

AN EVALUATION OF THE CONTRIBUTION OF UNITED
STATES PUBLIC LAW 480 TO THE FOOD GRAIN
TRADE, CONSUMPTION, AND PRODUCTION
OF THE LESS DEVELOPED COUNTRIES

By

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Objective	2
Review of Literature	4
Methodology	11
Source of Data	14
Definitions, and Organization of the Study	14
II. THE LESS DEVELOPED COUNTRIES BEFORE P. L. 480: EMPHASIS ON FOOD GRAINS	16
The Food Problem in the LDCs in the 1950's	17
The Food Problem: A Demand and Supply Approach	19
The LDCs' Food Problem in Relation to Foreign Trade	27
III. PUBLIC LAW 480	37
Historical Background	37
Issues Surrounding P. L. 480	43
P. L. 480 Magnitude and Components	48
P. L. 480 Interest in the LDCs	52
P. L. 480 and Other Food Aid Programs	54
The Three Effects of P. L. 480	55
IV. P. L. 480 TRADE EFFECT IN THE LESS DEVELOPED COUNTRIES	58
The Setting	58
Methodology	69
P. L. 480 Trade Effect	79
A Note on the LDCs' Food Grain Elasticities and Propensities	92
V. P. L. 480 CONSUMPTION EFFECT IN THE LESS DEVELOPED COUNTRIES	100
P. L. 480 Contribution to the LDCs' Food Grain Consumption	101
The LDCs' Income Elasticities of Food Grain Consumption	107

Chapter	Page
VI. P. L. 480 PRODUCTION EFFECT IN THE LESS DEVELOPED COUNTRIES	117
Food Aid and Agricultural Development in the LDCs . .	118
P. L. 480 and Agricultural Development in the LDCs: Emphasis on Food Grain Production	121
VII. SUMMARY AND CONCLUSIONS	132
A SELECTED BIBLIOGRAPHY	136
APPENDIX A - GRAIN IMPORTS OF THE LDCS	145
APPENDIX B - GRAIN EXPORTS OF THE LDCS	152
APPENDIX C - LDCS' POPULATION, 1951-1966 AND AVERAGE 1951-1953	156
APPENDIX D - UNITED STATES EXPORTS OF WHEAT AND FLOUR, RICE, OTHER GRAINS, AND TOTAL GRAINS UNDER THE TERMS OF CONCESSIONAL SALE	159
APPENDIX E - SELECTED STUDIES RELATING PUBLIC LAW 480 TO DIFFERENT ASPECTS OF ECONOMIC DEVELOPMENT IN INDIVIDUAL COUNTRIES AND GROUPS OF COUNTRIES	168

LIST OF TABLES

Table	Page
I. World Grain Production, Area, and Yield Per Acre Harvested by Regions, Average 1934-1938 and 1948-1952	22
II. Per Capita Grain Output, and Area, by Regions, Averages 1934-1938 and 1948-1952	23
III. Estimates of Population and Growth Rates, by Economic Areas, 1938, 1953-1955 Averages	26
IV. Grains: Major Exporting Countries: 1913 and 1953	29
V. Percentage Distribution by Regions of Average Annual World Imports (Gross) of Selected Grains, 1909-1913 to 1952/53 - 1956/57	30
VI. Less Developed Regions' Trade in Grains: Total and Net Trade in Wheat, Rice, Corn, and All Grains, Averages 1934-1938 and 1948-1952	32
VII. Per Capita Annual Grain Production, Net Trade, and Availability by Regions, Averages 1934-1938, and 1948-1952	35
VIII. Percentage U. S. Share of Average Annual World Exports (Gross) of Selected Grains, 1854-1858 to 1952-1956	49
IX. U. S. Agricultural Exports under Specified Government-Financed Programs: Value and Percent of Total Agricultural Exports, Calendar Years 1955 Through 1969 and July-December 1954	50
X. Public Law 480 Food Grain Exports, Value of Commodities Shipped, and Their Shares in Total P. L. 480 Exports, July 1, 1954, Through December 31, 1969	53
XI. LDCs' Population, and Annual Imports of Food Grains by Source, Average 1951-1953	67
XII. LDCs' Annual Food Grain Imports by Source as a Percentage of Their Total Food Grain Imports, Average 1951-1953	68

Table	Page
XIII. LDCs' Annual Income and Imports of Total Grains and Wheat and Flour Per Capita, by Source, Average 1951-1953	70
XIV. LDCs' Income Elasticities of Imports and Marginal Propensities to Import Total Grains and Wheat and Flour, by Source of Imports, Average 1951-1953	78
XV. LDCs' Annual Income and Imports of Total Grains and Wheat and Flour Per Capita, Average 1954-1956	80
XVI. LDCs' Annual Income and Imports of Total Grains and Wheat and Flour Per Capita, Average 1959-1961	81
XVII. LDCs' Annual Expected, Actual, and Concessional Imports of Wheat and Flour from the U. S.; and P. L. 480 Trade Effect, Average 1954-1956	83
XVIII. LDCs' Annual Expected, Actual, and Concessional Imports of Total Grains from the U. S.; and P. L. 480 Trade Effect, Average 1954-1956	84
XIX. LDCs' Annual Expected, Actual, and Concessional Imports of Wheat and Flour from the U. S.; and P. L. 480 Trade Effect, Average 1959-1961	86
XX. LDCs' Annual Expected, Actual, and Concessional Imports of Total Grains from the U. S.; and P. L. 480 Trade Effect, Average 1959-1961	87
XXI. LDCs' Annual Expected and Actual Commercial Imports of Wheat and Flour and Total Grains from Other Developed Countries, and the LDCs, Average 1959-1961 (Thousand Metric Tons)	89
XXII. P. L. 480 Annual Contribution to the LDCs' Total Grain Consumption, Average 1954-1956	103
XXIII. P. L. 480 Annual Contribution to the LDCs' Wheat and Flour Consumption, Average 1954-1956	104
XXIV. P. L. 480 Annual Contribution to the LDCs' Total Grain Consumption, Average 1959-1961	105
XXV. P. L. 480 Annual Contribution to the LDCs' Wheat and Flour Consumption, Average 1959-1961	106
XXVI. LDCs' Annual Total Grain Consumption, Average 1951-1953	110
XXVII. LDCs' Annual Wheat and Flour Consumption, Average 1951-1953	111

Table	Page
XXVIII. LDCs' Annual Expected and Actual Commercial Imports, from All Sources, Average 1954-1956	114
XXIX. LDCs' Annual Expected and Actual Commercial Imports, from All Sources, Average 1959-1961	115
XXX. Index of Grain Production, Area, Yield, Population, and Output Per Person by Economic Groups of the World, 1934-1938, 1957/58 - 59/60, and 1960/61	122
XXXI. Distribution by Regions of Public Law 480 Title I Sales Agreements, July 1954 to June 1958	125
XXXII. Source of U. S. Economic Assistance Commitments to LDCs .	128

LIST OF FIGURES

Figure	Page
1. The Relationship and Emergence of P. L. 480 Trade, Consumption, and Production Effects in the Less Developed Countries	56
2. Alternatives of P. L. 480 Trade Effect in the Less Developed Countries	59

CHAPTER I

INTRODUCTION

The United States emerged from World War II as the richest large nation on earth. Many countries long isolated from others continued to live in abject poverty, but they had become aware of a better life and were anxious to claim their share. To the challenge of the demanding multitudes all over the globe the United States responded with a series of aid measures. One of these was designed to feed the hungry with the surplus grown in the United States. This law was passed in 1954, and has been in operation long enough to permit a study of its impact.

Since its enactment in 1954, the Agricultural Trade Development and Assistance Act, known as P. L. 480, has attracted research and controversy. Most studies have traced its impact on the economies of recipient countries individually or in groups. Some have been descriptive studies of the law's effect on the commercial exports of the United States' competitors. Others have related the law to aspects of the United States' economy,¹ such as foreign policy and new markets for

¹For example, Willard W. Cochrane proposed in 1959 a combined surplus disposal and domestic supply control program for agricultural products. For full detail see his article, "Farm Technology, Foreign Surplus Disposal and Domestic Supply Control," JFE, XLI, No. 5 (1959), 885-99. See also Elmer L. Menzie, et al., Policy for United States Agricultural Export Surplus Disposal, Technical Bulletin No. 150 (Tucson: The University of Arizona Agricultural Experiment Station, 1962); and George Dietz, "Developing Foreign Markets Through Local Currency Projects," JFE, XXXIX, No. 5 (1957), 1529-37.

United States agricultural products. Aggregate analyses of the impact of P. L. 480 on the economies of the less developed countries (LDCs) are few, even though P. L. 480 is of a global nature. In spite of all the attention given to the food problem of the LDCs, and the contribution of United States food aid in alleviating part of that problem, no study has tried to measure the real extent of that contribution. Aggregate studies have been disregarded because the law was considered only a temporary measure for disposing of agricultural surpluses, to be extended periodically by the Congress. In addition, comparable, sufficient, and reliable statistical information is difficult to obtain from the less developed countries.

Objective

This study will attempt to discover the aggregate impact of P. L. 480 on the less developed countries. Has the law permitting these food shipments made any measurable difference to the recipients? If so, is it possible to reach conclusions about the magnitude and importance of the role played by the law? Reaching the objective of this study will mean finding answers to the following questions:

- 1) What was the impact of P. L. 480 sales on the commercial food grain trade of the less developed countries?
- 2) What was the contribution of P. L. 480 shipments to food grain consumption in the less developed countries?
- 3) What was the effect of P. L. 480 programs on food grain production in the less developed countries?

These questions will be treated separately, although they are inevitably related. For example, while P. L. 480 might have stimulated food grain consumption, did it at the same time depress domestic production

or foreign commercial trade patterns for these grains?

P. L. 480 does not operate in the LDCs alone, but these countries have long been its major concern. The magnitude of P. L. 480 sales to these countries has raised controversy about the impact on their economies. Food grains are important to this study because from the start, food grains have been the bulk of all P. L. 480 shipments. Also, food grains are prominent in the diet of the LDCs.

The first question, or what may be called the "P. L. 480 trade effect", covers the conditions under which P. L. 480 sales to the LDCs may have been a substitute for, or an addition to, their foreign commercial food grain imports; the answer to this question may also help determine whether P. L. 480 shipments have provided new markets for, and hence increased commercial exports of, United States food grains.

The second question deals with the "P. L. 480 consumption effect", or "welfare effect", and the objective is to find out by how much, how, and which regions of the LDCs have been favored by the law's massive food grain shipments. Finding P. L. 480's contribution to the LDCs' total level of food grain consumption can shed some light on the law's response to their increasing food needs, which result primarily from population and per capita income increases. It is not intended, however, to provide normative statements that the law's consumption effect is large or small, nor to suggest an "optimum" level of contribution.

The third question concentrates on where, how, and under what conditions P. L. 480 might be used to promote an increase in food grain production in the less developed countries. This may be called the "P. L. 480 production effect."

Review of Literature

For the reasons mentioned above, most studies of P. L. 480 have dealt with its impact on the economies of individual recipients or groups of recipients. The relationship of P. L. 480 commodities to economic development, trade, prices, and consumption has been the subject of research done on, among others, India, Turkey, Israel, Colombia, Pakistan, Korea, Brazil, Greece, and Egypt. Most of these were general studies and emphasized the law's importance for the economic development of the country under study.² These studies, however, allow no aggregate statement of impact on the LDCs, because the impact differed from one economy to another, and in some cases conflicting conclusions emerged about the law's effects on these recipients. S. R. Sen wrote that Indian commercial imports ". . . have not been lower than normal in spite of. . . large imports under P. L. 480. . . ." ³ But Alfred Kahn, writing on Israel, found Title I of the Act to be ". . . at the expense of normal commercial sales, rather than going to satisfy incremental demands generated by the program itself."⁴

Frank D. Barlow and Susan A. Libbin investigated in detail the economic effects of food aid to Turkey, Greece, Spain, Colombia, Israel, and India, emphasizing Title I of the Act. Their results were generally positive. For example, food aid benefited almost all sectors of the

²A bibliography of these studies on individual recipients is given in Appendix E, p. 168.

³"Impact and Implications of Foreign Surplus Disposal on Underdeveloped Economies - The Indian Perspective," JFE, XLII, No. 5 (1960), 1035.

⁴"Agricultural Aid and Economic Development: The Case of Israel," QJE, LXXVI, No. 4 (1962), 590.

Israeli economy, and in India allowed the government to continue its overall development projects. Greece, Spain, and Turkey had reached stages of growth at which the availability of food aid stimulated further growth. For all except India, Title I commodities allowed greater flexibility in planning the use of agricultural resources. Most of the six countries adopted measures such as price support programs to reduce food aid impact on prices of domestically produced farm products.⁵

Aggregate studies of the P. L. 480 impact on economic aspects of the LDCs taken together can be divided into theoretical and descriptive studies, and empirical studies. Some early, general work tried to relate surplus disposal (or P. L. 480 in particular) to different economic phenomena in recipient countries, especially the LDCs. In 1954 the Food and Agriculture Organization of the United Nations (FAO) drafted principles for foreign surplus disposal, with the goal of increasing the recipients' consumption of surplus commodities without either causing world prices of these products to fall, or producing "harmful interference with normal patterns of production and international trade."⁶ Concessional commodities should promote increased consumption, consumption which would not otherwise have taken place.⁷

⁵Food Aid and Agricultural Development (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 51, 1969).

⁶United Nations, Food and Agriculture Organization, Food Aid and Other Forms of Utilization of Agricultural Surpluses: A Review of Programs, Principles, and Consultations (Commodity Policy Studies, No. 15), 1964, p. 17.

⁷D. A. FitzGerald, Operational and Administrative Problems of Food Aid (Rome: Food and Agriculture Organization of the United Nations, World Food Program Studies, No. 4), 1965, p. 7.

These principles failed in practice because of disputes over the definition of "normal patterns of production and trade."

In 1954-1955 the FAO did a pilot study of the uses of agricultural surpluses to finance economic development in the LDCs without competing with domestic production or usual import sales of the recipient countries. India was chosen for this study, which concluded that the goal could be achieved when 1) the recipient is putting forth the maximum effort at development without the surpluses (acquisition of surpluses thus making possible further development), and when 2) consumption increases to the full extent of the surpluses added to the supply.⁸

Numerous studies followed which tried to evaluate P. L. 480 in terms of the FAO principles.⁹ In 1958 John H. Davis concluded that the law has succeeded in moving surpluses out of the United States and in boosting consumption in some of the LDCs, but that it has been less than successful in assisting recipients' economic development, reducing their need for United States dollar aid, and stimulating United States export markets.¹⁰ Mordecai Ezekiel recommended further studies to obtain concrete results about using surplus food to finance economic development. He stressed that present evidence, while inconclusive, suggests that under favorable conditions and good administration, food

⁸V. M. Dandekar, The Demand for Food, and Conditions Governing Food Aid During Development (Rome: Food and Agriculture Organization of the United Nations, World Food Program Studies, No. 1), 1965, p. 25.

⁹For example, see J. Richter, "Agricultural Surpluses for Economic Development," JFE, LXIV, No. 1 (1956), 69-73. See also seminars and discussions on the "Impact and Implications of Foreign Surplus Disposal on Underdeveloped Economies," JFE, XLII, No. 5 (1960), 1019-83.

¹⁰"Surplus Disposal as a Tool for World Development - Objectives and Accomplishments," JFE, XL, No. 5 (1958), 1484-96.

aid may produce positive results.¹¹

The following year, Ali Ahmed Attiga defined the conditions under which United States surplus food might be used as a source of capital formation in the LDCs without disrupting either world agricultural trade patterns or domestic agricultural production and prices in the countries in question.¹² Also in 1959, Robert M. Stern concluded that it seems ". . .likely that other food exporting countries have been displaced to some degree as a consequence of United States surplus disposal efforts, in particular those under P. L. 480."¹³ He suggested further examination of the effect of these programs on competing exporters and the underdeveloped countries. Deena Khatkhate argued, in 1962, that surplus disposal in the LDCs did not affect agricultural production adversely.¹⁴ Franklin Fisher's work in 1963 presented a theoretical framework for the impact of food surplus disposal on recipients' agricultural production. His conclusions were based on theoretical answers to the questions 1) How large and serious a discouragement to domestic agriculture is the importation of foreign food surpluses?

¹¹"Apparent Results in Using Surplus Food for Financing Economic Development," JFE, XL, No. 4 (1958), 923.

¹²Opportunities and Problems of Using United States Food to Increase Capital Formation in Underdeveloped Countries, Agricultural Economics Pamphlet No. 103 (Brookings: South Dakota State College Agricultural Experiment Station, 1959).

¹³"The Regional Pattern of World Food Imports and Exports," Weltwirtschaftliches Archiv, Band 83, Heft 2 (1959), p. 266.

¹⁴"Some Notes on the Real Effects of Foreign Surplus Disposal in Underdeveloped Economies," QJE, LXXVI, No. 2 (1962), 186-96. See also comments on Khatkhate's article by Christopher Beringer and Walter P. Falcon, QJE, LXXVII, No. 2 (1963), 317-26; and by Mahmood Khan, QJE, LXXVIII, No. 2 (1964), 348-49.

and 2) Given the type of expenditures for economic development to which the receipts from surplus food sales are devoted, by how much do such expenditures offset any negative effect of the surplus by (directly or indirectly) encouraging development of domestic agriculture?¹⁵

In the late 1960's the question of comprehensive studies of P. L. 480 arose. In 1967 Harry Johnson asked whether the damage done to the LDCs' export earnings was greater or less than the benefits derived from the surpluses received. No study in response to this question has yet appeared.¹⁶ This study will attempt to begin answering the question, limiting itself to food grain trade, consumption, and production effects in the LDCs. Similarly, Earl O. Heady and John F. Timmons admit that there are ". . .no quantitative studies which reflect the global outcome over donor, recipient, and third countries of our aid - a necessary level of measurements if we are to know the net effects."¹⁷

There have been no systematic empirical studies of P. L. 480 trade, consumption, or production effects in the LDCs. However, reference to these effects appears in studies done by the United States Department of Agriculture and the FAO. The USDA, estimating future world demand for wheat, food grains, and total grains, refers briefly to the impact

¹⁵"A Theoretical Analysis of the Impact of Food Surplus Disposal on Agricultural Production in Recipient Countries," JFE, XLV, No. 4 (1963), 863-75.

