in most Latin American countries because of their desire to increase agricultural exports, thereby increasing foreign exchange earnings. Although an integral part of the sector analysis work, this project was designed to be responsive to all three types of clientele.

4. Estimates relevant to Latin American countries and improved estimating techniques will continue to be unavailable from FAO and USDA's international divisions, although both will remain good sources of the secondary data required as inputs for making better estimates.

5. Close coordination between personnel working on the external subsector and those concerned more directly with overall sector analysis continues.

Close coordination is needed to insure that project outputs are compatible with sector analysis requirements and that internalization is completed in Colombia. We propose to foster the necessary coordination by maintaining a single PASA relationship with the U.S. Department of Agriculture to carry out agricultural sector analysis work, including, but not limited to, that portion having to do with the external subsector.

IV. Project Outputs

A. Output and Output Indicators

This project will produce a series of outputs:

1. Improved techniques developed, tested, and evaluated:

   a. Improved techniques developed for estimating the external demand for agricultural commodities.

b. Improved techniques developed for evaluating Colombia's and other Latin American countries' competitive advantage in the world market for agricultural commodities.

c. Improved techniques developed for evaluating the effectiveness and efficiency of export marketing systems for agricultural commodities.

Two additional outputs--models of the international beef, sugar and fish markets and estimates of the external demand for Colombian beef, sugar, and fish produced by these models--are by-products of (a) and (b).

2. Model of the international markets for beef, sugar and fish developed, operating, and capable of supplying estimates of external demand.

The models themselves represent another output which could be utilized by Colombia and other Latin American countries as is or with minor modifications. (For example, if the European community makes a major change in its beef production program, a new production function might have to be estimated and substituted into the model.)

3. Estimates of potential exports and prices for selected agricultural commodities.

Actual estimates of the external demand for Colombia's exports of beef, sugar, and fish represent a third type of project output. These estimates can be incorporated into the sector model. Additionally, they can be utilized by policy makers and trade analysts concerned directly with the goal of increasing Colombia's agricultural exports. Similar export estimates can be prepared for other Latin American countries if sufficient data describing their own production and consumption patterns (supply and demand functions) and government policies can be developed and incorporated into the commodity models and if they are willing to make such information available to the export analysis group.

4. Evaluations of Colombia's export marketing systems for selected agricultural products completed--i.e. beef, sugar, fish, and processed foods.

Each evaluation will describe the existing export marketing system, identify the bottlenecks in the system which must be removed if exports are to increase, explore alternative solutions for removing these bottlenecks, select the most promising alternatives, and contribute to techniques of analysis that

can be used profitably in other Latin American countries (see above 1.c.).

5. A mechanism developed for internalizing the techniques, models, and data outputs of the project, (see Section III, B).

B. Assumptions for Outputs

1. Secondary data available or can be generated within the time frame and budget constraints of the project.

2. Supply and demand functions for each commodity are available from each Latin American country that desires to be included in the analysis or can be readily generated.

Sufficient data on production, consumption and trade will probably be available from secondary sources for all the major importing countries and many of the major exporters. This is not the case for Colombia and perhaps not for a number of other Latin American countries. It has been arranged, therefore, for the Colombian sector analysis group to provide the project with the necessary information on the production and consumption of these three commodities in Colombia. This will include estimating supply and demand functions. Data will be generated, assembled and processed as part of the sector analysis effort and will not be changeable to this project as such. Likewise, if other Latin American countries like Nicaragua and Ecuador, for example, want to receive more detailed estimates of their potential exports, they will have to provide the project with supply and demand functions for the commodities they are interested in. Assistance in developing necessary information can be considered, but would require approval by AID--probably in the form of a PROP amendment. Funding for such activities is not budgeted herein.

V. Statement of Project Inputs

A. Statement

This project will require three years to complete. Forty-five man months of professional services will be required during FY 1975, 55 man months during FY 1976 and 52 man months during FY 1977. One alternative was to select a full time staff--starting with one economist per commodity. Instead the work was broken down into a series of tasks (see Course of Action) requiring a number of analysts each with specialized knowledge of the commodities being analyzed, marketing systems, demand analysis, transportation economics or model building. This approach will enable us to take fuller advantage of the specialized talent available within USDA, but will require

greater management skills to coordinate. Secretarial help and assistance in collecting the required secondary data has also been budgeted for. Other costs are primarily for transportation.

