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PROJECT REVIEW
Diversification and Trade
in
Latin America

9310641

North Carolina State University
Contract AID/csd-3632

by

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John B. Stovall, CED/ERS/USDA

ISN =
24871

B9310641001701

Agricultural Diversification and Trade

in

Latin America

Dr. Richard L. Simmons
Project Leader

I. Introduction

A field review of end of project status of the NCSU project on agricultural diversification and trade was held at Raleigh, April 12 and 13, 1976. Participants in the review were Douglas Caton, AID/TAB, John Stovall, ERS/USDA, and R.L. Simmons, Project Leader. The review focused on the prospective content of the final report under the contract (general contract provision 16). Provision 16 asks for a report which finalizes the research by summarizing the accomplishments of the assignment, methods of work used, and recommendations regarding unfinished work and/or program continuation. The NCSU contract officially ended March 31, 1976.

II. Project History

The NCSU research on diversification and trade in Latin America was completed in two phases. Phase I, contract AID/csd-3283, was a feasibility study for a specific research project. The NCSU Phase I study in Latin America was coordinated with USDA and East-West Center phase I studies on diversification and trade in the Far East. This phase covered the period May 1, 1971 to April, 1972, with a funding level of \$50,000. Phase II of the research, Contract AID/csd-3632,

covering the period, April, 1972 to March 31, 1975 (extended to 3/31/76), evaluated the comparative advantage of selected Central American countries to export winter vegetables to the U.S. and Canada. The estimated total expenditure on Phase II, 1972-1976, was \$284,397.

In accomplishing this objective, efforts were to be directed to:

(1) Evaluating the export potential of Guatemala and El Salvador to U.S. and Canadian markets.

(2) Analyzed alternative means and costs of transporting and distributing vegetables from the production zones to the market.

(3) Held workshops in Central America to secure adequate coordination of the research.

Fulfillment of these objectives involved the following steps:

(1) estimation of the demand for selected winter vegetables in U.S. and Canadian markets;

(2) estimation of the supply potential for winter vegetables on small, medium, and large farms in the primary production areas of Guatemala and El Salvador, compared with competing areas of Florida and Mexico;

(3) evaluation of domestic demand and consumption compared with export demand;

(4) analysis of alternative means and costs of transporting and distributing vegetables from production zones

(5) summarization of all analytical data developed in (1) through (4) above by using appropriate analytical procedures and models;

(6) the holding of an annual workshop in Central America to ensure adequate coordination of the research.

More was done on some project objectives than on others. A few objectives required by-passing for reasons of lack of data, absence of local support, and changes in local conditions and interests. Together, the objectives covered the following lines of research: (1) macro-level investigations requiring estimates of supply and demand functions--in Central America, and in the U.S. and Canada, assessed according relative to price, future demand, and farm costs, and (2) a two-fold country-level assessment: (a) conditions under which winter vegetables might be economically exported by El Salvador and Guatemala, and (b) conditions for successful participation of small farmers.

Project publications and manuscripts are listed in Appendix 1. A budget accounting as of March 16, 1976 is attached as Appendix 2. A list of LDC nationals trained at NCSU is attached as Appendix 3.

The outline of the report being prepared by Dr. Simmons as the concluding project report is attached as Appendix 4. The final report is scheduled to be completed on/about May 31, 1976. (Note: The outline, as written, appears to be a last report on the project, rather than a final report as outlined in article 16).

III. Project Review

The review of the research, and the findings and recommendations included the following representative titles:

1. An explanation of the technical composition of the NCSU demand estimation, together with a statement of the kinds of questions it can handle.

2. Judgements as to what could be done with the data assembled, or the kinds of data generated by the model.

3. What was the understanding of the purpose of the research: (a) Was it the question of comparative advantage of crops vs the U.S. and Mexico, and (b) was it to help build up country analytical bases?

4. What has been the experience of the project in assembling and analyzing data, holding workshops, dealing with the small farmer participation question, and developing its inter-regional trade model?

5. What are the expectations regarding what the findings of the project may be able to add to the ability a country to plan development?

6. To what extent has the project--through workshops, graduate training, meetings of various kinds--been able to add to building country planning competence?

Information obtained and points brought out in the review included the following:

1. Food production oriented research and technical assistance, while important, is not adequate when making comparisons of farmer options and alternatives. Information re-

quirements include price data and demand estimates in domestic and foreign markets and an evaluation of future trade potentials in the light of things that might happen.