¹⁶Economic Policies Toward Less Developed Countries (2d ed.; New York: Frederick A. Praeger, 1968), p. 92.

¹⁷"Objectives, Achievements, and Hazards of the U. S. Food Aid and Agricultural Development Programs in Relation to Domestic Policy," in Alternatives for Balancing World Food Production and Needs (Ames: The Iowa State University Press, 1967), p. 192.

of concessional sales of surplus products on this demand. An FAO study on world grain consumption from 1955-1956 to 1963-1964 indicates that in developing countries ". . .almost half of the increase in the food use of grains was due to higher consumption of wheat, which was made possible mainly through larger imports of this grain on special terms,"¹⁸

In 1969, however, Per Andersen tried empirically to measure the extent to which food aid (P. L. 480) substituted for commercial food imports of twelve recipient countries from 1964 through 1966. This was only a part of the major objectives of his study, which were to

. . .estimate the value of food aid to recipient countries relative to other types of aid, the cost to donor countries using the opportunity cost principle, and the efficiency of food aid relative to other types of aid in obtaining economic progress in recipient countries.¹⁹

Andersen's study was based mainly on data obtained through a mail survey conducted during 1967-1968. Questionnaires were sent to 441 persons, representing fourteen P. L. 480 recipients (developed and less developed, as defined by this study), who were considered to be "knowledgeable on economic development and external economic assistance programs and needs." With a 20% response, his statistical analysis concluded that ". . .during the period 1964-66, each bushel of wheat exported under P. L. 480 reduced the quantity of wheat imported commercially by the aid recipient by about two-fifths of a bushel." Then he

¹⁸United Nations, Food and Agriculture Organization, "Trends and Patterns in World Grain Consumption," Monthly Bulletin of Agricultural Economics and Statistics, XIV, No. 10 (1965), 13.

¹⁹"The Role of Food, Feed, and Fiber in Foreign Economic Assistance: Value, Cost, and Efficiency" (unpublished Ph.D. dissertation, Oklahoma State University, 1969), p. 158.

used the estimate for wheat again to establish estimates for food, feed, and fiber also.

This study differs from Andersen's in methodology and objectives, and should provide different results, because here the less developed countries are taken together, only food grains are considered, P. L. 480 consumption and production effects are examined along with the trade effect, and the base period of investigation is different.

In summary, the need for this study is based on these factors:

- 1) An aggregate study of the impact of P. L. 480 on the LDCs, with special reference to their food problems, is called for to supplement the widely disparate existing studies on individual countries.
- 2) Evaluation of the effects of P. L. 480 shipments on the level of food grain consumption in the LDCs requires judgment on whether these shipments were added to domestic food grain supplies, replaced other food grain aid, or displaced commercial food grain imports.
- 3) There has been no systematic empirical study of P. L. 480's trade effect on food grains in the LDCs; most existing work has been colored by value judgment.²⁰ This study accepts the responsibility for such an empirical inquiry.

²⁰ John Pincus wrote, in Trade, Aid and Development: The Rich and Poor Nations (New York: McGraw-Hill, 1967), p. 325:

There is no way of dumping more than \$1 billion worth of free food on the world market each year without affecting trade and prices. P. L. 480 wheat and flour marketings alone amount to as much as one-fourth of world trade annually. . . . It is clear that some P. L. 480 exports substitute. . . Northern exports, mainly grains. However, we have as yet no good basis for estimating how much these surpluses substitute for commercial exports, rather than supplement them.

Methodology

P. L. 480 Trade Effect

In order to find out whether the LDCs have imported commercially more or less than their expected level of commercial food grain imports (had P. L. 480 not been enacted), an annual average of their projected level of commercial imports of food grains for 1954-1956 and 1959-1961 will be calculated. The first period represents the early years of the law, when its interest in the LDCs was not yet a priority. The LDCs' share in wheat and flour shipments in 1954/55, for example, was only 28%, but had grown to 40% by 1955/56 (see Appendix D). For total grains these percentages were 25% and 28%. In the second period, the law's programs were more fully underway, and concentrated on the LDCs by exporting to them over 80% of P. L. 480 wheat and flour in fiscal 1959 and fiscal 1961. This percentage was over 70% for total grains.

During both periods the international prices of grains remained relatively stable. Studying these periods, then, will allow a wider investigation of P. L. 480's effects, as they are observed at two different stages of the law's operation.

Regression analysis will be used to determine the projected levels, using 1951-1953 as the base period. In all three periods, an average of three years will be preferable to single years for avoiding problems of short-run fluctuation and cumulative effect in the estimates. One of the following four alternatives will emerge:

A) P. L. 480 as a perfect substitute for commercial imports:

when projected commercial food grain imports \gg their actual total food grain imports (including P. L. 480 shipments)

B) P. L. 480 as a perfect supplement to commercial imports:

when projected commercial food grain imports < their actual total
 food grain imports
 by the full amount
 of P. L. 480 sales

C) P. L. 480 as part substitute and part supplement to commercial imports:

when projected commercial food grain imports < their actual total food
 grain imports by less
 than the full amount
 of P. L. 480 sales

D) P. L. 480 as neutral to commercial imports:

when concessional sales under the law do not occur.

Estimates will be drawn for the LDCs' expected commercial imports of food grains from 1) the United States, 2) other free developed countries, 3) the LDCs themselves, and 4) all sources taken together.

These estimates will be helpful in indicating how much of the commercial imports from these sources has been substituted or supplemented by P. L. 480 shipments.

P. L. 480 Consumption (Welfare) Effect

Food grain consumption in the less developed countries is based on domestic production mainly, and so P. L. 480 should not be expected to contribute these countries' total food grain consumption. Nevertheless, the share of P. L. 480 food grain shipments as a percentage of the LDCs' total consumption of these commodities will be calculated for each of the two periods under study, and will be referred to as the law's consumption (welfare) effect in these countries. Although many generalizations are offered - some by the law itself - about the contribution of P. L. 480 to world hunger in general and food grain shortages in particular, little effort has been made to measure this

contribution on an aggregate basis with emphasis on the LDCs. An estimate of the P. L. 480 food grain consumption effect in the LDCs is not intended to provide normative statements on how large or small the effect should be, but rather to measure the extent of the contribution of this massive surplus aid program to overcoming the LDCs' food shortage.

In addition, an estimate for the LDCs' income elasticities of food grain consumption before and after the enactment of the law will allow general statements such as whether or not these countries' food grain consumption, during the law's operation, responded differently to income from that of the base period before its enactment. Comparing these income elasticities is important because of the fact that the law hoped to stimulate the recipients' food consumption.

P. L. 480 Production Effect

Many studies on P. L. 480 have focused on the law's impact on economic development in general, and production in particular, in the recipient countries. Various measures - land reform, improved seeds and fertilizers, agricultural education and research, easy credit, irrigation and marketing facilities - have been used in the LDCs to expand agricultural production, including that of food grains. Rather than simply repeat established findings, this descriptive part of the study will correlate the experiences of the LDCs in light of their P. L. 480 purchases, and try to reach general conclusions on where, how, and under what conditions P. L. 480 may have been used to contribute to an increase in food grain production in these countries.

Source of Data

The statistical information about the LDCs' food grain production, acreage, exports, imports, and economic variables such as per capita income and population, are compiled mainly from publications of the UN (United Nations), FAO (Food and Agriculture Organization of the United Nations), USDA (United States Department of Agriculture), and the OECD (Organization for Economic Co-operation and Development).

Definitions, and Organization of the Study

In this study, P. L. 480 will be understood as a short name for the Agricultural Trade Development and Assistance Act as amended since its enactment in 1954.

The term LDCs (Less Developed Countries) will follow the United Nations classification to cover all the countries of non-communist Asia (except Japan), Latin America, and Africa (except the Union of South Africa). The LDCs will be subdivided into nine regions to facilitate investigation of the three P. L. 480 effects. These three entire continents will be referred to collectively as the less developed continents, or regions, of the world for the purpose of making general historical statements.

For the purposes of this study, food grains are those grains or grain equivalents (prepared products which include grains, such as rolled wheat and cornmeal) which are intended for human consumption.²¹ The term food grains thus includes wheat, wheat flour, rice, corn, rye,

²¹Similar to the United Nations Standard International Trade Classification scheme for cereals (SITC).

barley, sorghum, millet, and oats. This definition tries to avoid the arbitrary distinction between "food grains" and "feed grains." Wheat, for example, is used to make bran which is used for feed. And some of the so-called feed grains - corn, barley, and oats - are commonly used for food in the less developed countries. Yellow corn, for example, is a traditional food staple in rural areas of Egypt.²²

The next chapter will outline the less developed countries' economic conditions before the enactment of P. L. 480, with emphasis on food grains. An examination of the factors affecting the LDCs' demand, supply, and foreign trade of these products will provide the background for Chapter III, which will discuss P. L. 480's magnitude and historical development, and their relationship to these countries. Chapters IV, V, and VI are reserved for P. L. 480's trade, consumption, and production effects respectively. The study will be summarized and concluded in Chapter VII. A series of appendixes will record data and information too detailed for extensive inclusion in the body of the dissertation.

²²Haven D. Umstott, Public Law 480 and Other Economic Assistance to United Arab Republic (Egypt) (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 83, 1964), p. 25.

CHAPTER II

THE LESS DEVELOPED COUNTRIES BEFORE P. L. 480:

EMPHASIS ON FOOD GRAINS

Any anticipated contribution of P. L. 480 to the economies of the less developed countries depends upon their need for the commodities supplied by the law. It thus becomes important to find out the key variables affecting these countries' capacity to meet their own growing need for food, a result primarily of population and income growth.

The poverty problems of the less developed countries are complicated, and related to many economic, social, political, and cultural factors. This chapter will present a statistical and historical economic background of these countries' poverty before P. L. 480, restricting its scope to those problems and issues which were connected with their food grain trade, consumption, and production. It will offer answers to questions on the degree of the LDCs' self-sufficiency, on their imports and exports, and on the effect of their increasing population and income on their demand for the products in question. Finding these answers will mean analyzing factors such as production, land area, yield, international trade, and agricultural policies toward food grains in the LDCs. These economic factors will be examined under three general headings: the LDCs' food problem in the 1950's; a supply and demand approach to the LDCs' food problem; and the LDCs' food problem in relation to foreign trade.

The Food Problem in the LDCs in the 1950's

World attention has been focused on the problems of underdevelopment only since World War II. L. J. Zimmerman offered a succinct explanation for the emergence of world consciousness at this particular moment in history:

In the period preceding 1830 - i.e., during the classical epoch - economists wrote nothing but *Inquiries into the Nature and Causes of the Misery of Nations*. During the century between 1830 and 1930, the belief in economic progress was so great that it was postulated instead of analyzed in economic theory. The third period, World War I, and especially the World Crisis of the 1930's, meant the end of the belief in an unbridled economic progress. After World War II economists as well as politicians began to realize that practically everything that had been said in the past about economic progress referred to Western countries alone.¹

Gunnar Myrdal has explained the same outcome from a more humanistic point of view. He saw World War II as a "shaking of the foundations", a destruction of established power structures, one of which was the British Empire. Suddenly millions of subject peoples were released from colonial and despotic domination, and the new nationalism which emerged was marked not only by a demand for liberty, but by a demand for equal opportunity with other peoples. All wanted economic as well as political development.² The Cold War, another consequence of World War II, created an international division into two camps, each dominated by one of the superpowers. The adherents of both camps eagerly court the favor and political support of the emerging new nations

¹Poor Lands, Rich Lands: The Widening Gap (New York: Random House, 1965), pp. 5-6.

²Rich Lands and Poor (New York: Harper & Brothers, 1957), p. 7.

through the most attractive means; they offer developing nations, on easy terms, grants or donations of capital to help finance development and the achievement of other nationalistic aspirations.³

The LDCs share some common development problems, although they differ among themselves in many other respects. Universally, per capita incomes are low, social overhead capital is limited, illiteracy is high. Most of the populations live by agriculture or some other form of primary production; creative business and government administrators are lacking; cultural conditioning affects development negatively; the nations depend on the export of primary products for foreign exchange.

Of all these issues,⁴ the food problem has attracted the most attention, perhaps because the lack of an adequate diet in these countries symbolizes most poignantly their universal poverty. It has been referred to as a real example of the Malthusian race between population growth and food production. In the 1960's, many economists recommended, as a solution, control of the LDCs' population, increased food production in both developed and less developed countries, and promotion of food aid from the developed countries to those less developed. Malthus himself, over 150 years ago, recommended only population check as a remedy to world food problems; he generally discouraged giving the poor charity, because in doing so, ". . .the same produce must be divided among a greater number, and consequently a day's labour will purchase a

³Harry Johnson, The World Economy at the Crossroads (London: Oxford University Press, 1965), p. 72.

⁴Others are balanced versus unbalanced growth, trade versus aid, political instability, investment criteria, import substitution, the preconditions to take-off, population, and industrialization.

smaller quantity of provisions, and the poor therefore in general will be more distressed."⁵

This study does not extend itself to include the treatment of non-grain foods, such as meat, eggs, fats and oils, milk products, and sugar; grains are the major food stuffs in the LDCs, and the main source of protein. Grains may be safely considered an indicator, if incomplete, of the food problem of these countries. In Cochrane's words: "Food and grains are almost synonymous to those dealing with the world food problem."⁶

The Food Problem: A Demand and Supply Approach

Unreliable statistics make it impossible to estimate accurately the extent of the world food problem, or the number of persons suffering from hunger and malnutrition. But with or without numerical measurements, there is no doubt that the suffering is widespread and that the sufferers are numerous.

The food problem of the less developed countries can be expressed as a supply of food grains insufficient to meet their increasing demand for these products. Domestic production of food grains, however inadequate, is the principal source of grains in the less developed countries; this section will discuss domestic production (Tables I and II), followed by an explanation of the determinants of their demand for the

⁵From Population: The First Essay, quoted in Contemporary Economic Problems and Issues, by Thomas J. Hailstones, Bernard L. Martin, and Frank Mastrianna (2d ed.; Cincinnati: South-Western Publishing Company, 1970), p. 485.

⁶The World Food Problem: A Guardedly Optimistic View (New York: Thomas Y. Crowell Company, 1969), p. 50.

products in question, and finally an examination of their food grain imports, which attempt to fill the gap between domestic production and demand.

Table I shows that between 1934-1938 and 1948-1952 world grain production increased 9%, from 651 million tons to 710 million tons. Wheat and maize, followed by rice, were by far the largest grain crops in that period.⁷ Both developed and less developed regions contributed to this increase, but at widely different rates. The less developed regions' grain production increased by only 6% in that period, as compared with 12% for the developed regions, much of it owing to Africa, since Asia showed only a 5% increase and Latin America none. North America and Oceania are responsible for the expanded grain production of the developed regions; the damage of World War II caused Western Europe a slight drop in grain production, and reduced the Soviet Bloc's share of world grain production from 23% in 1934-1938 to 19% in 1948-1952. By comparison, North America expanded its share in world grain production from 17% to 24% in these same periods.⁸ Of the less developed regions, Asia is the principal producer of grain, producing about 40% of the world's grain in 1934-1938, 38% in 1948-1952. Latin America and Africa taken together produced only 9% for both periods.

⁷F. C. Schlömer, "Developments in World Grain Production by Type of Grain and Region, 1951-57, and Outlook," Monthly Bulletin of Agricultural Economics and Statistics, VIII, No. 3 (1959), 13.

⁸In fact, the United States' share in world production of wheat, corn, oats, barley, rye, rice, and all grains was 15.7%, 55%, 30.7%, 10.5%, 1.4%, 1.3%, and 20.4% respectively in average 1950-1954. See U. S., Department of Agriculture, Prospects for Foreign Trade in Wheat, Rice, Feed Grains, Dry Peas, Dry Beans, Seeds, Hops (Washington, D. C.: Foreign Agriculture Service, 1961), p. 3.

The modest improvement in grain production in the less developed regions loses its impressiveness when per capita grain production is considered (Table II). These regions produced 224 kilograms of food grains per person in 1934-1938, less than half the portion of the developed regions. Production fell to only 192 kilograms in 1948-1952, a drop of 14% (25% for Latin America alone). The developed regions achieved a 6% increase, a spectacular 31% in North America alone. The gap between per capita grain production in the developed and less developed regions has widened from 246 kilograms in 1934-1938 to 305 kilograms in 1948-1952, reflecting the latter's rapid population growth.

Grain area (Table I) increased by 18% in the less developed regions between 1934-1938 and 1948-1952, which was not enough to prevent a drop in per capita grain area from 0.48 acres in 1934-1938 to 0.46 acres in 1948-1952. These figures are roughly half the per capita grain area in the developed regions (Table II). During these same periods grain area was cut by 29 million acres in the developed regions with the exception of North America, which showed a slight increase in grain area. Therefore, even though their total grain area has been expanded, the less developed regions' per capita grain area has declined because of their population growth. Per capita grain area in the developed regions has been reduced because of both population growth and reduction in total grain area.

North America alone has expanded grain yields per acre by 49% between 1934-1938 and 1948-1952. This increase was 34% for Oceania, 12% for the developed regions taken together. In the less developed regions as a whole, on the other hand, yield per acre has declined by 10% in the same period.