Inputs by Type and Year

Functions Required

	Man Months		
	FY 1975	FY 1976	FY 1977
Management	5 1/4	3	2
Review, Development and Evaluation of Techniques	10	6	6
Transport Analysis	4	0	0
Commodity Analysis	15 1/2	37 1/4	30
Marketing Analysis	10	9	14
Total Professional	44 3/4	55 1/4	52
Data Collection Assistance	10	10	2
Secretarial	12	12	12
Total	66 3/4	77 1/4	66

Budgetary Inputs by Category and Year

Category	FY 1975	FY 1976	FY 1977
Salaries	$136,895	$164,463	$144,041
Travel & Per Diem	10,000	10,000	15,000
Sub Total	146,895	174,463	159,041
Office Equipment	2,000		
Printing, Postage, Misc. Supplies, etc.	1,000	1,000	1,000
Overhead 25%	37,474	43,866	40,010
Total	$187,369	$219,329	$200,051

B. Assumptions for Inputs

Personnel with model building, commodity and marketing expertise available. See discussion in section on Manpower and Human Resource Availabilities (p.16).

Rationale

Efforts to develop new techniques for estimating external demand will be treated as a distinct activity not because this block of work is to be undertaken for different reasons than the broader sector analysis of which it is a part, but because;

1. The kinds of things which need to be done in order to estimate external demand are different,

2. The level of effort required is significant,

3. Work on the external subsector can proceed concurrently with the overall sector analysis work and can be undertaken by analysts who are not involved in the day to day work of sector analysis as it has proceeded to date, and

4. Project outputs--actual estimates and improved estimating techniques--can be used by a broader audience--i.e. sector assessment countries as well as those countries interested primarily in improving the estimates of their agricultural exports and not yet interested in the overall evaluation of their agricultural sectors.

A. Alternatives

Two courses of action are open: (1) we can continue to estimate external demand constraints as we have done so far, i.e. extrapolation of historical trends modified by considerations which appear pertinent on the basis of casual observation, or (2) we can try to develop better techniques.

Projections made on the basis of extrapolations of historical trends are particularly risky unless modified by analysts who know the market for each individual commodity well and are able, therefore, to make adjustments for such things as changes in production programs still in the planning stage in major competitors for example or potential changes in tariff barriers or tastes in major importing countries. It takes time for an individual to become familiar enough with a commodity and its markets to be able to make good intuitive judgments. But even if an analyst has a good intuitive feel for his market, if a number of changes occur simultaneously--and this is frequently the case--he may have trouble sorting out the timing and relative strength of their impacts on prices and the level and direction of trade flows. In other words, international commodity markets are intricate systems characterized

by complex and dynamic interrelationships among a large number of actors--all major producers, consumers, importers and exporters.

Continuing to rely on extrapolations of historical trends for our estimates of export demand is a questionable choice. The dynamics of these commodity markets can not be accounted for adequately by using this technique. For example, one never could have predicted the substantial increase in world demand and prices for grains and beef during the last two years using this technique. Nor will the other commonly used techniques--market share analysis, single equation estimates--give any better results. Yet our estimates of external demand must be reliable if sector analysis resource allocation models are to yield results in which we can be confident. For countries like Colombia, where a substantial portion of domestic production is already exported, realistic estimates of export demand are particularly important.

During the initial review of potential techniques, heavy emphasis was placed on those which gave promise of being able to more directly capture the complex interrelationships within international commodity systems. Several types of quantitative models were found suitable for this purpose--econometric, spatial equilibrium, dynamic systems analysis. The decision at this point is to concentrate on the spatial equilibrium technique to begin with because it holds promise of being able to meet the requirements specified in the Introduction (p.3) in the shortest time period. On the other hand, the systems analysis techniques developed originally by Forrester of MIT and used in the Nigeria and Korea sector analyses may be able to capture the structure (basically a disequilibrium system) and dynamics of international commodity market more realistically than the spatial equilibrium technique. This technique has never been applied to trade problems before; therefore, its use will be more exploratory. The plan is to use this technique to evaluate the international beef market (second and third year), but only after a satisfactory spatial equilibrium model has been constructed of the same market (first and second year). This procedure will provide a unique opportunity to compare the performance, reliability, cost, and flexibility of two quite different analytical techniques during the third year (see Course of Action).