Dr. Simmons used a price "sensitivity" approach projecting a 20 percent increases in U.S. demand for vegetables, and a yield increase of 50 percent in El Salvador and Guatemala averaged over the next five years. Estimates of potential competition from Mexico was estimated using Mexico food supply expansion data. The Mexico data was secondary source data, checked and updated by means of field visits (ERS/USDA, data on the Mexico agricultural food production situation were not used because they needed updating).

2. The main emphasis in the project was setting up and demonstrating the use of demand estimation techniques (model), to show the planning benefits of hard results, comparative to subjective estimates or speculations. The project did not set out to improve upon demand estimation modelling per se. An example of a statistical model utilized in estimating U.S. winter season demand for selected vegetables can be outlined as follows:

$$P_{it} = a_0 + \sum_{j=1}^5 a_j D_{jit} + B_0 X_{it} + \sum_{j=1}^5 B_j S_{jit} + Y_0 I_{it} + \epsilon_{it}$$

where $i, j =$ class 1, 2, 3, 4, or 5 ($i, j=1$ for December, $i, j=5$ for April).

$t =$ crop years 1, 2, ...n.

$P_{it} =$ monthly average price for the vegetable in question, cents per pound, for i month, t year.

X_{it} = monthly shipments of the vegetable in question to U.S. and Canadian markets, pounds per capita, in the i th month of year t .

I = monthly disposable income, dollars per capita.

= random disturbance with zero mean and constant variance.

D_j = intercept shifting variable with

1 when $i = j$

$D_{jit} =$

0 when $i \neq j$

S_j = slope coefficient changing variable with

X_{it} where $i = j$

$S_{jit} = D_{jit}X_{it} = 0$ where $i \neq j$

One of the principal characteristics of the NCSU modelling effort was inclusion of a risk aversion coefficient and a variance-covariance matrix of gross activity returns to provide supply estimates discounted for risk $(-\theta(X rX)^{1/2}$. While risk estimates were not made for individual farms or areas, the sensitivity of the optimal solution as θ varies, was estimated. The risk estimates were, in part, based on similar work by a World Bank team, Duloy, Norton, et al. The variance estimates are based on gross returns per hectare (six year period) and include yield and price variance. Transportation add on from Central America or Mexico would also affect estimates of price (or demand) elasticity.

3. The project originated with discussions between the Regional Bureau Agricultural Officers and Dr. Art Coutu, TAB/AGR, centering on concern that very little was known about price, and about markets. Don Feister, LA/DR, pin-pointed

vegetables and the small farmer labor surplus in Central America as the theme of the project. The project contract was written to require active host country cooperative and participation in the research, and an objective was included on seminars, workshops, and training. He was unable to achieve objectives three and four (See II, above), and therefore, concentrated on objective five, the use of models to make demand estimates. Workshops and seminars were held in Central America to the extent feasible and appropriate (objective six).

4. The Project Leader's observations and conclusions on the findings of the research included:

a. Vegetable supply potentials for Guatemala and Mexico were estimated (a sub-project with the University of Florida team in El Salvador did not yield adequate supply estimate results).

b. Domestic demand for fresh vegetables is not large enough yet to be a factor requiring statistical estimates. Preservation and storage of vegetables could add an important dimension to the total vegetable picture, but only after domestic per capita income and employment increases substantially. Now mainly traditional food habits affects what is consumed.

c. Alternative means of transporting of commodities to export markets, and the costs-returns of quality control should be evaluated. Export market potential estimates must incorporate the cost and volume effects of tariffs and quotas.

d. Export marketing, particularly for vegetables, is high risk, high management demand, compared to the domestic situation. The cost of export marketing at present rates is ten times the cost of production and the exporter bears the entire cost of price decline, spoilage and loss, waiting time, and market close-outs. Quality control is much more essential than for domestic markets.

e. Any expansion of export trade in the foreseeable future depends upon getting yields up 50 percent or more, reducing production costs by half, introducing quality control, finding volume markets, and being able to develop integrated, larger scale, operations. The small farmer doesn't appear in this picture except insofar as he may choose to rent his land, or furnish labor.

f. Two workshops were held, one in Guatemala, and one in El Salvador. A third workshop was to have been held (in Guatemala) but outbreak of Mediterranean Fruit Fly removed all local support and interest. Problems encountered included financial support of potential participants, limited AID Mission and AID/Washington support, and, fundamentally, export vegetables were not all that important comparatively.