TABLE I

WORLD GRAIN PRODUCTION, AREA, AND YIELD PER ACRE HARVESTED
BY REGIONS, AVERAGES 1934-1938 AND 1948-1952

Region	Production		Area		Yield per Acre Harvested	
	1934-38	1948-52	1934-38	1948-52	1934-38	1948-52
	million metric tons		million acres		kilograms	
<u>Less Developed</u>						
Latin America	31	31	67	69	461	450
Africa	26	32	97	111	265	287
Asia	260	272	511	616	508	441
Total	317	335	675	796	468	420
<u>Developed</u>						
North America	109	169	245	257	443	659
Western Europe	67	65	105	96	638	676
Oceania	5	7	16	15	331	444
E. Europe & USSR	153	134	357	326	429	408
Total	334	375	723	694	462	538
<u>World</u>	651	710	1,398	1,490	465	475
- - - Indices (1934-38) = 100 - - -						
<u>Less Developed</u>						
Latin America	100	100	100	103	100	98
Africa	100	123	100	114	100	108
Asia	100	105	100	121	100	87
Total	100	106	100	118	100	90
<u>Developed</u>						
North America	100	155	100	105	100	149
Western Europe	100	97	100	91	100	106
Oceania	100	140	100	94	100	134
E. Europe & USSR	100	88	100	91	100	95
Total	100	112	100	96	100	116
<u>World</u>	100	109	100	107	100	102

Source: Lester R. Brown, Man, Land, and Food: Looking Ahead at World Food Needs (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 11, 1963), pp. 50, 53, 56.

TABLE II

PER CAPITA GRAIN OUTPUT, AND AREA, BY REGIONS,
AVERAGES 1934-1938 AND 1948-1952

Region	Per Capita Grain Output		Per Capita Grain Area	
	1934-1938	1948-1952	1934-1938	1948-1952
	- - - kilograms - - -		- - - acres - - -	
<u>Less Developed</u>				
Latin America	254	190	.55	.42
Africa	158	161	.59	.56
Asia	231	197	.45	.45
Total	224	192	.48	.46
<u>Developed</u>				
North America	768	1,006	1.73	1.53
Western Europe	247	234	.39	.35
Oceania	455	538	1.45	1.15
E. Europe & USSR	533	453	1.24	1.10
Total	470	497	1.02	.92
<u>World</u>	307	284	.66	.60
- - - Indices (1934-38) = 100 - - -				
<u>Less Developed</u>				
Latin America	100	75		
Africa	100	102		
Asia	100	85		
Total	100	86		
<u>Developed</u>				
North America	100	131		
Western Europe	100	95		
Oceania	100	118		
E. Europe & USSR	100	85		
Total	100	106		
<u>World</u>	100	93		

Source: Brown, Man, Land, and Food, pp. 52, 55.

The low productivity in food grains can also be attributed to other factors besides the limited cultivated land.⁹ In many densely populated LDCs, marginal product of labor in agriculture - the abundant factor of production - was low, and declined from 1934-1938 to 1948-1952 because labor was assisted by only very limited capital inputs such as fertilizer, irrigation facilities, pesticides, improved seeds, agricultural research, and mechanization. Fertilizer consumption has been low and stable in the less developed regions (two kilograms of chemical fertilizer per acre in 1938 and in 1950/51), principally because of ignorance about the value of fertilizer and about methods of application, and because of the lack of production and distribution facilities. In addition to rainfall, many of the LDCs, especially in Asia, depend on irrigation for water and for the moisture needed to absorb the available nutrients. Irrigation facilities, pesticides, improved seeds such as hybrid corn, and the use of agricultural mechanization and research have all been limited by the scarcity of capital in these countries, and the unwillingness of farmers to adopt new techniques of production. In 1948-1952, then, the gap between yields per acre in the developed and the less developed regions was 188 kilograms.

While there has been only slight expansion in food grain production in the less developed regions, their demand for food, particularly food grains, has grown rapidly. Growing populations and incomes are the main causes. In these regions, increased numbers means an additional requirement for food grains specifically. Also, since these

⁹Full treatment of factors limiting agricultural production in general, and grain crops in particular, in the less developed regions is found in Brown, Man, Land, and Food, pp. 83-115.

areas have low standards of living, a large part of their increasing income is spent on food grains for the betterment of these standards, depending upon the size of their income elasticity of demand for these products.¹⁰ When increased demand is not met domestically, a need arises for foreign imports. The response of foreign imports of these products to the greater demand that results from income growth in these countries is called the income elasticity of food grain imports (percentage change in per capita food grain imports divided by percentage change in per capita income). Table III on the following page shows the LDCs' population growth.

Normally, a high birth rate in the LDCs was balanced by a high death rate, but public health practices in operation since the 1940's have upset this balance. Table III shows that the LDCs' population increased from 946 million to 1,107 million at an annual rate of 1.1% between 1938 and 1953-1955, a much steeper rise than that of the developed countries, which was .7% for the same period. This rapid increase in population makes the achievement of satisfactory living standards impossible: it aggravates the shortage of capital, diverts capital away from development, and creates a dense agricultural population in relation to the area of cultivated land. The average farmer under such conditions cannot make an adequate living for his family, especially when poverty prevents his applying modern technological improvements in agriculture.

¹⁰Income elasticities of demand for food in the LDCs were mentioned as 0.5 - 0.7; see Thorkil Kristensen, The Food Problem of Developing Countries (Paris: Organization for Economic Co-operation and Development, 1968), p. 15.

TABLE III
ESTIMATES OF POPULATION AND GROWTH RATES, BY ECONOMIC AREAS,
1938, 1953-1955 AVERAGES

Economic Areas	Population		Annual Growth Rate
	1938	1953-1955	1938 to 1953-1955
	-- million --		-- per cent --
Less Developed Countries (LDCs)	946	1,107	1.1
Africa	162	210	1.8
Latin America	134	177	1.9
Asia	650	720	.7
Developed Countries	556	626	.7
Communist Countries ^a	744	904	1.3
World Total	2,247	2,637	1.1

^aU. S. S. R., Eastern Europe, mainland China, North Vietnam, North Korea, and Mongolia.

Source: Arthur B. Mackie, Foreign Economic Growth and Market Potentials for U. S. Agricultural Products (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 24, 1965), p. 73.

Other less important factors affect the demand for food grains. Many people, for example, must live at the subsistence level on locally produced food, because of limited transportation and distribution facilities in the LDCs. A social factor may enter into the preference for food: as the LDCs begin to imitate Western ways, people may eat more wheat and less rice, which has been the traditional dish. Also, education develops awareness of the relationship between nutrition and health. On the other hand, some demand for food grains may be discouraged by a reduction in the prices of meat and fish, and by attitudes about thrift, which may be engendered by religion. Further, government policies may encourage (through nutrition programs) or discourage (because of balance of payments difficulties) this demand.¹¹

The LDCs' Food Problem in Relation to Foreign Trade

The LDCs depend heavily on foreign markets to supply additional food grains, and so their food problem is necessarily related to their foreign trade. Their capacity to import is affected not only by need, but by ability to pay, by government policies, and by trade relations.

The major flow of world trade is traditionally from and among the developed countries. So the less developed countries depend more on the developed countries than on themselves for both their exports (mainly primary products) and their imports (mainly manufactures).

¹¹Lester R. Brown, Food Consumption and Expenditures: India, Japan, United States (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 42, 1962), pp. 1-3. See also E. O. Pollock, "Is the World Changing Its Eating Habits?" Foreign Agriculture, XX, No. 6 (1956), 6-7.

As a group, the less developed regions depend for foreign exchange upon the export of primary products (food, agricultural materials, minerals); these were almost 90% of their total exports in 1913 and in 1953.¹² Fluctuations in prices and export earnings from these primary products has caused these regions to bend their efforts toward diversity in the export sector, and emphasize domestic industrialization.¹³

Several points can be made about the foreign grain trade of the less developed regions before and after World War II. Primarily, these regions collectively were neither major exporters nor major importers of grains. Table IV shows that the individual shares of both the United States and Canada in world grain exports in 1953 exceeded those of all leading less developed grain exporters together. In terms of imports, Table V indicates that Western Europe imported more wheat and flour, corn, barley, oats, and rye than the less developed regions combined from the turn of the century until the mid-1950's. However, the less developed regions' share in the imports of these products has grown, reaching, in 1949/50 - 1951/52, 39.1% of total world wheat exports, and about 20% for barley. Since rice production, consumption, and trade are dominated by Asia, and since Western Europe is not a major rice-eating region, the less developed regions, especially the Far East, imported 87% of total world rice in 1952-1956.

¹²Paul Lamartine Yates, Forty Years of Foreign Trade (London: George Allen & Unwin, Ltd., 1959), p. 240.

¹³Industrial products that require relatively unskilled labor and modest capital investment, and that can attract world buying power and promote export growth. See Hal B. Lary, Imports of Manufactures from Less Developed Countries (New York: Columbia University Press, 1968).

TABLE IV

GRAINS: MAJOR EXPORTING COUNTRIES: 1913 AND 1953

	Grain Exports		Share in World Grain Exports		Grains as Per Cent of Nation's Export	
	1913 - \$ million -	1953	1913 - per cent -	1953	1913 - per cent -	1953
<u>Developed Countries</u>						
United States	204.7	1,027.0	11.48	28.70	8.4	6.6
Canada	163.3	906.8	9.16	25.34	38.8	21.4
Australia	48.9	271.9	2.74	7.60	14.3	13.9
Germany	112.4	6.4	6.30	0.18	4.7	0.1
Netherlands	203.0	20.5	11.38	0.57	16.4	1.0
Rumania	86.6	-	4.86	-	65.8	-
Russia	274.8	-	15.41	-	35.1	-
Total			61.33	62.39		
<u>Less Developed Countries</u>						
Argentina	234.9	384.0	13.17	10.73	45.6	32.9
Siam	36.8	213.6	2.06	5.97	86.1	66.2
India	147.5	176.1	8.27	4.92	17.8	9.9
Indochina	37.7	38.5	2.11	1.08	68.3	39.8
Malaya	29.6	11.1	1.66	0.31	14.9	1.1
Total			27.27	23.01		
<u>Other^a</u>	203.1	522.0	11.40	14.60		
World Total	1,783.3	3,577.9	100.0	100.0		

^aDeveloped and less developed.

Source: Lamartine Yates, Forty Years of Foreign Trade, p. 241.

TABLE V

PERCENTAGE DISTRIBUTION BY REGIONS OF AVERAGE ANNUAL
WORLD IMPORTS (GROSS) OF SELECTED GRAINS,
1909-1913 TO 1952/53 - 1956/57

Commodity and Period	United Kingdom	Western Europe Including U. K.	Latin America	Near East	Far East	Africa	Total	All Others ^a
Wheat & Flour								
1909 - 1913	31.2	88.0	3.6	1.0	2.2	1.4	8.2	3.8
1924 - 1928	27.9	77.2	4.9	1.7	6.7	1.6	14.9	7.9
1934 - 1938	33.7	70.6	9.9	1.8	10.4	1.7	23.8	5.6
1949/50-1951/52	18.3	53.1	8.1	5.3	22.8	2.9	39.1	7.8
1952/53-1956/57	18.2	52.3	10.2	5.5	20.2	3.5	39.4	8.3
Rice								
1909 - 1913	4.9	27.9	2.8	1.6	51.2	4.8	60.4	11.7
1924 - 1928	2.3	16.4	2.9	1.2	66.7	3.5	74.3	9.3
1934 - 1938	1.3	14.2	4.2	1.2	73.5	4.0	82.9	2.9
1952 - 1956	1.2	8.8	5.7	2.6	73.7	5.1	87.1	4.1
Corn								
1909 - 1913	30.4	89.0	0.2	0.2	0.1	0.6	1.1	9.9
1924 - 1928	21.0	88.0	0.3	0.1	0.3	0.6	1.3	10.7
1934 - 1938	32.6	83.6	0.2	0.1	2.2	0.4	2.9	13.5
1952/53-1956/57	26.0	81.6	0.1	0.8	7.8	0.4	9.1	9.3
Barley								
1909 - 1913	18.6	98.6	0.1	0.3	0.1	0.3	0.8	0.6
1924 - 1928	24.2	95.7	0.1	0.9	0.5	1.2	2.7	1.6
1934 - 1938	33.2	88.4	0.4	1.1	2.0	2.8	6.3	5.3
1952/53-1956/57	17.5	69.1	0.1	1.4	17.8	0.5	19.8	11.1
Oats								
1909 - 1913	28.3	93.7	0.3	-	0.6	0.2	1.1	5.2
1924 - 1928	25.3	85.9	0.6	0.8	0.4	0.7	2.5	11.6
1934 - 1938	13.6	83.7	2.2	0.7	1.1	1.5	5.5	10.8
1952/53-1956/57	3.6	57.8	1.6	1.4	0.4	-	3.4	38.8
Rye								
1909 - 1913	-	94.5	-	-	-	-	-	5.5
1924 - 1928	-	79.7	-	-	-	-	-	20.3
1934 - 1938	-	82.9	-	0.5	-	-	0.5	16.6
1952/53-1956/57	0.4	72.4	-	0.7	-	-	0.7	26.9

^aIncludes Eastern Europe, U. S. S. R., North America, and Oceania.

Source: Stern, "Regional Pattern," p. 253.

These regions' net grain trade, as shown in Table VI, reflects a growing need for foreign grains. These regions collectively were net exporters of all grains, wheat, rice, and corn. Individually, they were all net exporters of corn, all except Asia were net exporters of wheat, and only Asia was a net exporter of rice.

By 1948-1952 the situation was drastically reversed. In aggregate terms, these regions became net importers of total grains, wheat, and rice; and net exporters of corn, with only about one million tons as compared with almost seven times that much before the war. Asia became a net importer of total grains, wheat, rice, and corn; Africa became a net importer of total grains and wheat; Latin America of wheat and rice, although it continued to export most of the less developed regions' corn, partly because of expansion in grain area in the early 1950's.

As the less developed regions came to depend more on foreign grain sources, their imports from the major grain exporters, especially the United States, increased substantially. Almost half of the United States' total exports of wheat and barley went to the less developed regions in 1952/53 - 1956/57.¹⁴

Conclusion

Several conclusions emerge from the preceding analyses which help to explain the position of the LDCs and the United States in the world food grain trade. Clearly the LDCs needed more food as their populations and incomes increased. Domestic production of food did not respond fast enough to keep pace with demand, and these countries experi-

¹⁴Stern, "Regional Pattern," pp. 258-59.

TABLE VI

LESS DEVELOPED REGIONS' TRADE IN GRAINS: TOTAL AND NET TRADE IN WHEAT^a,
RICE, CORN, AND ALL GRAINS, AVERAGES 1934-1938 AND 1948-1952

	Total Trade							
	Exports				Imports			
	Wheat	Rice	Corn	All Grains	Wheat	Rice	Corn	All Grains
	- - - 1,000 metric tons - - -							
<u>Average, 1934-38</u>								
Latin America	3,445	108	6,610	11,147	1,668	342	23	2,068
Africa	535	120	670	1,671	430	400	40	1,001
Asia	1,030	8,990	770	11,657	1,900	6,910	230	9,470
Total	5,010	9,218	8,050	24,475	3,998	7,652	293	12,539
<u>Average, 1948-52</u>								
Latin America	2,000	251	1,200	4,161	2,849	363	60	3,319
Africa	353	266	373	1,695	1,502	183	278	2,025
Asia	334	3,252	162	4,432	5,455	3,303	213	10,327
Total	2,687	3,769	1,735	10,288	9,806	3,849	551	15,671

^aWheat flour is included as wheat equivalent.

TABLE VI--Continued

Region	Net Trade							
	Exports				Imports			
	Wheat	Rice	Corn	All Grains	Wheat	Rice	Corn	All Grains
	- - - 1,000 metric tons - - -							
<u>Average, 1934-38</u>								
Latin America	1,777	. .	6,587	9,079	. .	234	. .	. .
Africa	105	. .	630	670	. .	280	. .	. .
Asia	. .	2,080	540	2,187	870	. .	. .	. .
Total	1,012	1,566	7,757	11,936	. .	. .	. .	. .
<u>Average, 1948-52</u>								
Latin America	. .	. .	1,140	842	849	112	. .	. .
Africa	. .	83	95	. .	1,149	. .	. .	330
Asia	. .	. .	. .	. .	5,121	51	51	5,895
Total	. .	. .	1,184	. .	7,119	80	. .	5,383

Source: Brown, Man, Land, and Food, pp. 62, 65, 67, 70.

enced a decline in all per capita grain production, per capita grain area, and yield per acre between the pre-World War II period and the early 1950's. Food grain imports were restricted, however, by their limited foreign exchange, as they became net importers of food grains.

Since the LDCs could not produce enough food domestically to allow for a moderate standard of living as their economic growth continued, foreign imports were increased to fill the gap. As the LDCs import more and more, and confront payment, they feel forced to increase their exports of primary products, long their mainstay in foreign exchange, or of their infant manufactured goods, which can hardly compete with those of the developed countries. Further, they must deal with the market fluctuations which imperil trade in primary products. Faced with deteriorating terms of trade, and the trade policies of the developed countries, especially the United States,¹⁵ many LDCs have turned to industrialization and commercial policy for more stability. Foreign exchange is then used for both food (cheaper food, and thus grains), and capital goods needed for development. All these factors gave rise to a decline of per capita annual availability of food grains for consumption in the LDCs from 216 kilograms before the war to 194 kilograms in 1948-1952, less than half of that in the developed countries (Table VII).

¹⁵The United States has tariffs and quotas in addition to export subsidy on some primary products which are exported in competition with the LDCs internationally. Grains, cotton, and tobacco are under some form of restriction. Removing these restrictions and moving toward freer trade was believed to be in the United States' interest, as more efficient allocation of resources, enhancing United States economic and political relations, and contributing to development in the poorer nations. D. Gale Johnson, "A Sound Trade Policy and Its Implications for Agriculture," Annals of the American Academy of Political and Social Sciences, Vol. 331 (September, 1960), 8-13.