Because these techniques may give better estimates at a high cost, some attention will also be given to developing and/or improving and testing less sophisticated techniques using model components. All techniques will be compared and evaluated on the basis of their:

1. Accuracy

2 Cost

3 Cost--effectiveness

4 Data requirements

5. Personnel requirements--number and level of training required.

6. Flexibility--i.e. adaptability to unusual commodity specifications and market situations; ability to handle complex economic situations.

Three commodities--beef, sugar, and fish--were selected for testing the new techniques. The decision to test techniques with actual commodities was made to insure realism and to provide useful output for the sector analysis group in Colombia. AID/Washington, USAID/Bogota, the Colombian sector analysis group, and the USDA/FASA group were all involved in the selection process.

In order to minimize the amount of time spent gathering data, commodities for which readily available data (current and historical) on production, consumption, and trade are not available were eliminated. All remaining commodities satisfied our second criterion--markets valuable enough to justify the expense of a major analytical effort.

Some commodities which satisfied both of the above enumerated criteria were nevertheless rejected for use during the technique development and testing phase: (1) bananas because the international market is atypical, i.e. the market is controlled by a few large companies; (2) cotton because the analysis would be complicated by the interrelationships between raw cotton and cotton textiles, (3) oils because the analysis would be complicated by the many sources of oils (soybeans, peanuts, cotton seed, etc.), by the products several forms (soybean oil vs. soybean meal, for example), and by its many uses (for human consumption or in the manufacturing of paint, varnish, synthetic fibers, and other industrial products). (Once the techniques are developed, however, they should be applicable to all these commodities).

Fresh fruits and vegetables were also rejected, in this case because sufficient data is not readily available and because North Carolina State University is well into an analysis of demand in the U.S. market for selected fresh fruits and vegetables from Central America. Although most of their time has been spent collecting cost of production data in three Central American countries, they still plan to build a spatial price equilibrium model to project trade flows

before they finish. Since this is one of the possible new techniques, their efforts will be carefully reviewed.

Beef, sugar, and fish--the three commodities selected--have large and/or rapidly growing international markets. They are major agricultural exports from Colombia as well as Latin America taken as a whole. Sugar and beef were the first and third most important agricultural exports from Latin America in 1972 (measured in value terms) and the third and fourth most important Colombian exports. Fish exports ranked seventh in importance for both Colombia and all Latin America. The production and marketing of sugar is quite distinct from beef, and beef from fish, which increases their utility as test commodities.

Before being accepted these commodities were also evaluated on the basis of their relative contribution to Colombian goals--increasing employment, improving income distribution, etc. According to the Colombian input/output table constructed by the sector analysis group, peso for peso, sugar is potentially the second most important contributor to increasing employment. It ranks lower as a means of improving income distribution (although still better than half of a group of 40 primary agricultural commodities). Beef scores lower on both counts, indicating that there would be a drop in employment if resources were shifted from sugar to beef, for example. But if land not now suitable for most cultivated crops (the llanos) were used more intensively for raising cattle, there would be an increase in total employment in the Colombian economy. Fish ranks between sugar and beef in its impact on employment and income.

D. Manpower and Human Resource Availabilities

This project is designed as an add-on to the Colombian agricultural sector analysis. The Colombian sector analysis group within the Ministry of Agriculture is fairly well staffed and should have little difficulty in generating the supply and demand functions required for each test commodity. Nor should it have any serious difficulties in using the outputs of this project, although some additions to staff may be necessary to insure that internalization of analytical techniques is complete. Other Latin American countries wanting detailed estimates of potential exports from the test models will also have to provide supply and demand functions for each commodity. No other involvement on their part is anticipated during the technique development and testing stage.

The USDA/PASA group already involved in sector analysis work was selected to implement the project. This procedure is designed to insure that project outputs are compatible with the needs of the broader sector analysis work and that internalization is completed within Colombia. USDA was also chosen

because it is a major source of commodity expertise. "The trade" is another source. However, these specialists would probably not be available for a project of this type with its orientation to planning and making longer range estimates. And even if trade specialists were available, their employment might pose conflict of interest problems.