IV. Conclusions and Recommendations

1. Conclusions

a. Knowledge of markets, prices, trade and terms of trade, is a requirement of comparative advantage studies of economic alternatives.

b. However, Phase I could probably have better established how vegetable production really was, the direction in which it was tending; then, it could have better judged what needed to be found out, and how to do it.

c. The project as contracted contained objectives for which data could not reasonably be obtained, and country participation requirements which could not be achieved.

d. The small farmer participation determination requirement on all but a labor input possibility could have reasonably been ruled out on other grounds prior to the initiation of the contract.

e. The demand estimation model will require explanation and clarification to be directly useful to LDC planners. Part of the clarification will require country data on specific cases, and training seminars or workshops.

2. Recommendations

a. Distribute the technical appendix explaining the demand estimation model to planning staffs in Central and South America, soliciting their response to the usefulness of the model as an analytical tool, and their interest in a workshop on this model, and in modelling in general.

b. Prepare a digest of the projects materials, and from other sources on demand and price estimating which could add to a country's planning ability.

Publications and Manuscripts under AID/csd-3532

- (1) Roberto Castro, "Expected Effects of Changing United States Tariff Levels on Winter Green Peppers", Ph.D. Thesis, NCSU, 1973.
- (2) Hans Binswanger, "The Measurement of Biased Efficiency Gains in U.S. and Japanese Agriculture to Test the Induced Innovation Hypothesis", Ph.D. Thesis, NCSU, 1973.
- (3) Roberto Castro and J. A. Seagraves, "The Supply of Winter Green Peppers in Florida", Economics Research Report No. , Department of Economics, NCSU, 1974.
- (4) Roberto Castro and R. L. Simmons, "The Demand for Green Peppers, Cucumbers, and Cantaloupes in the Winter Season", Economics Research Report No. 27, Department of Economics, NCSU, April, 1974.
- (5) Carlos Baanante, "Andean Group Economic Integration: The Case of the Nitrogenous Fertilizer Industry", Ph.D. Thesis, NCSU, 1974.
- (6) Hans Binswanger, "Problems with the Identification of Optimal Agricultural Export Diversification in Less Developed Countries in the Presence of Trade Distortions", discussion paper, mimeo, 42 pp. NCSU.
- (7) David J. Zimet, The Economic Potential for Increasing Vegetable Production in the Zapotitan District, El Salvador, M. S. thesis, University of Florida, 1974.
- (8) Richard L. Simmons, and Carlos Pomareda, "Equilibrium Quantity and Timing of Mexican Vegetable Exports," ~~a paper submitted to AJAE.~~ August 1975
- (9) Carlos Baanante and Richard L. Simmons, "Effects of a Customs Union on the Nitrogenous Fertilizer Industry of the Andean Zone," a paper submitted to Journal of Common Market Studies, accepted for publication
- (10) ~~Carlos E. Pomareda and Richard L. Simmons, "Programacion de la produccion de Hortalizas para exportacion en Mexico," a paper submitted to the bulletin of the Union Nacional de Productores de Hortalizas, Mexico, October, 1974.~~

also published in El Trimestre Economico, Jan-March 1976

(10) Carlos Pomareda and R. Simmons, ~~Effects of a Risk~~ "A Risk Programming Model for Planning Mexican Vegetable Exports", a chapter in Barroco, L. M., et al. Programming Studies for Agricultural Sector Policy, a book to be published by Johns Hopkins Press.

(11) Carlos Pomareda and R. Simmons, "Planning Reply Supply of Fresh Vegetables to U.S. Winter Markets," a paper submitted

12/1/75 - 2/29/76
Reporting PeriodName of Contractor: N. C. State University at RaleighContract No. AID/CSD 3632Contractor's Project Officer: Dr. Richard L. SimmonsPhone No. 737-2259

Category	4/1/72-3/31/76 Total Budget Amount (1)	Total Expenditures		Estimated Expenditures 3/1/76-3/31/76 (4)	Cumulative 3/31/76 (5)
		To Date 4/1/72-2/29/76 (2)	This Period 12/1/75-2/29/76 (3)		
Salaries & Wages	\$ 142,299.00	\$ 147,874.38	\$ 6,214.19	\$ 600.00	\$ 148,474.38
Prints & Postage	8,063.00	5,802.97	84.63	102.00	5,911.97
Consultant Fees	5,025.00	4,400.00			4,400.00
Workshops	2,500.00				
International Conferences	2,000.00				
Travel:					
International	19,851.00	17,240.00			17,240.00
Domestic	2,985.00	6,423.00			6,423.00
Allowances	2,639.00				
Telephone & Telegram	1,275.00	904.00		100.00	1,004.00
Supplies	1,374.00	1,646.87	12.94	25.00	1,671.87
Computer Use	5,531.00	3,803.28	311.17	500.00	4,303.28
Publications & Field Research	4,000.00				
Subcontract	29,160.00	28,075.00			28,075.00
Overhead	66,895.00	66,895.00	299.88	-0-	66,895.00
GRAND TOTAL	\$ 295,796.00	\$ 283,069.50	\$ 6,922.81	\$ 1,327.00	\$ 284,396.50