TABLE VII

PER CAPITA ANNUAL GRAIN PRODUCTION, NET TRADE, AND AVAILABILITY
BY REGIONS, AVERAGES 1934-1938, AND 1948-1952^a

Item	1934-1938	1948-1952
	- - - kilograms - - -	
<u>Developed Regions</u>		
Production	470	497
Net Trade	+15	-5
Availability	485	492
<u>Less Developed Regions</u>		
Production	224	192
Net Trade	-8	+2
Availability	216	194

^aPlus sign = net imports; minus sign = net exports.

Source: Brown, Man, Land, and Food, p. 119.

The United States is a major world grain supplier, exporting more grains yearly than all the LDCs together. In recent years, a growing amount of her grain exports have gone to these countries. While other major grain exporters have been seeking markets in the LDCs, the United States has instituted P. L. 480, a major export program for the disposal of accumulated United States agricultural surpluses.

Primary among the policy goals of P. L. 480 is the United States' hope that the surpluses may help meet the food and development needs of the LDCs, and establish future commercial markets in these countries. Success in meeting these goals has ramifications for both United States foreign policy and the LDCs' development plans. Has surplus disposal helped ease the LDCs' food problem by providing food grains beyond what these countries would have imported in the absence of P. L. 480? How far has P. L. 480 helped to meet these countries' growing need for food grains? Has P. L. 480 displaced the grain exports of nations in competition with the United States? These questions require answers on an aggregate level, considering the universality of the LDCs' food problem and the international spirit of P. L. 480. In this law United States interests and those of the LDCs come together, for the former wishes to be rid of agricultural surpluses, and the latter wishes to relieve a food problem and accelerate economic development.

Chapter III will trace the historical circumstances out of which P. L. 480 grew, and will discuss the law itself, its provisions and the controversy surrounding it. A brief outline of P. L. 480's three effects in the LDCs (trade, consumption, and production) will prepare for the detailed examination of these effects, in which the success of the law rests, in Chapters IV, V, and VI.

CHAPTER III

PUBLIC LAW 480

Historical Background

Agricultural prices in the United States, at low levels after World War I, declined further after the crash of 1929. Roosevelt's administration responded to the need in 1933 with major legislation imposing high support prices for agricultural products.¹ These prices were raised in World War II to stimulate an increase in domestic agricultural production, which had slackened, a result typical of wartime.² After the war, these support levels were not reduced fast enough to prevent the accumulation of food supplies. Also, technological advance in United States agriculture contributed to an increase in total farm production of about 50% between 1940 and 1958, and caused a large inventory problem. Thus, by the early 1950's, the United States government

¹For full detail on the historical development of these laws see D. Rasmussen and Gladys L. Baker, "A Short History of Price Support and Adjustment Legislation and Programs for Agriculture, 1933-1965," Agricultural Economic Research, XVIII, No. 3 (1966), 69-78.

²Parity acts before and after World War II had the common objectives of

. . . first, raising prices and/or incomes to some level that is considered a standard of equality (parity) with non-agriculture, and second, adjusting agricultural surpluses in order to realize the price and income goals.

Robert Tontz, "The Evolution of 'Agricultural Parity'" (Ph.D. dissertation, Oklahoma Agricultural and Mechanical College [now Oklahoma State University], 1952), p. 118.

had accumulated a formidable agricultural surplus which amounted, by 1955, to \$4,572 billion for all commodities owned by the Commodity Credit Corporation (CCC), \$2,297 billion in wheat alone.³ Domestic disposal measures such as school lunches and donations to charitable organizations were insufficient for the growing problem. Exports of agricultural products under special government programs reached between 60% and 70% of total United States agricultural exports from the post-World War II period through the Korean action. But in the early 1950's these agricultural exports fell off sharply from 1.2 billion dollars in 1950-1951 to only 0.5 billion dollars in 1952-1953.⁴ Thus the foreign disposal programs were unable to solve the surplus problem.

For foreign policy reasons, the United States avoided extensive foreign disposal outlets: such programs could harm world trade in, and prices of, the products in question.⁵ The FAO had tried twice, without success, to establish international control over surplus disposal. The first attempt was the International Commodity Clearing House (ICCH), proposed in 1949 for the purpose of negotiating sales of surpluses in nonconvertible currencies or at concessional prices. In 1955 came the World Food Reserve (WFR), with the intended purpose of controlling the disposal of recurrent agricultural surpluses. Both were rejected, mainly because of the lack of an international commitment on the part

³Statistical Abstract of the United States, 1969 (Washington, D.C.: Government Printing Office, 1969), p. 606.

⁴Cochrane, "Farm Technology," p. 889.

⁵Frederick C. Dirks, "U. S. Exports of Surplus Commodities," International Monetary Fund Staff Papers, V, No. 1 (1956), 200.

of the surplus-producing countries, and because of the difficulty of achieving the proposed objectives through a single international organization.⁶

United States food aid may be said to have begun in 1953, when the United States Mutual Security Act was amended to allow the use of \$250 million of foreign aid funds to buy surplus agricultural commodities. Agricultural surpluses thus came into use in addition to and in substitution for other forms of aid.⁷ In 1954, however, special legislation was enacted, aimed mainly at disposal of agricultural surpluses and the improvement of the United States' agricultural foreign policy. This was the United States Agricultural Trade Development and Assistance Act, commonly known as P. L. 480. Although this Act provided the "most comprehensive programs designed specially for disposal abroad of surplus farm commodities other than sales",⁸ pronouncements about its other objectives were perhaps overly optimistic. It was hoped that in addition to the accomplishment of its principal objectives, the Act would also expand United States exports of farm products in excess of usual commercial marketings without disrupting world trade, prices, and production of these products; and that it would stimulate economic development in friendly nations by allowing them to pay for surplus

⁶For more detail on these proposals, see United Nations, Food Aid and Other Forms of Utilization of Agricultural Surpluses, pp. 12-13; and J. P. O'Hagan and T. Lehti, "Some Economic and Policy Problems of Food Aid," Monthly Bulletin of Agricultural Economics and Statistics, XVII, No. 2 (1968), 1-12.

⁷FitzGerald, Operational and Administrative Problems, p. 1.

⁸O. B. Jesness, Trade, Aid, and Surplus Disposal, Public Affairs No. 4 (St. Paul: University of Minnesota Agricultural Extension Service and General Extension, 1961), p. 4.

products with their local currencies, part of which might be returned to them as loans or grants.⁹

P. L. 480 was enacted under three Titles, the first of which authorized sales of agricultural surpluses to foreign countries for payment in their currencies, the use of these currencies (counterpart funds, also called use currencies) being strictly limited by law. Title II provided for donations of surpluses as foreign relief to disaster victims, and Title III (in two programs) gave welfare organizations, domestic and foreign, donations of surplus food and allowed the CCC to barter surpluses for goods needed for United States national stockpiles. Title IV, passed in 1959, authorized the President of the United States to make long-term, low-interest contracts for the sale of surpluses, with payments to be made in dollars for a period of up to twenty years.

Amendments have expanded P. L. 480's original limits. In 1957 the "Cooley Loans" amendment allowed AID to use up to 25% of the fund accumulated under Title I for loans to American and foreign private businesses in order to increase their demand for United States agricultural products. In 1961 an amendment to Title II authorized grants of surplus agricultural commodities for development purposes in the less developed countries. And in 1962, United States and foreign private trade enterprises were allowed to enter into dollar credit sales agreements.

In the early 1960's, the United States government began to see P. L. 480 as a potential instrument of foreign policy. Though the most

⁹Agricultural Trade Development and Assistance Act of 1954 and Amendments, comp. by Gilman G. Udell, Superintendent of Documents (Washington, D. C.: Government Printing Office, 1966), p. 1.

important function of the Act remains that of surplus disposal, that function has been expanded to promote "international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes."¹⁰ The name "Food for Peace", which referred to all food aid programs and was applied mainly to P. L. 480 in the early 1960's, reflected this changed attitude.¹¹

1966 brought further modification of the law. For one, the original limitation of the law to surplus commodities was removed. A surplus commodity, under P. L. 480, would now be designated as such by the Secretary of Agriculture; its disposition would not ". . . reduce the domestic supply of such commodity below that needed to meet domestic requirements, adequate carryover, and anticipated exports for dollars. . . ." ¹² This new approach was of special help to India when she was faced with starvation after the bad monsoon season of 1966. The law also emphasized that P. L. 480 recipient nations are those which are already moving to improve their domestic agricultural production and to control their population growth. As a third measure, the law now provided

¹⁰ According to Cochrane, in The World Food Problem, p. 125: . . . the concept of foreign food aid has changed to an important degree over 50 years [since World War I]. Food aid was first conceived as a weapon of war; next it was viewed as a humanitarian gesture to starving people caught in the aftermath of war; next as a political weapon to minimize political unrest; then as a measure of disposing of unwanted food surpluses; and now as a resource to be used in the support of economic development.

¹¹ President Kennedy established the White House Office of Food for Peace on January 24, 1961. Food for Peace, The Food Aid Program, and Food for Freedom are all names for Public Law 480.

¹² Agricultural Trade Development and Assistance Act, p. 51.

assurance of a progressive transition from sales for foreign currencies to sales for dollars by December 31, 1971. The transition began in 1966, with the transfer of dollar credit sales to governments and private businesses abroad (Title IV of 1959 and its amendment of 1962) to Title I.¹³

P. L. 480's four amended Titles cover the following operations:¹⁴ concessional sales are carried out under Title I. These include sales for local currency, long-term dollar credit, and local currency credit. Title II covers donations and disaster relief, particularly in cases of famine and malnutrition. Malnutrition relief goes mainly to children, through preschool feeding and school lunch programs. Title II aid goes also for general community improvement. Friendly governments, private and public agencies (including the United Nations World Food Program), and non-profit voluntary agencies which have been approved by the Advisory Committee on Voluntary Foreign Aid administer this aid. The CCC pays for the preparation and transportation of the aid. Under Title III the CCC is authorized to conduct barter activities, in which P. L. 480 commodities are exchanged for foreign strategic materials and equipment not produced in the United States in sufficient quantity for the national stockpiles; or for foreign economic and military aid to friendly nations, partially for mutual security interest. This aid is carried for the most part through private trade channels.

¹³A detailed analysis of these four Titles as of January, 1968, appears in Andersen's "Role of Food, Feed, and Fiber," pp. 17-27.

¹⁴O. H. Goolsby, et al., P. L. 480 Concessional Sales (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 65, 1970), pp. 4-5.

Title IV -- general "administrative provisions" and requirements -- states the philosophical, political, and economic intentions of the Act. (P. L. 480 assistance, while meeting the needs of hungry people abroad, serves the United States' interest also.) This Title defines agricultural commodities as ". . . produced in the United States or manufactured in the United States from an agricultural commodity." Two organizations have been founded under the authority of Title IV, one of which helps farmers in recipient countries to increase their agricultural productivity, and enables farm youths and leaders to visit the United States. The other is an advisory committee which deals with general practices such as terms of credit sales, conditions for self-help, foreign currency allocation, and exchange rates determination. It thus acts as a built-in check system for the operation of the Act.

Issues Surrounding P. L. 480

During its seventeen years of operation, P. L. 480 has been the subject of foreign and domestic disputes. Earl L. Butz, then Assistant Secretary of Agriculture, anticipated some of them as early as 1955, when he expressed the fear of upsetting world markets, international relations, and world prices of the commodities handled under P. L. 480.¹⁵ Domestic opponents feared the Act would become a "give-away" program, "masking the loss" of the CCC in overseas transactions, and hindering United States commercial sales. Domestic supporters considered the Act a "permanent expansion of our exports of agricultural products, with

¹⁵"We Can't Just Send Our Farm Surpluses Overseas," Foreign Agriculture, XIX, No. 1 (1955), 9.

lasting benefits to ourselves and peoples in other lands."¹⁶

International apologists argued P. L. 480's humanitarian effect of feeding hungry people abroad, providing resources for economic development, and finding new markets for United States farm products.¹⁷ However, critics insisted that the law is a "dumping policy", that it has been a ". . . crude technique of price-cutting and will have detrimental effects on American commercial sales, as well as commercial sales of friendly competing nations. . . ."¹⁸ It would, they said, depress the agricultural production of recipient countries by reducing their domestic agricultural prices,¹⁹ and have a doubtful impact on their economic development.²⁰ Also, the use of the counterpart funds held by the United States in and for the recipient countries drew criticism for being restricted and inflexible, and because the currencies might cause infla-

¹⁶Peter A. Toma, The Politics of Food for Peace (Tucson: The University of Arizona Press, 1967), p. 41.

¹⁷J. S. Mann and Willard W. Cochrane, Food-for-Peace, Minnesota Farm Business Notes No. 470 (St. Paul: University of Minnesota Agricultural Extension Service, Institute of Agriculture, 1965), p. 3.

¹⁸R. L. Kristjanson, "Wheat," Annals of the American Academy of Political and Social Sciences, Vol. 331 (September, 1960), 72. Also, according to Cochrane, in "Farm Technology," p. 891:

Our first efforts at surplus disposal in the 1950's were very crude. We turned our agricultural attachés into order takers; we sent huckster teams around the world to find new markets; we engaged in barter; we pushed our surpluses hard. How much these concessional sales cut into the export markets of such friendly nations as Canada, New Zealand, and Denmark we will probably never know. . . .we have become sophisticated dumpers.

¹⁹Fisher, "A Theoretical Analysis," pp. 863-75.

²⁰Vinod Dubey, "Food Aid and Economic Development in Underdeveloped Countries," The Indian Journal of Economics, XLV, No. 177 (1964), 167-97.

tion when spent in the recipient countries. Inflation would result because these countries would always find it easy to use the currencies to meet needed expenditures for economic development and defense, among others. Also, the recipient countries argued that the use of the funds was inflexible when they attempted to channel them into projects of their own choosing rather than those supporting United States interests. Further, national pride in the less developed recipients causes distrust of what appears to be "charity" aid.²¹ Theodore Schultz recognized another problem with these counterpart funds:

It is indeed a serious misconception to treat the vast sums of foreign currencies that have been deposited and are being deposited to the account of the U. S. Embassies abroad as if they were hard money that will eventually be converted into dollars. . . . It is high time that the United States adopt a policy of reducing very substantially these exceedingly large balances of U. S. owned foreign currencies.²²

One additional issue related to the effectiveness of P. L. 480 is its uncertainty in meeting the long-run economic plans of the LDCs. There is no assurance of its continuation, or of its future sales conditions. It is not suggested here that P. L. 480 sales should go on forever, but they cannot be stopped abruptly when they are counted on as economic resources for development plans in these countries. Indian authorities, for example, have emphasized that India

²¹Jan Dessau, The Role of Multilateral Food Aid Programs (Rome: Food and Agriculture Organization of the United Nations, World Food Program Studies, No. 5), 1965, p. 1.

²²In "Impact and Implications of Foreign Surplus Disposal," p. 1026. For more discussion of the counterpart funds, see Edward S. Mason, "Foreign Money We Can't Spend," Atlantic Monthly, May, 1960, pp. 79-86; and Khatkhate, "Real Effects of Foreign Surplus Disposal," pp. 186-96.

. . .should not start any programme on the basis of P. L. 480 assistance which could not be later carried out with her own resources with some tightening of the belt, if necessary, . . .there should be at least an informal, if not a formal, understanding that the programme should continue for a certain minimum period and should not be stopped half-way without notice.²³

Reasonable precautions have also been mentioned for P. L. 480, to safeguard the usual commercial markets of the United States and assure that the concessional sales will not endanger world prices of agricultural products or the normal patterns of commercial trade with friendly countries.²⁴ Defending P. L. 480 against most of the above criticisms will require the evaluation of some of these precautions.

One is the usual marketing requirements (UMR), which limits exports to friendly countries and is normally based on the actual quantity of commercial import during recent years. UMR may be changed if there is a change in the recipient's ability to import commercially. Other precautions prohibit recipient countries from reexporting their received P. L. 480 products without the United States' approval, and limit their exports of products which are the same as, or like, the products of P. L. 480 sales. A fourth safeguard assures that the United States will seek a "fair share" of the recipient's increased commercial imports.²⁵ In line with United States commercial trade assurances, there is a

²³Sen, "Impact and Implications of Foreign Surplus Disposal," p. 1033.

²⁴Goolsby, et al., P. L. 480 Concessional Sales, pp. 19-20.

²⁵P. L. 480 recipients must purchase a specific amount of their foreign commercial imports of agricultural products from the United States. This arrangement is called "tied sale" or "tied usual." See Harry W. Henderson, comp., Dictionary of International Agricultural Trade (Washington, D. C.: U. S., Department of Agriculture, Foreign Agriculture Service, Agriculture Handbook No. 411, 1971), p. 147.

provision for "third country consultation", whereby commercial competitors of the United States who already have trade agreements with the prospective P. L. 480 recipient are consulted before concessional trade agreements are contracted.

But taking all of these precautions does not in reality guarantee that there will be no negative effect from P. L. 480 on the economies of the United States, her competitors, or the recipients.

Willard W. Cochrane has proposed seven ways to make the surplus disposal programs more acceptable to the United States, her recipients, and her competitors:

- 1) Surplus agricultural commodities will be used solely to finance economic development, except when used for famine or disaster relief;
- 2) Should agricultural surpluses be committed to a foreign country for a development project, they will become classified as "development supplies" and become a part of the aggregate demand for United States farm products;
- 3) Financing of aid would be arranged in a manner agreeable to the recipient - grants, loans, sales for national currencies. The basic objective would, as always, be accelerated economic development;
- 4) Recipients of surplus food aid must be able to demonstrate that these "development supplies" have not reduced their "normal" imports from other countries;
- 5) Agreements to finance the purchase of other needed goods and services besides food aid should be undertaken;
- 6) United States competitors in commercial sales, who themselves have considerable agricultural surpluses, should be invited to share in the development aid programs.