C. Economic and Social Costs and Benefits

A precise comparison of the costs and benefits of this project is impossible to make. Costs--estimated in Section V--are no problem to measure. However, measuring benefits is complicated by the nature of the Colombian agricultural sector model and by the fact that the outputs of this project can be used by all Latin American countries.

The first problem arises because in a general equilibrium model, like that developed for Colombia, all factors are interrelated. Improving the quality of any one element--such as external demand constraints--increases the power of the full model to allocate scarce resources between competing productive activities (irrespective of whether or not the products are exported). But it is impossible to say in advance how significant the change in allocation might be or how much difference it will make in terms of enabling Colombia to achieve higher levels of production, employment, etc.

Second, only a portion of the total benefits of the proposed project will be "captured" by Colombia. Since other Latin American countries will benefit also, a comparison of benefits and costs from the perspective of any individual country is misleading. If viewed as a regional effort for the benefit of all countries, the benefit/cost comparison looks better.

VII. Course of Action

This project will be divided into two separate but related components: (1) an analysis of the structure and dynamics of the export markets for beef, sugar and fish--all commodities of importance to Latin American countries, and (2) an in-depth analysis of the system for transferring these agricultural commodities from the producer in Latin America to the user in importing countries.

Part I of the project will begin by identifying and evaluating the existing markets for each commodity and the immediate restraints to trade. The more long-run objective, however, is to improve our ability to make long-run projections by developing techniques which better explain the underlying structure and dynamics of international commodity markets. To do so, we expect to develop quantitative models for each of the test commodities.

Spatial equilibrium models will be developed for all three test commodities. Work will begin on all three commodity models during the first year. During the second year, work on a systems model of the international beef market will begin, but only after the spatial equilibrium model of the same market has been developed and is running on the computer. Work on the two beef models (refinement of the spatial equilibrium model and construction of a systems model) will continue concurrently but separately during the second and third year. The systems technique, developed originally by Forrester of MIT, is potentially better suited to handle trade problems (because an international commodity market is basically a dynamic disequilibrium system) even though it has not yet been used for this purpose. Developing two beef models will provide a good opportunity to compare the performance, reliability, cost and flexibility of two quite different analytical techniques during the last year.

Outputs of these models will include projections of future supplies, demand, trade, and prices by country, given expected levels of exogenous variables such as population, income, and level of technology. The models will also be suitable for evaluating the impact of alternative policy decisions on the supply, demand, prices, and trade of each commodity. Types of policies analyzed will include tariff and non-tariff barriers, price supports, export subsidies and stock manipulation. Special attention will be given to policy variables that are under the control of Latin American exporting countries--domestic production programs, stock manipulation, and export subsidies. Therefore, besides providing specific inputs for the Colombian agricultural sector model (quantities of goods absorbable by the external market at given prices), this activity will help to identify potential export markets and policies and programs that will help Latin American countries expand their exports to these markets.

Part II of this project will focus on the system through which test commodities (sugar, beef, fish, processed foods) flow in moving from the producer in Latin America to the brokers or wholesalers in the importing country. This transfer system includes a number of components--transport from the producer to the packer; packing, processing, chilling, etc.; transport from plant, field, or packer to port; storage; ocean or air transport to importing countries; transport from point of import to wholesale market. Also included in this system are the numerous institutional requirements such as taxes, insurance, brokerage fees, tariffs, duties etc. As part of the analysis, the capacity of each component (i.e. the level of goods that can be handled and the rate at which goods can flow through each component) and the costs of each component in each system will be evaluated. Outputs expected from Part II are: (1) a better understanding of how the transfer system operates for each commodity, (2) the identification of major bottlenecks in each system which must be removed if exports are to increase, (3) the exploration of alternative

solutions for removing these bottlenecks (including recommendations), and (4) the development of a method of analysis that can be used to good advantage by other Latin American countries.

Finally, the activities and type of personnel required to develop techniques for evaluating the effectiveness and efficiency of export marketing systems (Part II) are quite distinct from those required to develop and test methods for estimating the external demand for the products passing through these systems (Part I). They are distinct enough, in fact, to necessitate developing a separate course of action for each. This follows in outline form and in more detail in Attachment B.