Method of Billing: Cash Basis

The undersigned hereby certifies: (1) that payment of the sum claimed under the cited contract is proper and due and that appropriate refund to A.I.D. will be made promptly upon request of A.I.D. in the event of non-performance, in whole or in part, under the contract or for any breach of the terms of the contract, and (2) that information on the fiscal report is correct and such detailed supporting information as A.I.D. may require will be furnished at the contractor's home office or base office as appropriate promptly to A.I.D. on request, and (3) that all requirements called for by the contract to date of this certification have been met.

I hereby certify that amounts invoiced herein do not exceed the contract price.

ALL OVERHEAD ON CAMPUS THIS PERIOD.

BY

G. E. Musser

TITLE Contracts and Grants Officer

DATE

3/12/76

2.3 C

Training of LDC Nationals

- R. Castro, Ph. D., Pen, May 1974
- C. Baanate, Ph. D., Pen, May 1974
- A. Baanate, one semester only, No degree
- E. Ospine, M.S., Colombia, September 1974
- C. Pomerade, Ph. D. studies (No degree)
- H. Binswanger, Ph. D., Switzerland, August 1972
- J. Hernandae, Ph. D., Guatemala-Mexico-still here
- R. Rodriguez, Ph.D., Mexico, no thesis yet
- S. Mastashari, Ph.D., no thesis yet
- L. Zavaletz, M.S., Peru, May 1975
- C. Barandianari, Undergraduate, Peru, no degree yet

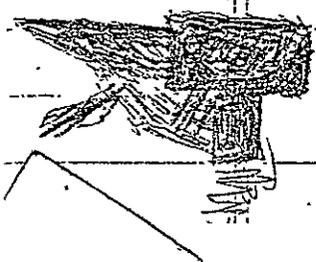
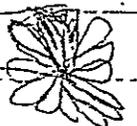
2.3 c

Training of L.D.C. nationals

- R Castro - Ph.D., Peru, May 1974
- C. Baanante - Ph.D., Peru, May 1974
- A. Baanante - one semester only - no degree
- E. Ospina - M.S. Columbia, Sept. 1974
- > C. Pumarada - Ph.D. studies (no degree)
- * H. Binswanger - Ph.D., Switzerland, Aug. 72
- > J. Hernandez - Ph.D. Guatemala - Mexico - still here
- > R. Rodriguez - Ph.D. Mexico, no thesis yet.
- > S. Mostafaei - Ph.D., Iran, no thesis yet
- > L. Zavaleta - M.S., Peru, May 1975
- > C. Barandianari - undergrad, Peru, no degree yet

BARANDIANARI

Proposed for
 + budget
 before Christmas



OUTLINE FOR FINAL REPORT

SUMMARY

INTRODUCTION

- Competition for U.S. Market
- Characteristics of U.S. Market

OBJECTIVES

- General Objectives
- Specific Objectives

DEFINITION OF PROBLEM

- Mexican production
- Florida production
- Guatemalan production
- El Salvadorean production
- Small farmer participation
- Possibilities for Alternative Markets
 - Domestic Market
 - Processed Products

MODEL SPECIFICATION

- Interdependence of production areas
- Riskiness

THE TECHNOLOGY SET FOR GUATEMALA

- The Producing Activities
- Land Use Calendars
- Water Requirements
- Input Requirements
- Yields
- Input Prices
- Product Prices
- Resource Constraints

ANALYSIS OF EXPORT POSSIBILITIES

- The Actual Situation
- Decrease in U.S. Production
- Increase in U.S. Demand
- Increase of Yields in Guatemala
- Increase in Rural Wages in Mexico
- Elimination of U.S. Tariffs on Vegetable Imports
- Increasing Yields of Cucumbers

CONCLUDING REMARKS

REFERENCES

APPENDIX A - The Mathematical Model

APPENDIX B - The Production Budgets for Guatemala