7) Until a development aid program can be organized world-wide, the FAO or another United Nations agency should have the responsibility of distributing agricultural surpluses to needy nations.²⁶

Cochrane made these same suggestions in his plan for connecting the surplus disposal of agricultural products with domestic supply control to meet the surplus problem of the supply of food and fiber while financing economic development in the LDCs.²⁷ Clearly P. L. 480, with all its effects on the economies of the recipients, the donor, and the donor's foreign competitors, has not satisfied all of them; many issues remain without satisfactory investigation or resolution.

P. L. 480 Magnitude and Components

Since the United States is a principal world food supplier, an agricultural surplus disposal program of the magnitude of P. L. 480 can be expected to produce some world-wide economic effects on recipient countries and on the United States' competitors in the trade of particular commodities. Table VIII on the following page shows the United States' total relative share in world exports of selected grains. Table IX gives the relative share of P. L. 480 in total United States exports of agricultural commodities during the fifteen years of the law's operation (1954-1969). This share was 23% (\$18,623 million). By comparison, the Mutual Security Programs (AID) had a relative share of

²⁶ "Public Law 480 and Related Programs," Annals of the American Academy of Political and Social Sciences, Vol. 331 (September, 1960), 18-19.

²⁷ "Farm Technology," pp. 893-94.

TABLE VIII

PERCENTAGE U. S. SHARE OF AVERAGE ANNUAL WORLD EXPORTS (GROSS)
OF SELECTED GRAINS, 1854-1858 TO 1952-1956

Grains	1854-1858	1884-1888	1909-1913	1924-1928	1934-1938	1952-1956
	- - - per cent - - -					
Wheat	24.9	35.8	14.5	22.1	8.0	33.5
Corn	36.3	44.2	16.2	5.7	8.0	50.3
Rye	.8	2.5	.7	34.3	4.1	8.1
Barley	-	.8	3.3	19.6	7.9	16.9
Oats	-	2.6	4.3	11.8	5.7	11.3

Source: Robert M. Stern, "A Century of Food Exports," Kyklos, XIII (1960), 58-60.

TABLE IX

U. S. AGRICULTURAL EXPORTS UNDER SPECIFIED GOVERNMENT-FINANCED PROGRAMS:
VALUE AND PERCENT OF TOTAL AGRICULTURAL EXPORTS, CALENDAR YEARS
1955 THROUGH 1969 AND JULY-DECEMBER 1954

	Total Public Law 480	Mutual Security (AID)	Total P. L. 480 Total Ag. Exports	Mutual Security (AID) Total Ag. Exports
	- million dollars -		- - - per cent - - -	
1954 (Jul-Dec)	70	211	5	13
1955	767	351	24	11
1956	1262	449	30	11
1957	1218	318	27	7
1958	1019	214	26	6
1959	1050	158	27	4
1960	1304	157	27	3
1961	1304	179	26	4
1962	1444	35	29	*
1963	1509	11	27	*
1964	1621	23	26	*
1965	1323	26	22	*
1966	1306	47	19	1
1967	1229	33	19	1
1968	1178	11	19	*
1969	1018	n.a.	17	n.a.
1955-69 and Jul- Dec 1954	18622	2223	23	3

* means less than 0.5 percent

n.a. means not available

Compiled from: U. S., Department of Agriculture, Foreign Agricultural Trade of the United States (Washington, D. C.: Economic Research Service, June, 1970), p. 7.

only 3% (\$2,223 million) for the same period. The P. L. 480 relative share was highest in 1956 (30%), and lowest in 1969 (17%).

The concern here is primarily with the quantity of food grains rather than with their quality, which may be measured in terms of protein and carbohydrate and vitamin content. By emphasizing quantity, this study relies on what M. K. Bennett calls the

. . . broad but eminently reasonable assumption that people are more deeply and fundamentally concerned with satisfying their hunger than with pleasing their palates or obtaining an appropriate balance of the nutritive elements.²⁸

This assumption will likely prove even more correct when applied to the less developed countries.

Having seen the importance of United States agricultural exports among world exports, and of P. L. 480 exports to United States agricultural exports, we may next examine the importance of food grains in the P. L. 480 programs. From July 1, 1954, through December 31, 1966, food grains and products in which wheat was the main ingredient made up 67% of the value of all commodities shipped under P. L. 480. Food grains have also dominated the programs administered under the individual Titles. From 1954 to 1966 food grains accounted for more than 50% of the total shipments to 38 countries under Title I (73% of all Title I recipients), 68 countries under Title II (86% of all Title II recipients), and to all countries receiving foreign donations under Title III. Food grains made up more than 50% of Title IV shipments to 27 countries (72% of all Title IV recipients) between July 1, 1961, and December 31,

²⁸ Food for Postwar Europe: How Much and What? War-Peace Pamphlet No. 5 (Stanford, California: Stanford University, Food Research Institute, 1944), p. 43.

1966.²⁹ Table X on the following page further illustrates the importance of food grains, outlining the share of food grains in P. L. 480 shipments from July 1, 1954, through December 31, 1969; the share is 67%. Food grains dominated individual programs, except for donations through voluntary relief organizations. Food grains were over 70% of total P. L. 480 shipments under each of the programs.

P. L. 480 Interest in the LDCs

Although P. L. 480 programs encompass both developed and less developed countries, they have been of particular importance to the latter. United States concessional sales have been greater than commercial sales to the LDCs since 1957, but the margin began to narrow in the late 1960's. In terms of grains, for example, the United States accounted for nearly 98% of non-commercial wheat exports to the LDCs in the early 1960's; by the mid-1960's, this proportion had declined to 94%, and during 1969 it dropped to 75%.³⁰

There are certainly purely practical reasons for giving food aid to the less developed countries:

- 1) The LDCs need help, and the United States has the resources to meet their needs.
- 2) Establishing a foundation of friendly relations with the LDCs will serve both world peace and the United States' national interest: by the year 2000, the combined population of the LDCs will be four times that of the developed countries.

²⁹Calculations are based on several tables in U. S., Congress, House, The Food Aid Program, 1966: Annual Report on Public Law 480, 90th Cong., 1st sess., 1967, H.D. 179.

³⁰Quentin M. West, "Developing Countries and U. S. Agricultural Trade," War on Hunger: A Report from AID, IV, No. 5 (1970), 15.

TABLE X

PUBLIC LAW 480 FOOD GRAIN EXPORTS, VALUE OF COMMODITIES SHIPPED, AND THEIR SHARES
IN TOTAL P. L. 480 EXPORTS, JULY 1, 1954, THROUGH DECEMBER 31, 1969

Commodity	Sales for Foreign Currency	Long-term Dollar and Convertible Foreign Currency Credit Sales	Government-to-Government Donations for Disaster Relief and Economic Development	Donations Through Voluntary Relief Agencies	Barter ^a	Total Public Law 480
- - - - thousands of dollars - - - -						
P. L. 480 Grains and Products ^b	8,325,057	1,193,547	850,001	932,823	1,232,794	12,534,222
P. L. 480 Other Products ^c	3,437,180	392,078	265,798	1,497,532	498,384	6,090,972
Total P. L. 480 Exports	11,762,237	1,585,625	1,115,799	2,430,355	1,731,178	18,625,194
- - - - per cent - - - -						
<u>Total P. L. 480 Food Grains</u> Total P. L. 480 Exports	0.707	0.752	0.761	0.383	0.712	0.672

^aExcludes exports after December 31, 1962, made under barter contracts which result in balance-of-payments benefits and rely primarily on authority other than Public Law 480.

^bIncludes wheat, wheat flour, bulgur wheat, rolled wheat, corn, barley, grain sorghums, oats, rolled oats, rye, mixed feed grains, rye flour, cornmeal, and rice.

^cIncludes fats and oils, oil seeds and meal, dairy products, meat and poultry, fruits and vegetables, and others.

Compiled from: U.S., Congress, House, 1969 Annual Report on Public Law 480: Food for Peace, 91st Cong., 2d sess., 1970, H.D. 91-352.

- 3) If the LDCs become trading nations, and help expand United States commercial markets, the food aid will have been a valuable investment for the future.³¹

Mason summarized the United States' interest in the less developed countries as involving humanitarian, economic, and security purposes.³²

P. L. 480 and Other Food Aid Programs

Compared with P. L. 480 programs, food aid from other sources, bilateral and multilateral, has been limited indeed.³³ Canada, France, Australia, and West Germany, the only other countries with considerable food aid programs, handled a total of \$251 million in aid from 1952 through 1963; the United States exported \$9.9 billion during that same period, mainly through P. L. 480.³⁴

Food aid provided by all multilateral agencies, such as the World Food Program (WFP) and the United Nations Relief and Rehabilitation Agency (UNRRA), totaled only \$44 million in 1963, and increased to only \$91 million by 1968, a small amount compared with P. L. 480 sales. The UN and FAO-sponsored WFP gives food aid to the LDCs to help meet emergencies and finance economic and social projects. Yet from its incep-

³¹John Pincus, Reshaping the World Economy (Englewood Cliffs, New Jersey: Prentice-Hall, 1968), pp. 62-63.

³²"American Interests in Underdeveloped Areas," in America's Foreign Policy, ed. by Harold Karan Jacobson (New York: Random House, 1960), pp. 554-60.


³³Other agencies such as UNICEF and the World Health Organization provide a very limited amount of food to needy people in the LDCs.

³⁴Frank D. Barlow and Susan A. Libbin, "The Role of Agricultural Commodity Assistance in International Aid Programs," Foreign Agricultural Economics (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 118, 1965), p. 14.

tion in 1963 through 1969, the WFP disbursed only \$267 million in aid to developing countries, mostly in the form of wheat and flour. The United States is the major contributor to the WFP, giving mainly food (through P. L. 480), ocean transportation, and a small cash donation (through AID). The United States' pledge to the WFP from the time of its establishment until 1972 has reached \$298.3 million.

The United States is also a principal participant in the Colombo Plan, begun in 1951 to help further general economic development in Asia.³⁵ By mid-1969 the United States had contributed about 87% of the Plan's total aid of almost \$30 billion, in the form of P. L. 480 commodities, industrial equipment, and AID assistance, with the goal of increasing agricultural technology and production in the recipient countries.

The Three Effects of P. L. 480



The preceding discussion of P. L. 480 suggests the following conclusions. However diversified many of P. L. 480's aims and concerns may be, the Act's trade, consumption, and production effects in the LDCs have occupied most of the studies of this system.

The following chart puts together the main economic variables and the types of problems involved in analyzing these three effects. Although some of the less developed countries are net food grain exporters, as a group they are net importers of food grains, as the chart shows. In addition, the chart summarizes the main questions of the

³⁵The other major donor countries are the United Kingdom, Canada, Australia, New Zealand, and Japan. Henderson, Dictionary of International Agricultural Trade, p. 25.

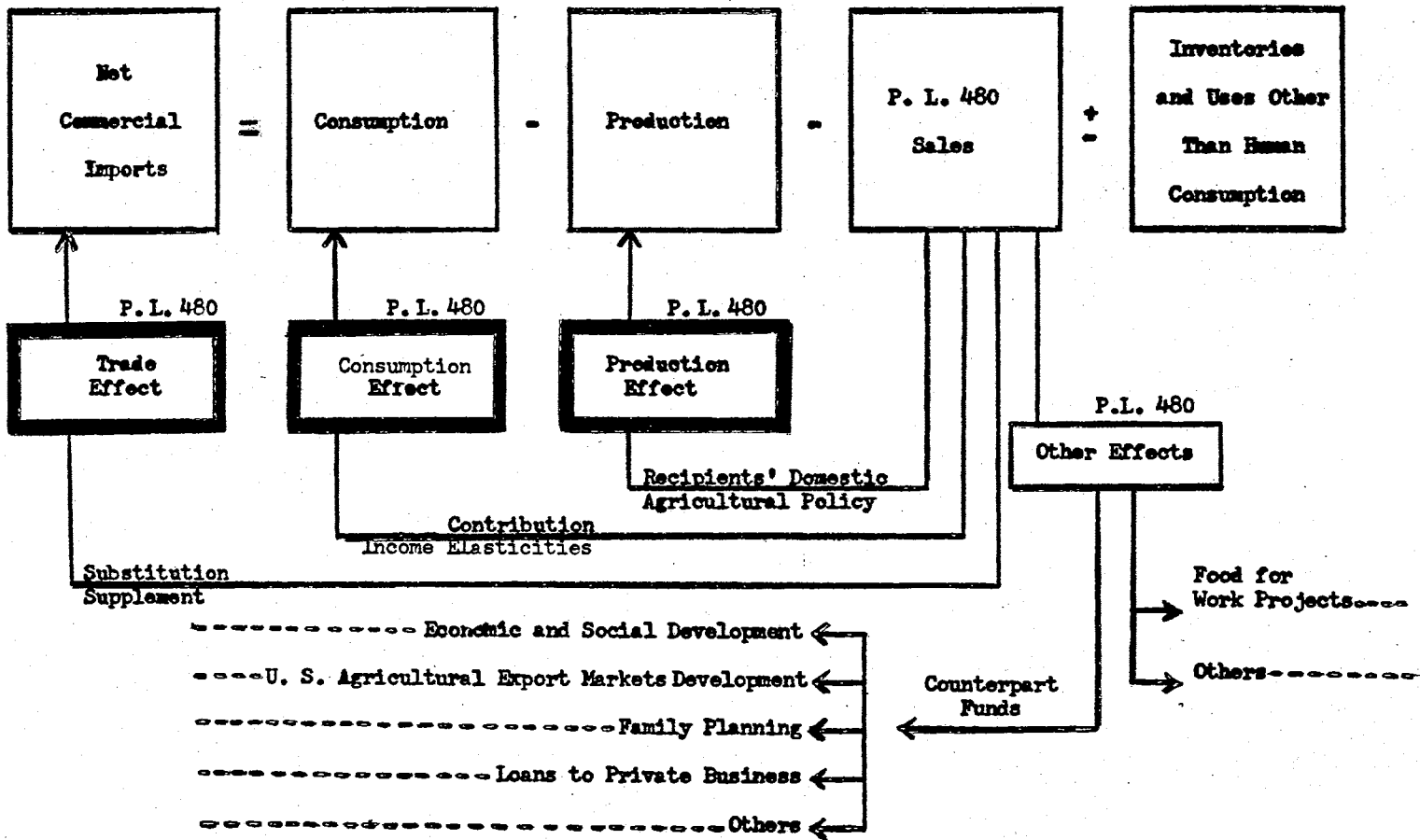


Figure 1. The Relationship and Emergence of P. L. 480 Trade, Consumption, and Production Effects in the Less Developed Countries

coming three chapters:

- A) Were P. L. 480 sales substitutes for, or supplements to, the net commercial trade of food grains of the less developed countries?
- B) What were the income elasticities, and the contribution of P. L. 480 sales to the food grain consumption, of the less developed countries?
- C) What was the effect of P. L. 480 on the production of food grains in the less developed countries, especially through their domestic agricultural policy?

CHAPTER IV

X

P. L. 480 TRADE EFFECT IN THE LESS DEVELOPED COUNTRIES

The Setting

P. L. 480 was enacted at a time when the less developed countries were relying more and more on foreign sources of food grains, especially the United States. Controversy has arisen over P. L. 480's effect on their commercial grain imports. Have they increased their grain imports because of P. L. 480 and at the expense of exporters in competition with the United States, or have they considered these concessional supplies to be additions to their commercial imports in order to increase their food grain consumption? The diagram on the following page illustrates the possible situations of P. L. 480 shipments as complement, substitute, or neutral (independent) to the LDCs' commercial imports.¹

¹Complementarity and substitution are used here in a broader sense than the well-known Hicks definitions of the terms. According to Hicks, product X is a substitute for product Y if $\frac{\partial X}{\partial P_Y} > 0$; that is, as the price of product Y (P_Y) increases, the demand for product X increases, assuming that prices of all other products remain the same, and that the consumer is income-compensated so as to leave him at the same level of satisfaction as before the change in P_Y . With these same assumptions, X is a complement to Y if $\frac{\partial X}{\partial P_Y} < 0$, and independent of Y if $\frac{\partial X}{\partial P_Y} = 0$. Commercial sales and most P. L. 480 shipments are valued at export market prices; thus Hicks' definitions do not apply, for P_X must be constant as P_Y changes. However, commercial and P. L. 480 sales differ mainly in their terms of payments; the latter is "softer", allowing local currency or long-term dollar payments, or being waived altogether. See J. R. Hicks, Value and Capital (Oxford University Press, 1939), pp. 309-12.