OUTLINE OF COURSE OF ACTION

Part I--Analysis of the structure and dynamics of the export markets for beef, sugar and fish.	Part II--In-depth analysis of the system for transferring beef, sugar, fish and processed foods from the producer in Latin America to the user in importing countries.
1. Develop and test spatial equilibrium models and algorithms and select one or more most suitable for analyzing international commodity markets.	1. Assemble and review any previous studies of the structure of Colombia's export marketing system for these commodities.
2. Define each commodity and specify countries/regions to be analyzed.	2. Develop system for structuring and analyzing data for first commodity.
3. Collect data.	3. Determine additional data needed to analyze this commodity system.
4. Estimate demand functions for each commodity for each country/region.	4. Develop system for collecting data.
5. Estimate transportation costs.	5. Collect data in the field.
6. Develop alternative supply situations.	6. Analyze data and make recommendations.
7. Run models using a variety of assumptions about (1) government production and trade policies in the major importing and exporting countries, (2) price elasticities, (3) transportation costs.	7. Refine techniques.
8. Analyze and disseminate results.	8. Apply the improved techniques for evaluating the effectiveness and efficiency of export marketing systems to the other three commodities and to other sector analysis countries as requested.
9. Refine spatial equilibrium models, develop new data where necessary, incorporate additional sector analysis countries.	9. Integrate results of Part II into Part I.
10. Rerun models.	
11. Analyze and disseminate results from the spatial equilibrium models.	
12. Develop and test a systems model of the international beef market (i.e. both the framework of equations and the computer program which describes the structure and dynamics of this market).	
13. Run this model using a variety of assumptions about (1) government production and trade policies in the major importers and exporters, (2) price and other behavior patterns in the major importers and exporters, (3) transportation costs.	
14. Analyze and disseminate result from the systems model.	
15. Evaluate cost-effectiveness of all techniques for estimating external demand developed and/or tested during the project.	

AID 1320-28 (11-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1975 to FY 1977
Total U. S. Funding $406,000
Date Prepared: May 10, 1974

Project Title & Number: External Trade/Sector Analysis Support - 598-15-995-554a

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To assist Latin American countries to set feasible, consistent objectives in such areas as employment, crop production, foreign exchange earnings and income distribution, and to allocate resources in a manner consistent with their achievement.	Measures of Goal Achievement: 1) Techniques of agricultural sector analysis--including techniques for estimating external demand--developed and in use in at least one Latin American country. 2) Capacity of agricultural sector models to assist L.A. countries to set and achieve development objectives demonstrated.	Comparison of model predicted results with those observable in the real world when countries actually adopt the strategies "recommended" by the models.	Assumptions for achieving goal targets: 1) One or more countries will use the results of the sector analysis and/or adopt sector analysis techniques. 2) These countries have sufficient flexibility to change and/or induce changes in existing resource allocation patterns to permit them to follow the recommended strategies.
Project Purpose: 1) To develop techniques for determing resource allocation patterns appropriate for achieving each prespecified objective, and to quantify the trade-offs between objectives. 2) To develop, test and compare the effectiveness of different techniques for evaluating a country's ability to compete in agricultural export markets and for estimating future demand and prices. 3) To estimate exports and price levels for sector analysis groups. 4) To internalize techniques developed as part of the project.	Conditions that will indicate purpose has been achieved: End of project status. 1) Each component of analysis constructed and external sector work incorporated into overall agricultural sector model. 2) Techniques for evaluating external demand and marketing systems fully developed and tested. 3) Internalization complete in Colombia.	1) Documents describing all phases of analysis completed. 2) Estimates of agricultural export levels and prices made available to Colombian sector analysis group. 3) Agriculture analysis--including external sector component--continues in professional manner after A.I.D. phase-out.	Assumptions for achieving purpose: 1) Agricultural sector analysis continues to be a priority undertaking for A.I.D., the Government of Colombia and other L.A. countries. 2) Good estimates of external demand for agricultural commodities are needed for sector analysis. 3) These estimates and techniques for making them will continue to be unavailable from FAO and USDA.
Outputs: 1) Improved techniques for (a) estimating external demand for agriculture products, (b) evaluating export marketing systems 2) Models of international markets for beef, sugar and fish. 3) Estimates of potential exports and prices for the same commodities. 4) Evaluations of Colombia's export marketing systems for beef, sugar, fish and processed foods. 5) Internalization completed.	Magnitude of Outputs: Outputs as specified will either be achieved or they won't be. They can only be evaluated qualitatively.	See block above.	Assumptions for achieving outputs: 1) Necessary data available or can be generated within time frame and budget constraints of project. 2) Supply and demand functions for each commodity and from each Latin American country that desires to be included in the analysis are available or can be readily generated.
Inputs: See page 12	Implementation Target (Type and Quantity) See Page 12	Day to day contact, expenditure receipts, vouchers, etc.	Assumptions for providing inputs: Personnel with model building, commodity and marketing expertise available.