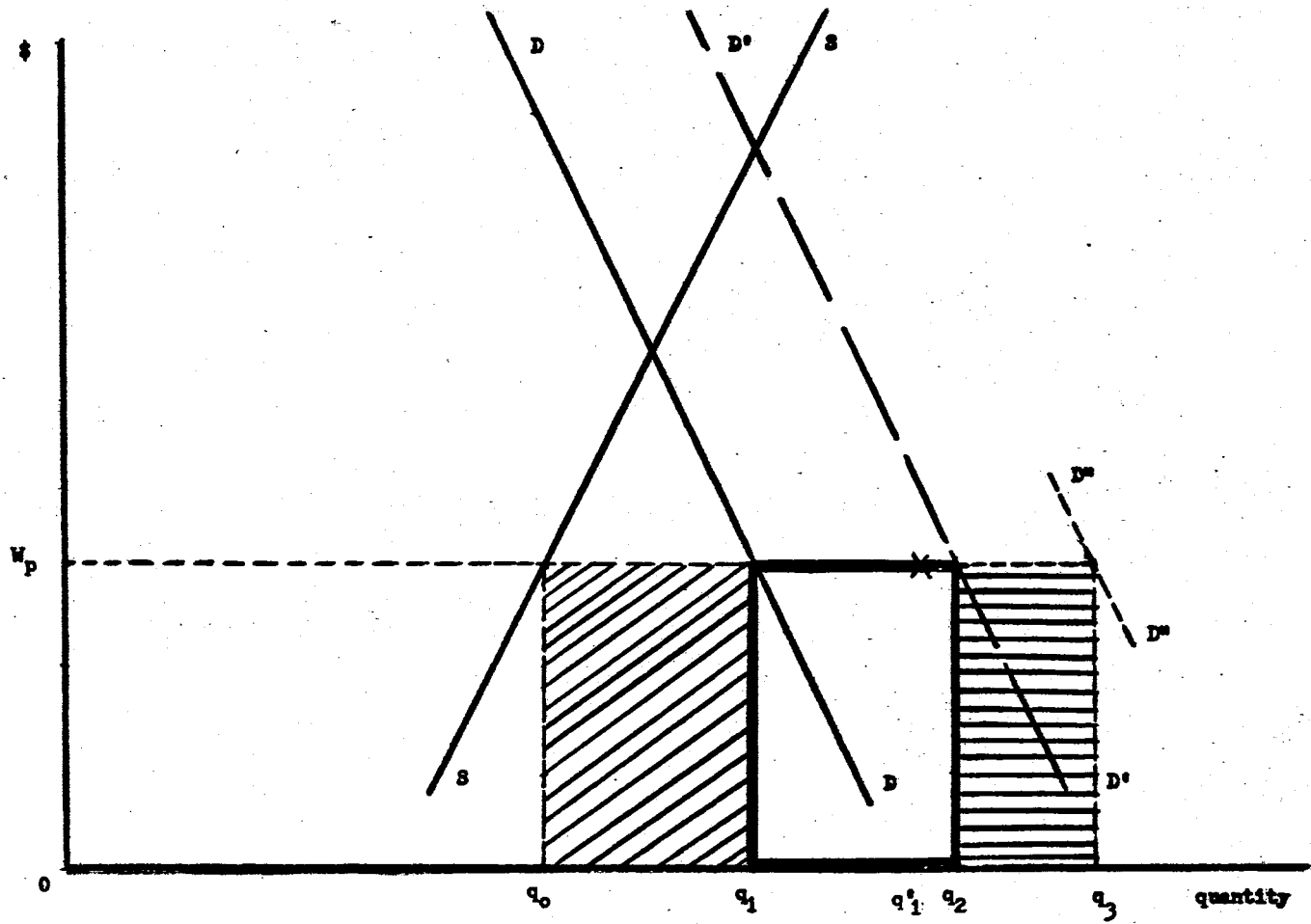


Figure 2. Alternatives of P. L. 480 Trade Effect
in the Less Developed Countries

Case I: P. L. 480 as a Perfect Substitute for Commercial Imports

The LDCs' demand and domestic supply of food grain (W) - wheat, for example - are represented by D D and S S curves. At the world price of wheat, W_p per metric ton, domestic production (Oq_0) falls short of meeting the quantity demanded (Oq_1) by $q_0 q_1$ metric tons of imported wheat. As D D shifts to D' D' as a result of a rise in per capita income, with S S remaining the same, additional imports of $q_1 q_2$ metric tons of wheat are expected at W_p , bringing the total commercial imports to $q_0 q_2$. If P. L. 480 shipments are $q_0 q_2$ metric tons of wheat, then the law has replaced all the commercial imports of wheat that would otherwise have taken place. The same result of perfect substitution is obtained if P. L. 480 shipments are less than or equal to, for instance, $q_0 q_1$, which are actual imports less than what was expected because of non-income determinants of wheat imports. In these situations P. L. 480 is a perfect substitute for commercial trade.

Case II: P. L. 480 as a Perfect Complement to Commercial Imports

After the LDCs import commercially the quantity $q_0 q_2$, they may receive $q_2 q_3$ metric tons of wheat from the United States under P. L. 480 as a humanitarian gesture to increase their food grain consumption, or to introduce them to United States food grains for economic reasons, since they may become importers. Actual imports are thus greater than what was expected, and P. L. 480 is trying, through favorable taste and preference for United States wheat, to cause a shift in the LDCs' demand from D' D' to D'' D''. Therefore, P. L. 480 shipments of $q_2 q_3$ metric tons of wheat are in addition to expected commercial imports, and are a

perfect complement to commercial wheat imports.

Case III: P. L. 480 as Part Substitute and Part Complement to Commercial Imports

If, with the shift in demand from $D D$ to $D' D'$, the LDCs import commercially only $q_0 q_1$ metric tons of wheat, but receive $q_1 q_3$ metric tons through P. L. 480, then the law substitutes expected commercial imports of $q_1 q_2$ metric tons of wheat and complements that with the further quantity $q_2 q_3$. In this case, P. L. 480 partially substitutes and partially complements commercial imports of the product in question.

Case IV: P. L. 480 as Neutral (Independent) to Commercial Imports

In this case, as demand shifts to $D' D'$, the LDCs' actual commercial wheat import ($q_0 q_2$) is equal to what was expected in the absence of P. L. 480, and they do not receive any shipment under the law.

Substitution and complementarity are not new ideas, and are not confined to P. L. 480. Since World War II, numerous empirical studies have attempted estimates of the elasticity of substitution in the international trade of competing countries.² Most of these dealing with P. L. 480's trade effect on the United States' competitors treated those competitors individually: the impact of P. L. 480 sales on Canadian wheat or Pakistani cotton, for example.³ Should a substitution effect

²Robert M. Stern and Elliot Zupnick, "The Theory and Measurement of Elasticity of Substitution in International Trade," Kyklos, XV (1962), 580.

³For examples of the consequences of P. L. 480 on Canadian wheat, and agriculture generally, during the early years of the law's operation, see G. E. Britnell, "The Implications of United States Policy for the Canadian Wheat Economy," The Canadian Journal of Economics and Political Science, XXII, No. 1 (1956), pp. 1-16.

emerge from this study, it will be traced to find out whether it was at the expense of United States commercial exports of food grains; those of other developed countries; or those of the less developed countries.⁴

Scanning the development of predictive trade models in recent years will help explain the use of this study's model for the prediction of the LDCs' food grain imports had P. L. 480 not been enacted.⁵ Originally such models dealt with single countries on a short-term basis, but in the 1950's they became international in scope and outlined long-term trends. This change resulted from the increasing interdependence of the world community, growing interest in the problems of underdevelopment, and concern that development is proceeding so slowly in much of the world. Also, more comprehensive models are possible now because reasonably standardized economic data are becoming available from most nations.

Most current world economic models are "gap models", one of which hypothesizes rates of economic growth for the LDCs, often unrealistically, and derives their imports from the developed countries from these growth rates, using import functions.⁶ Imports of the developed coun-

⁴For this purpose, the world is divided into four parts: the United States, other developed countries, the less developed countries (LDCs), and the communist countries. The developed countries are Canada, Japan, the countries of the EEC (European Economic Community) and the EFTA (European Free Trade Association), Cyprus, Finland, Malta, Greece, Iceland, Ireland, Spain, Australia, New Zealand, and South Africa. The communist countries are the U. S. S. R., Eastern Europe (Albania, Poland, Bulgaria, Czechoslovakia, East Germany, Hungary, Romania, Yugoslavia), and communist Asia (mainland China, Mongolia, North Korea, and North Vietnam).

⁵H. Glejser, "Predictive World Models," in Megistos: A World Income and Trade Model for 1975, ed. by C. Duprez and E. S. Kirschen (Amsterdam: North-Holland Publishing Company, 1970), pp. 3-15.

⁶For an explanation of explanatory variables usually used in import demand analysis, see Edward E. Leamer and Robert M. Stern, Quantitative International Economics (Boston: Allyn & Bacon, 1970), p. 13.

tries from the LDCs are similarly estimated. The difference between these trade flows is called the LDCs' trade gap, which must be filled by an influx of foreign capital and aid. Therefore, foreign aid is based on the gap between the LDCs' foreign exchange earnings and import requirements. Models by Maizels, Balassa, and the GATT are examples of this approach. Since the objectives of this study are not to find the "optimum" amount of foreign aid, or of food grains in such aid, needed to fill the LDCs' trade gap, the use of trade gap models here will not be appropriate.⁷

Other models projected grain imports of the LDCs to be the difference between their adjusted production and adjusted demand for these products. These models thus required a set of supply and demand equations.⁸ Although these equations include many assumptions and variables,⁹ income and population were treated as key variables in the

⁷Several studies have tried to estimate aid requirements of the LDCs: for example, Jaroslav Vanek, Estimating Foreign Resource Needs for Economic Development (McGraw-Hill, 1967); and Robin Marris, "Can We Measure the Need for Development Assistance?" The Economic Journal, LXXX, No. 319 (1970), 650-67.

⁸In addition to the many FAO models, see John E. Hutchison, James J. Naive, and Sheldon K. Tsu, World Demand Prospects for Wheat in 1980 with Emphasis on Trade by Less Developed Countries (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 62, 1970); and Donald W. Regier and O. H. Goolsby, Growth in World Demand for Feed Grains: Related to Meat and Livestock Products and Human Consumption of Grain, 1980 (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 63, 1970).

⁹Although Lars G. Sandberg admits that "Projections of supply and demand as well as estimates of price elasticities are all subject to considerable error", he used a "set of projections for world production of and demand for grain, given current prices and policies" in his study, "International Trade in Grains: Projections and United States Policy," The Review of Economics and Statistics, XLVIII, No. 2 (1966), 161.

demand for grains.

Skepticism about the effect of international grain prices on the imports of these products by the LDCs has arisen because, from the mid-1950's to 1960/61, export prices of grains fluctuated within relatively narrow limits. Also, United States and Canadian policies of holding stocks have kept prices within the agreed range of the international wheat agreements.¹⁰ International prices may, after all, be invalid as bases for judgment, because ". . .there are few foodstuffs traded today on freely competitive markets."¹¹

Arthur B. Mackie recognized this positive relationship between per capita incomes and the demand for agricultural products; he used regression analysis to predict world market potentials for United States agricultural products in 1980 through income elasticities of imports.¹² He suggested that this methodology be used to study market potentials for specific commodities also. This study, for different purposes, uses Mackie's elasticities of imports approach for food grains to analyze the P. L. 480 trade effect. Though other factors affect imports, such as domestic supply, balance of payments, foreign exchange reserves, and government trade policies, the change in per capita income is the most critical, because it determines demand: ". . .if a general increase in

¹⁰International Wheat Council, Trends and Problems in the World Grain Economy, 1950-1970 (London, April, 1966), pp. 15 and 5.

¹¹Stern, "Regional Pattern," footnote 3, p. 266.

¹²Foreign Economic Growth and Market Potentials; see also his article, "International Trade and Economic Growth," in Foreign Agricultural Trade of the United States (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, March, 1964), pp. 5-17.

the effective demand for agricultural and other products is not met domestically, it will spill over national boundaries and increase the total demand for imports."¹³

The LDCs will be divided into nine regions in order to facilitate aggregate comparisons among them for the purpose of studying P. L. 480 effects: for instance, which region or regions have been most influenced by the law's three effects. The nine regions are Latin America, North Africa, West Africa, East Africa, West Asia, South Asia, South East Asia, Other East Asia, Far East and Oceania.¹⁴ Basic grain trade data on these regions are available.¹⁵

¹³Mackie, Foreign Economic Growth and Market Potentials, p. 29.

¹⁴1) Latin America: Central and South America and the Caribbean.

2) North Africa: Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia.

3) West Africa: Angola, Camaroon, Central African Republic, Chad, Congo Republic (Brazzaville), Republic of Congo (Kinshasa), Dahomey, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Portuguese Guinea, Senegal, Spanish Sahara, South East Africa, Upper Volta, and Togo.

4) East Africa: Botswana, Burundi, Comoro Islands, Ethiopia, Kenya, Lesotho, Mauritius, Malawi, Malagasy Republic, Mozambique, South Rhodesia, Reunion, Rwanda, Somali Republic, French Somaliland, Swaziland, Tanzania, Uganda, and Zambia.

5) West Asia: Aden, Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Saudi Arabia, Syria, Turkey, Lebanon, Qatar, and Yemen.

6) South Asia: Afghanistan, Bhutan, Ceylon, India, Nepal, and Pakistan.

7) South East Asia: Burma, Cambodia, Laos, South Vietnam, and Thailand.

8) Other East Asia: Hong Kong, South Korea, Macao, Philippines, Portuguese Asia, Ryukyu Islands, and Taiwan.

9) Far East and Oceania: Australian New Guinea, Brunei, New Caledonia, Fiji, Guam, Indonesia, Malaysia, West Irian, Papua, French Polynesia, Sabah, West Samoa, Sarawak, and Singapore.

¹⁵Arthur B. Mackie, et al., World Trade in Selected Agricultural Commodities, 1951-65, Vol. II: Food and Feed Grains: Wheat, Rice, Maize, Barley, and Other Cereals (Washington, D. C.: U. S., Department of Agriculture, Economic Research Service, Foreign 45, 1968).

Table XI gives the LDCs' regional annual average imports of these commodities by source of imports in absolute terms, and their population for the three years before the enactment of P. L. 480. Latin America and South Asia led the other regions in wheat and flour and total grains imports from the United States, other developed countries, the LDCs, and all sources taken together. South Asia shows a heavy demand for foreign grains (inexpensive food) because of low per capita incomes and because of religious injunctions against meats among the two major religions of the region. Hindus, the majority of the population, may not eat beef; Moslems, most of the rest of the population, are forbidden pork. Rice and wheat thus constitute the main diet of South Asia's increasing population, particularly in India and Pakistan.¹⁶

Table XII shows that, with the exception of South Asia and East Africa, all less developed regions relied heavily on the United States for total food grain imports shortly before the enactment of P. L. 480. 42% of these regions' annual total grain imports came from the United States, and at least half of their imports of wheat and flour, corn, barley, and other cereals. Since the rice-eating countries in the Far East (Monsoon Asia) produce the bulk of their domestic need, the United States provided little of their total rice imports. The same is true of Africa and Latin America, which depend more on wheat and other grains than on rice as food staples. Barley has been another negligible import; the LDCs have depended mainly on themselves for imports of barley as well as for rice. Also, the less developed regions generally consid-

¹⁶Over half of this region's wheat and flour imports came from the United States during average 1951-1953.

TABLE XI

LDCS' POPULATION, AND ANNUAL IMPORTS OF FOOD GRAINS BY SOURCE,
AVERAGE 1951-1953

	LESS DEVELOPED COUNTRIES											Grand Total
	Latin America	AFRICA				ASIA				Far East & Oceania		
		North	West	East	Total	West	South	South East	Other East		Total	
<u>Population</u>	166971.00	53713.00	84441.00	63781.00	201936.00	64207.00	483281.00	57241.00	52715.00	657444.00	88736.00	1115086.00
<u>Food Grain Imports</u>												
from United States ^a												
Total Grains	2134.66	442.66	90.00	28.66	561.33	353.66	2145.33	-	602.66	3101.66	492.33	6290.00
Wheat & Flour	1651.33	437.00	79.33	13.66	530.00	315.00	1686.66	-	253.33	2255.00	442.66	4879.00
from Developed ^b												
Total Grains	834.00	448.33	136.33	159.00	743.66	284.33	1157.00	110.00	352.66	1904.00	383.33	3864.99
Wheat & Flour	820.00	444.33	122.33	105.33	672.00	264.66	1136.66	109.66	296.33	1807.33	338.66	3638.00
from LDCs												
Total Grains	1188.00	52.33	93.00	168.66	314.00	219.00	1209.66	1.00	406.33	1835.99	1073.66	4411.66
Wheat & Flour	938.00	8.66	-	9.33	18.00	50.00	272.66	-	-	322.66	-	1278.66
from Communist												
Total Grains	-	108.66	-	-	108.66	2.00	343.00	-	3.00	348.00	-	456.66
Wheat & Flour	-	92.00	-	-	92.00	2.00	-	-	-	2.00	-	94.00
from All Sources												
Total Grains	4156.66	1052.00	319.33	356.33	1727.66	859.00	4855.00	111.00	1364.66	7189.66	1949.33	15023.33
Wheat & Flour	3409.33	982.00	201.66	128.33	1312.00	631.66	3096.00	109.66	549.66	4387.00	781.33	9889.66

^aMainly commercial; however, some limited dollar sales were financed through United States foreign aid funds.

^bExcluding the United States.

Source: Appendixes A and C.

TABLE XII

LDCS' ANNUAL FOOD GRAIN IMPORTS BY SOURCE AS A PERCENTAGE^a OF THEIR TOTAL FOOD GRAIN IMPORTS, AVERAGE 1951 - 1953

Food Grains	Source	Less Developed Countries											Grand Total
		Latin America	Africa				Asia				Far East & Oceania		
			North	West	East	Total	West	South	East	Other East		Total	
		per cent											
Wheat & Flour	United States	48	45	39	11	40	50	54	-	46	51	57	49
	Dev. Countries ^b	24	45	61	82	51	42	37	100	54	41	43	37
	LDCs	28	1	-	7	3	8	9	-	-	7	-	13
	Comm. Countries	-	9	-	-	7	-	-	-	-	-	-	1
Corn	United States	88	23	54	12	19	43	76	-	-	56	-	54
	Dev. Countries	-	-	17	40	32	-	-	-	-	-	-	11
	LDCs	12	8	29	47	39	57	24	-	100	44	100	31
	Comm. Countries	-	68	-	-	10	-	-	-	-	-	-	4
Rice	United States	58	-	-	-	-	7	2	-	20	7	4	12
	Dev. Countries	-	26	10	3	8	18	-	-	2	2	4	2
	LDCs	41	74	90	97	92	75	81	100	78	80	92	79
	Comm. Countries	-	-	-	-	-	-	17	-	1	11	-	5
Barley	United States	43	-	-	-	-	-	-	-	77	64	-	57
	Dev. Countries	2	-	-	-	-	2	-	-	19	16	-	14
	LDCs	55	100	100	100	100	98	-	-	4	20	-	29
	Comm. Countries	-	-	-	-	-	-	-	-	-	-	-	-
Other Cereals	United States	21	-	-	-	-	34	71	-	99	70	-	66
	Dev. Countries	30	-	38	55	30	4	3	-	1	3	100	5
	LDCs	50	100	61	45	70	61	-	-	-	6	-	9
	Comm. Countries	-	-	-	-	-	-	26	-	-	21	-	19
Total Grains	United States	51	42	28	8	32	41	44	-	44	43	25	42
	Dev. Countries	20	43	43	45	43	33	24	99	26	26	20	26
	LDCs	29	5	29	47	18	25	25	1	30	26	55	29
	Comm. Countries	-	10	-	-	6	-	7	-	-	5	-	3

- indicates a negligible quantity. ^aPercentages do not add to 100% because of rounding.

^bExcluding the United States for all categories of grains.

Source: Several tables in Mackie, et al., World Trade in Selected Agricultural Commodities, 1951-65.

er barley, - and rye and oats - "inferior" as food to wheat products and rice, which are universally regarded as "superior" cereals.¹⁷ Thus, these regions, before the enactment of P. L. 480, looked to the United States as their principal supplier of total food grains in general, and of wheat and flour in particular. These two categories of grain will receive special attention.¹⁸

Table XI also shows the LDCs' reliance on themselves for other types of grains. Far East and Oceania imported an annual average of 1073.6 tons of grains from the LDCs (1951-1953), none in wheat or flour. In Latin America, Argentina is the United States' only important competitor in exporting grains to other Latin American countries and Europe.

Methodology

The functional relationship between grain imports by source of imports and incomes per capita in the less developed regions (Table XIII) will be studied using regression and correlation analyses. These analyses will indicate whether a relationship exists or not and if so how strong it may be (degree of association among variables); they will also be used to predict per capita grain imports had P. L. 480 not been enacted (the dependent variable Y for total grains and Y' for wheat and flour) when the value of the independent variable (per capita income of the less developed regions X) is known for the periods under prediction. The method of least squares is commonly used to estimate regression

¹⁷United Nations, Food and Agriculture Organization, The Economic Relationships Between Grains and Rice (Commodity Bulletin Series, No. 39), 1965, p. 39.

¹⁸Unless stated otherwise, flour is in wheat equivalent.

TABLE XIII

LDCs' ANNUAL INCOME AND IMPORTS OF TOTAL GRAINS AND WHEAT
AND FLOUR PER CAPITA, BY SOURCE, AVERAGE 1951 - 1953

LDCs	Per Capita Income (U. S. dollars) ^a	per capita grain imports (pounds)								
		A) Total Grains				B) Wheat and Flour				
		from U. S.	from Dev. Countries ^b	from LDCs	from All Sources ^c	from U. S.	from Dev. Countries ^b	from LDCs	from All Sources ^c	
Latin America	264.719 ^d	28.168	11.012	15.686	54.882	21.803	10.827	12.385	45.015	
Africa	North	117.894	18.168	18.801	2.148	43.178	17.936	18.237	.355	40.305
	West	58.685	2.350	3.559	2.428	8.337	2.071	3.194	-	5.265
	East	48.303	.991	3.496	5.830	12.317	.472	3.641	.322	4.436
	Total	81.859 ^e	6.128	8.105	3.428	18.861	5.786	7.336	.196	14.323
Asia	West	196.043	12.143	9.763	7.519	29.494	10.816	9.087	1.717	21.688
	South	59.792	9.786	5.278	5.518	22.147	7.694	5.185	1.244	14.123
	South East	56.219	-	4.236	.038	4.275	-	4.223	-	4.223
	Other East	131.349	25.204	14.749	16.993	57.072	10.594	12.393	-	22.987
	Total	71.779 ^f	10.401	6.385	6.058	24.109	7.562	6.060	1.082	14.711
Far East & Oceania	n.a.	12.232	9.524	26.675	48.430	11.000	8.414	-	19.412	
All LDCs	109.582	12.436	7.729	8.722	29.702	9.646	7.192	2.528	19.552	

^aAlthough these data were not adjusted for inequalities in purchasing power among nations, they reflect the relative differences in per capita incomes. Official exchange rates were used to convert incomes to U. S. dollars. Free or principal import rates, or both, were used for countries with multiple exchange rates.

^bExcluding the United States.

^cIncluding the communist countries.

^dArgentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Paraguay, Peru, and Venezuela.

^eEgypt, Morocco, Uganda, Nigeria.

^fIraq, Israel, Lebanon, Syria, Turkey, Ceylon, India, Pakistan, Burma, Thailand, China (Taiwan), Republic of Korea, and the Philippines.

Sources: United Nations, Statistical Yearbook, 1969 (New York: Statistical Office of the United Nations, Department of Economic and Social Affairs, 1970); and International Monetary Fund, International Financial Statistics Supplement to 1961/1962 - 1965/1966 Issues; and Appendix A.

equations since, under certain assumptions, it gives an unbiased estimation of the regression parameters, and is the most precise of all methods of unbiased linear estimation (subject to smaller sampling errors).¹⁹

Table XIII is used for a cross-sectional analysis of income and grain imports per capita in the LDCs, to estimate these regression equations for an average of the 1951-1953 period.²⁰ A correlation analysis will then measure the strength of the relationship. Based on these regression equations, the LDCs' annual average expected commercial food grain imports will be calculated for average 1954-1956 and average 1959-1961, and will be compared with actual imports to determine the law's trade effect.

Table XIII shows that Latin America, with an annual per capita income of \$265, had the highest per capita imports of total grains (28 pounds from the United States, 55 pounds from all sources) and of wheat and flour (22 pounds from the United States, 45 pounds from all sources). By comparison, South East Asia, with a \$56 annual per capita income, had negligible per capita imports of total grains and of wheat and flour, especially from the United States and the LDCs.

This relationship between grain imports by source of import, and income per capita in the less developed regions (Table XIII) is represented on the following page by two functional linear forms: double logarithmic (log-linear) and arithmetic (linear):

¹⁹John Neter and William Wasserman, Fundamental Statistics for Business and Economics (3rd ed.; Boston: Allyn & Bacon, 1967), p. 521.

²⁰Lack of data, especially for incomes in the less developed regions before the 1950's, made it impossible to supplement cross-sectional with time-series analysis.

I) For Total Grain Imports

1) from the United States

$$A) \log Y_{1t} = a_{1t} + b_{1t} \log X_t + U_{1t}$$

$$B) Y_{1t} = a_{1t} + b_{1t} X_t + U_{1t}$$

2) from other developed countries

$$A) \log Y_{2t} = a_{2t} + b_{2t} \log X_t + U_{2t}$$

$$B) Y_{2t} = a_{2t} + b_{2t} X_t + U_{2t}$$

3) from the less developed countries

$$A) \log Y_{3t} = a_{3t} + b_{3t} \log X_t + U_{3t}$$

$$B) Y_{3t} = a_{3t} + b_{3t} X_t + U_{3t}$$

4) from all sources

$$A) \log Y_{4t} = a_{4t} + b_{4t} \log X_t + U_{4t}$$

$$B) Y_{4t} = a_{4t} + b_{4t} X_t + U_{4t}$$

where $t = 1, 2, 3, \dots, 11$ observations; U_{it} are the error terms where $i = 1, 2, \dots, 4$; and a_{it} and b_{it} are the regression parameters.

II) For Wheat and Flour Imports

1')

$$A) \log Y'_{1t} = a'_{1t} + b'_{1t} \log X_t + U'_{1t}$$

$$B) Y'_{1t} = a'_{1t} + b'_{1t} X_t + U'_{1t}$$

2')

$$A) \log Y'_{2t} = a'_{2t} + b'_{2t} \log X_t + U'_{2t}$$

$$B) Y'_{2t} = a'_{2t} + b'_{2t} X_t + U'_{2t}$$

3')

$$A) \log Y'_{3t} = a'_{3t} + b'_{3t} \log X_t + U'_{3t}$$

$$B) Y'_{3t} = a'_{3t} + b'_{3t} X_t + U'_{3t}$$

4')

$$A) \log Y'_{4t} = a'_{4t} + b'_{4t} \log X_t + U'_{4t}$$

$$B) Y'_{4t} = a'_{4t} + b'_{4t} X_t + U'_{4t}$$

Although both linear and log-linear methods presume a basic relationship between grain imports and incomes per capita, each is based on a different a priori assumption.²¹ A linear double logarithmic equation is often used by econometricians in predictive models such as this, partly because the income elasticity of imports is equal to the parameter (b), the regression coefficient which is constant for all values of per capita incomes. Such income elasticity, when it is in evidence, indicates the presence of a relationship between imported grain and incomes per capita at a given time. When used to predict future imports, this relationship assumes that regions with low per capita incomes will follow the import pattern of higher income regions, as their per capita incomes increase.²²

The double log-linear form assumes a constant income elasticity of imports (a constant response of per capita grain imports to per capita incomes in percentage terms). On the other hand, the linear arithmetic functional relation implies a constant slope (marginal propensity to import, which is a constant response of per capita grain imports to per capita incomes in absolute terms). A disadvantage of using only this form is that, as the LDCs' per capita incomes rise, their marginal propensity to import grain may diminish in favor of a greater demand for

²¹ See Leamer and Stern, Quantitative International Economics, pp. 17-18.

²² Graham Hallett, The Economics of Agricultural Policy (New York: Augustus M. Kelley, Publishers, 1970), p. 118.

other, more expensive, types of food, such as meat. In other words, if Engel's Law applies to food grains in the less developed countries, the log-linear form will prove to be more efficient. Leamer and Stern have written that "The use of the linear or log-linear form might therefore be looked on as testing the significance of a particular functional form rather than the significance of the particular explanatory variable."²³ This study will use both the log (Method A) and the arithmetic (Method B) linear functional forms in the regression analysis for both wheat and flour, and total grains.²⁴

²³Quantitative International Economics, p. 18.

²⁴It is acceptable to treat total grains here as one commodity, since all types of grains have been expressed in metric tons. Also, according to Hicks, ". . .if the prices of a group of goods change in the same proportion, that group of goods behaves just as if it were a single commodity." Value and Capital, p. 15. This condition seems to exist, according to the International Wheat Council study, Trends and Problems in the World Grain Economy, p. 15: ". . .international prices of wheat and coarse grains have moved to a large extent independently. Nevertheless, the similarity of the basic underlying conditions of supply for all grains in recent years and the existing possibilities of substitution among wheat and among coarse grains, as well as some competition between coarse grains and lower quality wheats as feed, have ensured that during the last decade wheat and coarse grains have followed the same trend. However, an expected disadvantage of treating total grains as a single commodity is that so doing may weaken the correlation coefficient (R^2) for total grains relative to those for wheat and flour. This is particularly a problem for sources of imports, where the LDCs import other types of grains which do not have (R^2) as strong as those for wheat and flour.

The assumptions of this linear regression model²⁵ are

1. that the covariance between X_t (the independent variables) and U_{it} (the errors) is zero. So the random variables X_t and U_{it} are independent of each other for all t and for all i ;
2. that $E(U_{it}) = 0$. That is, the expected value of the errors is zero for $t = 1, 2, \dots, 11$ and for $i = 1, 2, \dots, 4$;
3. that the variance of U_{it} is homogeneous over time; i.e., $E(U_{it}^2) = \sigma^2$ for all t and for all i ;
4. that the errors (U_{it}) are independent of each other; i.e., $\text{covar}(U_{it}, U_{ij}) = 0$ for all $t \neq j$.
5. that X_t are fixed (non-stochastic), and there are no errors in their estimation for $t = 1, 2, \dots, 11$.

²⁵See J. S. Cramer, Empirical Econometrics (Amsterdam: North-Holland Publishing Company, 1969), pp. 83-87.

The linear regression equations have been estimated from Table XIII, using Methods A and B, in the following form:

I) For Total Grain Import	II) For Wheat and Flour Imports
1) <u>from the United States</u>	1')
A) $\log Y_1 = -2.4618 + 1.6870 \log X$ (0.4359) $R^2 = 0.62^*$	$\log Y'_1 = -2.6134 + 1.7040 \log X$ (0.4450) $R^2 = 0.62^*$
B) $Y_1 = -0.3152 + 0.1085 X$ (0.0278) $R^2 = 0.63^*$	$Y'_1 = -0.3799 + 0.0827 X$ (0.0187) $R^2 = 0.69^*$
2) <u>from other developed countries</u>	2')
A) $\log Y_2 = -0.4681 + 0.6861 \log X$ (0.2020) $R^2 = 0.56^*$	$\log Y'_2 = -0.6478 + 0.7566 \log X$ (0.2007) $R^2 = 0.61^*$
B) $Y_2 = 4.7458 + 0.0357 X$ (0.0191) $R^2 = 0.28^{***}$	$Y'_2 = 4.0237 + 0.0362 X$ (0.0184) $R^2 = 0.30^{***}$
3) <u>from less developed countries</u>	3')
A) $\log Y_3 = -2.2781 + 1.4511 \log X$ (0.8680) $R^2 = 0.24$	$\log Y'_3 = -2.3657 + 1.2114 \log X$ (0.5326) $R^2 = 0.36^{**}$
B) $Y_3 = 0.9955 + 0.0532 X$ (0.0193) $R^2 = 0.46^{**}$	$Y'_3 = -2.7884 + 0.0424 X$ (0.0105) $R^2 = 0.64^*$
4) <u>from all sources</u>	4')
A) $\log Y_4 = -0.8378 + 1.1053 \log X$ (0.3022) $R^2 = 0.60^*$	$\log Y'_4 = -1.3073 + 1.2513 \log X$ (0.2578) $R^2 = 0.72^*$
B) $Y_4 = 6.5257 + 0.1952 X$ (0.0570) $R^2 = 0.57^*$	$Y'_4 = 1.2777 + 0.1617 X$ (0.0386) $R^2 = 0.66^*$

where * means statistically significant at the 99 percent level.

** means statistically significant at the 95 percent level.

*** means statistically significant at the 90 percent level.

Table XIV on the following page summarizes the regression coefficients in these estimated linear regression equations. It also suggests that in all cases a positive relationship exists between income and imports per capita of total grains and of wheat and flour. In terms of marginal propensity to import, any ten-dollar increase in per capita incomes in the less developed regions is associated with an average increase of 20 pounds of imported grains, 16 pounds of imported wheat and flour in 1951-1953. However, the income elasticities of imports indicated that as per capita income increases by 10%, per capita imports of wheat and flour increase by 17% from the United States, 8% from other developed countries, 12% from the LDCs themselves, and 13% from all sources. For total grains these percentages are 17%, 7%, 15%, and 11%. As these countries struggle toward economic development, any increase in per capita income must be allotted to foreign manufactured goods and services, agricultural products in general, and food in particular. Increasing populations, coupled with domestic agricultural production which is inadequate to meet the growing demand, will mean a greater demand for cheaper foods, generally for foreign food grains.

Per capita incomes in the LDCs are comparatively low, even with some increases, and so these countries have not yet reached the point at which income growth is accompanied by negative elasticities of total demand (from both domestic and foreign sources) for grains. This situation exists in developed nations, whose high per capita incomes allow a preference for meat over grains. In the United States, Canada, Australia, and most of Europe, per capita consumption of grains has been on a steady decline, elasticity coefficients ranging from -0.1 to -0.5. By comparison, the LDCs generally register positive income elasticities

of demand of 0.1 to 0.8.²⁶ India is representative, with an income elasticity of demand for cereals of about 0.7.²⁷

TABLE XIV

LDCS' INCOME ELASTICITIES OF IMPORTS AND MARGINAL PROPENSITIES TO IMPORT GRAINS AND WHEAT AND FLOUR, BY SOURCE OF IMPORTS, AVERAGE 1951-1953^a

Source of Imports	Income Elasticities of Imports (Regression Coefficients: Method A)		Marginal Propensities to Import (Regression Coefficients: Method B)	
	Total Grains	Wheat & Flour	Total Grains	Wheat & Flour
United States ^b	1.6870 (0.4359)	1.7040 (0.4450)	0.1085 (0.0278)	0.0827 (0.0187)
Other Developed Countries	0.6861 (0.2020)	0.7566 (0.2007)	0.0357 (0.0191)	0.0362 (0.0184)
Less Developed Countries	1.4511 (0.8680)	1.2114 (0.5326)	0.0532 (0.0193)	0.0424 (0.0105)
All Sources	1.1053 (0.3022)	1.2513 (0.2578)	0.1952 (0.0570)	0.1617 (0.0386)

^aFigures in parentheses are standard errors of the regression coefficients.

^bMackie found that the income elasticity of agricultural imports from the United States was 1.04 in 1938 and 1.32 in 1959-1961. Foreign Economic Growth and Market Potentials, p. 42.

²⁶Hutchison, et al., World Demand Prospects for Wheat in 1980, p. 43.

²⁷Hallett, Economics of Agricultural Policy, pp. 115-116.

P. L. 480 Trade Effect

Tables XV and XVI give the LDCs' annual average incomes and actual imports of total grains and of wheat and flour per capita by source of imports for the two periods under study. The estimated linear regression equations (1) and (1') are now used to calculate the LDCs' annual expected commercial imports of these commodities from the United States as their per capita incomes (the independent variable) changed in each of the periods.²⁸ These estimates of expected per capita imports are, then converted from per capita to absolute terms by multiplying each region's per capita expected imports by its average population for the period in question. In addition, the total expected imports of each region are converted from pound estimate to metric tons (1 metric ton = 2204.6 pounds).

Tables XVII and XVIII give the P. L. 480 trade effect in the LDCs for the first period for both wheat and flour and total grains under the log (Method A) and the arithmetic (Method B) functional forms. Clearly, wheat and flour dominate total grain concessional imports: annual concessional exports of wheat and flour were, on the average, 1848 thousand metric tons, while total grain concessional exports were only 2258 thousand metric tons during this period.