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : The Files

DATE: January 28, 1974

FROM : LA/DR/SA, Russell Misheloff

SUBJECT: PROP for Sector Analysis Support Project (598-15-995-554)

Mr. Daly
Mr. Misheloff-3243

On March 1, 1973, Mr. Kleine, in his capacity as Deputy U.S. Coordinator, Alliance for Progress, approved a "waiver to the requirement to resubmit an education sector support PROP" to permit FY 1973 funding of an experimental activity designed to lower educational output costs. A revised PROP was to be prepared as a basis for future year funding.

It is clear from the memoranda dealing with the waiver (Attachments A and B) that it was intended that the revised PROP would cover the activity just mentioned, not all education sector analysis support activities. The latter were to be combined with sector analysis support activities related to other sectors to form a single "basket project". In paragraph 3 of Attachment B, these kinds of activities are described as having a "technical support" character.

In accordance with this decision, a Sector Analysis Support project (598-15-995-554) was created and first funded in FY 74. Since it is a technical support type activity, no PROP is required (See M.O. 1025.1, Paragraph IV B1). Of course, this in no way obviates the need to obtain L.A. Bureau approval of each proposed sector analysis.

Attachments:

Attachment A: Action Memo - Kimball to Deputy U.S. Coordinator dated February 28, 1973.

Attachment B: Memo - Harrison/ Kleine on subject "Request for PROP Waiver - Education Sector Support Project" drafted February 23, 1973.

Clearance: LA/DP: ~~Howas~~ FW THTE

AUG 27 1976

ACTION MEMORANDUM FOR THE ACTING ASSISTANT ADMINISTRATOR (LA)

FROM: LA/DR, Charles Weinberg

Problem: To request approval for Transitional Quarter funding for the L.A. Regional Sector Analysis Support project (598-15-995-554).

Discussion: In the Congressional Presentation we requested $349,000 total from the following funding sources:

Food and Nutrition	-	$215,000
Population Planning and Health	-	46,000
Education and Human Resources Development	-	88,000

During the recent ABS review, it was agreed that these amounts represented our actual requirements.

Recommendation: That you approve Transitional Quarter obligation of these amounts.

Approved _____

Disapproved _____

Dated 8/27/76

598-554a

MEMORANDUM

JUL 24 1974

TO : AA/LA, Mr. Herman Kleine

FROM : LA/DR, John R. Breen

SUBJECT: PROP Review -- Sector Analysis Division, LA/DR, External Trade/Sector Analysis Support

The DAEC is scheduled to meet on Friday, July 26, at 10:30 a.m., in Room 2248 to consider this PROP.

Summary Description. The sub-project proposal grew out of recognition that one of the weakest parts of the large scale input-output linear programming model of the Colombia Agricultural Sector was the estimates of export prices and volumes for agricultural products. Limited work on these subjects showed that current techniques are not adequate and new methodologies are needed.

The proposed project has two aspects. The first and most important one is to develop two large scale modeling techniques -- spatial equilibrium methods and simulation methods -- for the worldwide meat, sugar, and fish markets. These activities will show demand and supply in all major supplying and consuming countries or regions, with special emphasis on Colombian supply conditions, as well as world transportation and marketing costs, in order to develop longer term projections of the demand and price situation for Colombian exports of these products. If the effort is successful, other countries in Latin America or elsewhere, who are actual or potential exporters of these products, could adapt the results to study their own export prospects. Importers of the products could use the model to determine long-run supply conditions. Methodological innovations and improvements can be extended to other products and internalized in other Latin American countries.

The second aspect of the project will be a detailed study of the current Colombia export marketing system for meat, sugar, fish and processed foods designed to determine where bottlenecks exist and how they can be corrected. Methodological improvements are expected from this aspect of the project, but no specific methodologies are slated for testing and development.

Funding. This sub-project is budgeted for $606,000, almost entirely for salaries, with approximately one third of the amount to be spent each fiscal year for three years, starting in FY 1975. The funding will go entirely for a PASA agreement with the USDA.

Issues

1. Although this project proposal promises to develop new methodologies and specific market models that can be used by other countries, it is focused on Colombia and could be considered a sub-project of the Colombian Agricultural Sector Analysis. This latter project is now over three years old, but has not yet been given a comprehensive and carefully structured evaluation; such an evaluation is now being planned. Should a large new sub-project of this project be approved before the project has been evaluated and its usefulness to sector analysis methodology and to better sector assessments and analyses in Latin America, as well as to USAID/Colombia and the GOC, been determined?

2. The PROP justifies the proposed sub-project by saying that FAO and USDA do not presently do the type of world market analysis that Colombia and other LDC's require, and that individual countries do not do an adequate job with existing techniques. No reference is made, however, to many other international organizations that do directly, or hire consultants to do, market and marketing studies. Specifically, many USAIDs have had export development projects to develop these types of information; the World Bank is very active in agricultural projects and in many countries has studied markets for the commodities to be produced. The IDB, UNCTAD, ECLA, CIPE, GATT, OECD, IMF, INR, are other organizations that come to mind. Why is the output of these organizations not adequate? If it needs improvement, why shouldn't these organizations be encouraged to undertake this kind of research?

3. The first aspect of the proposed project is worldwide in scope and could benefit all Latin American potential or actual exporters of meat, fish, and sugar. Before approving the sub-project, should USAIDs in these countries be informed of the study to determine their interest and desire to participate, and if the response is positive, the sub-project be restructured to include these countries so as to internalize the sector analysis process in more countries and increase the sector assessment abilities of more USAIDs?

4. Over half of the effort in the project will go into developing the spatial equilibrium and simulation models of world markets. These methods have had relatively little application previously to world markets. While methodological development is a risky business, have the risks of success and failure for this project in developing useful models been assessed against the costs? Specifically, can these proposed methodologies take into account the very important political elements in the markets to be studied -- EEC meat import policy, U.S. sugar acts, meat sanitary regulations, U.S. "on and off" meat policy? If such "unpredictables" will always remain, is the marginal increase in accuracy of demand estimates for these products worth the cost?

5. The PROP has no discussion of the overall competence of the USDA for this project, and the qualifications of the staff it will assign to it, as compared with what might be available from universities or consulting firms. Should a justification for picking the USDA for this project be provided before the PROP is approved?

6. The models of worldwide markets will have to be developed largely from secondary data sources. While some data collection is provided for in the PROP, will this be adequate, or will unreliable data for world producing and consuming markets seriously limit the usefulness of the results?

7. Since this modeling is to be worldwide in scope, is this an appropriate project for LA/DR, or should it be referred to TAB for implementatio. ?

8. While the studies of Colombian export marketing activities may develop methods of use to other countries, they are essentially country-oriented, and of a type that would ordinarily be funded by a USAID export development project. Is this activity suitable for LA/DR funding, or should it be referred to USAID/Colombia to see if they are interested in funding th activity?

9. While "internalization" of the product market modeling effort in Colombia is well discussed in the PROP, little attention is given to "internalization" of the studies of the Colombian agricultural export marketing system. A previous AID/MSU project in Colombia had great success in training agricultural marketing experts, and PROEXPO, the Colombian Export Promotion Agency, is also active, but these personnel are not included in the Ministry of Agriculture group with which Sector Analysis Division now works closely in Colombia. Should greater consideration be given to Colombian participation in the export marketing system studies, with perhaps less emphasis on USDA work, and some funding for Colombian experts?