Except for West and East African LDCs, which did not receive wheat and flour on concessional terms from the United States, most of the other LDCs have substituted P. L. 480 sales for what they would have

²⁸ It is not assumed that P. L. 480 has contributed to these changes in incomes, nor that these incomes would have been different in its absence; its magnitude is too small relative to total incomes in the LDCs in an aggregate study such as this.

TABLE XV

LDCS' ANNUAL INCOME AND IMPORTS OF TOTAL GRAINS AND WHEAT AND FLOUR
PER CAPITA, AVERAGE 1954 - 1956

LDCs	Per Capita Income (U. S. dollars) ^a	per capita grain imports (pounds)								
		Total Grains				Wheat & Flour				
		from U. S.	from Dev. countries ^b	from LDCs	from all sources ^c	from U. S.	from Dev. countries	from LDCs	from all sources ^c	
Latin America	229.301 ^d	18.565	10.89	18.819	48.275	14.746	10.2	17.42	42.366	
Africa	North	125.436	10.403	8.047	2.266	22.321	10.403	6.774	-	18.781
	West	62.847	3.823	4.641	4.26	12.725	2.924	4.009	-	6.933
	East	62.496	.0972	5.065	4.968	10.152	.0972	4.709	-	4.806
	Total	88.444 ^e	4.413	5.692	3.958	14.497	4.036	4.974	-	9.438
Asia	West	249.007	23.734	10.761	11.271	45.766	19.523	10.452	1.435	31.411
	South	55.612	2.219	3.37	3.024	9.612	1.776	3.266	-	5.042
	South East	63.144	1.246	3.358	1.756	6.36	1.115	3.358	-	4.486
	Other East	162.675	23.149	11.918	15.777	52.067	18.349	11.307	-	29.656
	Total	72.617 ^f	5.893	4.735	4.709	16.156	4.764	4.581	1.395	9.485
Far East & Oceania	n. s.	3.813	10.873	23.168	37.94	1.048	9.413	-	10.462	
All LDCs	104.999	7.257	6.214	8.022	22.052	5.753	5.782	2.672	14.283	

^aAs in note a, Table XIII. ^bExcluding the United States. ^cIncluding the communist countries.

^dAs in note d, Table XIII. ^eThe countries in note e, Table XIII, with the addition of Kenya.

^fAll countries in note f, Table XIII, except China (Taiwan) and the Republic of Korea.

Sources: See the sources of Table XIII.

TABLE XVI

LDCs' ANNUAL INCOME AND IMPORTS OF TOTAL GRAINS AND WHEAT AND FLOUR
PER CAPITA, AVERAGE 1959 - 1961

LDCs	Per Capita Income (U. S. dollars) ^a	per capita grain imports (pounds)								
		Total Grains				Wheat & Flour				
		from U. S.	from Dev. countries ^b	from LDCs	from all sources ^c	from U. S.	from Dev. countries	from LDCs	from all sources	
Latin America	241.184 ^d	28.199	5.848	14.287	51.075	24.132	5.628	11.896	43.956	
Africa	North	133.936	56.885	33.067	4.551	98.651	50.463	29.496	2.185	86.122
	West	80.318	5.624	7.325	4.759	18.377	3.859	6.344	-	10.202
	East	64.692	1.927	6.298	5.593	13.818	.949	5.302	.188	6.439
	Total	98.845 ^e	18.084	13.839	4.962	38.265	15.333	12.165	.642	29.199
Asia	West	179.870	42.250	23.864	14.080	80.538	29.434	22.115	2.297	54.070
	South	70.381	17.341	3.251	3.473	24.907	15.625	3.241	-	18.917
	South East	69.889	3.255	1.820	1.071	6.323	3.068	1.820	.197	5.086
	Other East	115.596	31.630	9.228	17.942	62.440	27.880	8.954	.033	36.867
	Total	81.541 ^f	19.682	5.680	5.535	31.862	16.827	5.474	.251	22.612
Far East, Oceania &	n. a.	3.677	10.094	31.457	50.535	1.125	8.956	.152	10.233	
All LDCs	113.826	19.043	7.378	8.653	36.699	16.106	6.84	2.082	25.601	

^aAs in note a, Table XIII.^bExcluding the United States.^cIncluding the communist countries.^dIn addition to the countries given in note d, Table XIII: Uruguay, El Salvador, Bolivia. Cuba is not included.^eIn addition to the countries in note e, Table XIII: Algeria, Tunisia, Sudan, Ghana, Congo, Guinea, Togo, Kenya, Tanganyika.^fIn addition to the countries in note f, Table XIII: Jordan and Cambodia.Sources: Mackie, Foreign Economic Growth and Market Potentials, pp. 75-76; and several tables in United Nations, Demographic Yearbook, 1966 (New York: Statistical Office of the United Nations, Department of Economic and Social Affairs, 1967), pp. 120-29.

imported commercially from the United States. For example, the Latin American region was expected to import commercially from the United States 1536 thousand metric tons (Method B) of wheat and flour on the average during 1954-1956. Their total actual imports (1219 thousand metric tons) were less than was expected because of non-income factors, and so the total shipments of these commodities under concessional terms were a perfect substitute for the expected commercial imports from the United States. In North Africa and Other East Asia, however, actual total imports exceeded expected commercial imports by some concessional shipments; here the law shows signs of complementarity. Other East Asia, for example, imported only 193 thousand metric tons commercially, as against expected commercial imports of 374 thousand metric tons (Method A). Therefore, concessional sales of 288 thousand metric tons substituted United States commercial imports by 181 thousand metric tons of wheat and flour, and supplemented that with the remaining 107 thousand metric tons. There remains a question of whether or not P. L. 480 complementarity in this Other East Asian region in average 1954-1956 caused a reduction of this region's grain imports from other developed countries or from the LDCs themselves.

Using the estimated regression equations (2) and (2'), (3) and (3'), to predict this region's imports of wheat and flour and total grains, knowing its average annual per capita income in 1954-1956, their expected annual wheat and flour imports from other developed countries would have been 277.225 thousand metric tons (Method A) and 259.447 thousand metric tons (Method B), in the absence of P. L. 480. Their actual annual imports from these countries were 296 thousand metric tons. Their expected annual imports of total grains were 292.932 thou-

TABLE XVII

LDCS' ANNUAL EXPECTED, ACTUAL, AND CONCESSIONAL IMPORTS OF WHEAT AND FLOUR FROM THE U. S.; AND P. L. 480 TRADE EFFECT, AVERAGE 1954 - 1956

		Expected Commercial Imports		Actual Imports ^a	Concessional Imports ^b	P. L. 480 Trade Effect		
		Method A	Method B			Method A	Method B	
		- - - thousand metric tons - - -						
Countries	Latin America	2117.355	1536.379	1218.666	479.900	Case I perfect substitute to U. S. commercial imports		
	Africa	North	239.895	261.713	272.333	268.450	Case III part (mostly) substitute, and part supplement to U.S. commercial imports	
		West	116.173	198.331	120.333	-	Case IV neutral effect	
		East	86.296	147.852	3.060	-	Case IV	
	Total	495.392	680.106	395.666	268.450	Case I		
Developed	Asia	West	924.451	633.870	612.000	529.250	Case I	
		South	533.256	981.603	413.000	258.950	Case I	
		South East	79.944	136.068	31.333	23.200	Case I	
		Other East	373.56	342.362	480.333	287.700	Case III part substitute, part supplement	
	Total	1164.839	1815.392	1536.666	1099.100	Case III	Case I	
Less	Far East & Oceania	n. a.	n. a.	45.000	-	n. a.		
	All LDCs	3756.111	4614.821	3196.000	1847.450	Case I		

^aIncludes both commercial and concessional imports; see Appendix A.

^bAn average of 1954/55 - 1955/56 fiscal years; see Appendix D.

TABLE XVIII

LDCS' ANNUAL EXPECTED, ACTUAL, AND CONCESSIONAL IMPORTS OF TOTAL GRAINS FROM THE U. S.; AND P. L. 480 TRADE EFFECT, AVERAGE 1954 - 1956

		Expected Commercial Imports		Actual Imports ^a	Concessional Imports ^b	P. L. 480 Trade Effect	
		Method A	Method B			Method A	Method B
		- - - thousand metric tons - - -					
Countries	Latin America	2737.190	2030.077	1534.333	523.745	Case I	
	North	313.089	348.026	272.333	268.475	Case I	
	West	153.498	267.641	157.333	22.000	Case III	Case I
	East	114.043	199.555	3.000	-	Case IV	
	Total	650.882	909.897	432.666	290.475	Case I	
Developed	West	1193.417	837.054	744.000	729.579	Case I	
	South	706.047	1329.924	516.000	304.368	Case I	
	South East	105.646	183.593	35.000	34.850	Case I	
	Other East	485.602	453.796	606.000	369.571	Case III	
	Total	1535.806	2439.908	1901.000	1443.447	Case III	Case I
Less	Far East & Oceania	n. a.	n. a.	163.666	.402	n. a.	
	All LDCs	4920.555	6153.979	4031.666	2258.068	Case I	

^aIncludes both commercial and concessional imports; see Appendix A.

^bAn average of 1954/55 - 1955/56 fiscal years; see Appendix D.

sand metric tons (Method A), and 276.180 thousand metric tons (Method B); again the actual annual imports were greater: 312 thousand metric tons on the average for 1954-1956. Thus, no justified claim can be made that P. L. 480 complementary shipments substituted other developed countries' commercial grain exports. This is also true for the LDCs, since the Other East Asian region's expected annual imports of total grains from the LDCs (both methods) were lower than their actual annual imports.

The United States' grain competitors were concerned that P. L. 480 might have an adverse effect on their exports, but the law has mainly replaced the United States' own commercial exports to most of these less developed regions. During the early years of the law, getting rid of surpluses was the priority; the safeguards against P. L. 480 shipments reducing United States commercial sales were not really tested yet.²⁹ The P. L. 480 trade effect on the LDCs' total grain imports has seemed to follow the wheat and flour pattern, with most of the regions substituting concessional sales of total grains for their commercial imports from the United States.

In order to analyze the P. L. 480 trade effect in the second period, average 1959-1961, a substitution of the LDCs' annual per capita incomes for this period (Table XVI) in the estimated regression equations (1) and (1') will estimate their expected commercial imports of wheat and flour and total grains from the United States. Tables XIX and XX summarize these expected imports, plus the actual total and concessional imports of these products by the less developed regions for this

²⁹The United States' stockpiles of principal grains increased 115% from mid-1952 to mid-1954. See O'Hagan and Lehti, "Some Economic and Policy Problems of Food Aid," p. 1.

TABLE XIX

LDCS' ANNUAL EXPECTED, ACTUAL, AND CONCESSIONAL IMPORTS OF WHEAT AND FLOUR FROM THE U. S.; AND P. L. 480 TRADE EFFECT, AVERAGE 1959 - 1961

		Expected Commercial Imports		Actual Imports ^a	Concessional Imports ^b	P. L. 480 Trade Effect	
		Method A	Method B			Method A	Method B
		--- thousand metric tons ---					
Countri es	Latin America	2660.0	1864.12	2298.333	1342.8	Case I perfect substitute	Case III part substitute, part supplement
	North	302.959	316.587	1493.0	1263.25		Case III
	West	196.743	287.377	177.0	66.05		Case I
	East	105.177	176.315	33.666	19.5		Case I
	Total	678.667	866.395	1703.666	1348.8		Case III
Develo ped	West	606.810	519.74	1055.0	844.466 ^c		Case III
	South	877.949	1395.572	4006.333	3900.233 ^d		Case III
	South East	108.429	173.142	98.333	90.7		Case I
	Other East	242.866	279.981	850.0	666.7		Case III
	Total	1571.786	2273.57	6009.666	5710.733 ^e		Case III
Less	Far East & Oceania	n. a.	n. a.	54.333	2.7 ^f		n. a.
	All LDCs	4852.5	5648.084	10066.0	8996.0		Case III

^aCommercial and concessional (see Appendix A).

^bAverage 1959/60-1960/61 fiscal years (Appendix D).

^cAverage fiscal 1958/59-1960/61 (Appendix D).

^dAverage fiscal 1959/60-1961/62 (Appendix D).

^eAverage fiscal 1957/58-1958/59 (Appendix D).

^fAverage fiscal 1957/58-1959/60 (Appendix D).

TABLE XX

LDCS: ANNUAL EXPECTED, ACTUAL, AND CONCESSIONAL IMPORTS OF TOTAL GRAINS FROM THE U. S. AND P. L. 480 TRADE EFFECT, AVERAGE 1959 - 1961

		Expected Commercial Imports		Actual Imports ^a	Concessional Imports ^b	P. L. 480 Trade Effect		
		Method A	Method B			Method A	Method B	
		- - - thousand metric tons - - -						
Countries	Latin America	3436.190	2462.213	2685.666	1520.092	Case I	Case III	
	Africa	North	395.266	420.616	1683.000	1447.995	Case III	
		West	258.899	385.288	285.000	107.629	Case III	Case I
		East	138.901	237.725	68.333	37.618	Case I	
		Total	889.889	1156.606	2009.333	1593.442	Case III	
Developed	Asia	West	787.814	688.196	1514.333	1099.279	Case III	
		South	1157.949	1877.207	4446.333	4287.570 ^d	Case III	
		South East	143.013	232.940	104.333	96.928 ^f	Case I	
		Other East	317.378	372.772	964.333	898.835	Case III	
		Total	2067.857	3047.132	7029.333	6872.403 ^c	Case III	
Less	Far East & Oceania	n. a.	n. a.	177.666	152.834 ^f	n. a.		
	All LDCs	6343.750	7521.800	11902.000	10753.995	Case III		

Notes a through f are identical with notes a through f, Table XIX.

period. They suggest that by 1959-1961 there had been a shift in the P. L. 480 trade effect. Both methods show that the law's concessional exports of the commodities under study partly supplemented and partly substituted expected commercial imports from the United States in most of these regions.

Major changes had occurred in the attitudes of both the United States and the recipient LDCs by 1959-1961. P. L. 480 committed itself more deeply to the LDCs' economic development. Feeding their masses of hungry people was now an objective, and the United States liberally provided commodities beyond the earlier "normal" trade pattern. The LDCs, for their part, now realized that they could buy more, badly needed, food using their local currencies. It is not hard for governments to issue or borrow these currencies for such a purpose, especially in the knowledge that these counterpart funds will be used again, at least partially, for their own economic and social development.

As a result of these developing trends, the P. L. 480 trade effect for this second period is different; in most of the less developed regions, P. L. 480 sales supplemented, as well as substituted, what would have been bought, in the absence of the law, from the United States.

There was a question about the effect of these supplementary P. L. 480 shipments on commercial imports from other developed countries and from the LDCs. Table XXI, using the estimated regression equations (2), (2'), (3), and (3'), shows that actual commercial imports of wheat and flour and total grains from these two sources were considerably less than the expected imports for many of the less developed regions under both methods. This is particularly so for South Asia, with major recipients India and Pakistan. It is possible that the law's sales had an

TABLE XXI

LDCS' ANNUAL EXPECTED AND ACTUAL COMMERCIAL IMPORTS OF WHEAT AND FLOUR AND TOTAL GRAINS FROM OTHER DEVELOPED COUNTRIES, AND THE LDCS, AVERAGE 1959 - 1961^a (THOUSAND METRIC TONS)

		WHEAT AND FLOUR						TOTAL GRAINS						
		from Developed Countries			from LDCs			from Developed Countries			from LDCs			
		Expected		Actual	Expected		Actual	Expected		Actual	Expected		Actual	
		Method A	Method B		Method A	Method B		Method A	Method B		Method A	Method B		
DEVELOPED COUNTRIES	Latin America	(1359.0	1214.5	536.0)**	315.5	708.1	1133.0	(1997.1	1271.6	557.0)**	(1438.1	1317.7	1360.7)*	
	North	270.6	262.5	872.7	(48.0	85.5	64.7)	289.8	281.8	978.3	(190.1	240.4	134.7)**	
	West							(316.4	349.2	336.0)*	(140.4	241.8	218.3)	
	East													
	Total	807.8	844.5	1351.7	(124.9	155.7	71.3)	883.8	919.2	1537.7	(459.7	695.3	551.3)**	
	Asia	West	409.7	377.5	792.7	(83.2	173.3	82.3)**	429.7	400.1	855.3	353.3	378.9	504.7)
		South	(1441.5	1684.8	831.0)**	(191.1	50.0	-)	(1615.4	1860.8	833.7)**	(647.9	1216.0	890.7)
		South East												
		Other East	249.4	250.2	273.0	(41.4	64.4	1.0)**	269.9	270.4	281.3	158.1	218.0	547.0
		Total	(2244.6	2490.9	1955.0)**	(318.1	238.6	89.7)**	(2488.9	2734.0	2028.7)**	1117.5	1906.0	1976.7
LESS	Far East & Oceania													
	All LDCs	(5055.0	5089.4	4275.3)**	833.1	1272.9	1301.3	(5475.0	5504.5	4611.0)**	3171.9	4409.7	5408.3	

^aFor only those regions having a Case III P. L. 480 trade effect in Tables XIX+XX, under Method A or B or both.

* indicates expected commercial imports > actual commercial imports under at least one of the two methods.

** indicates expected commercial imports > actual commercial imports under both methods.

adverse effect on United States competitors' grain exports to that Asian region. However, the LDCs taken together imported more from themselves than was expected, by a small margin. Their actual imports from other developed countries were less than expected.

In 1966, I. Little and J. Clifford predicated descriptively the very results which have emerged from this empirical study. They recognized the conditions under which commodity aid replaces commercial imports, and were able to identify other developed countries and not the LDCs as those most strongly affected by such programs:

The idea that commodity aid alone can permit faster development to the extent that sufficient extra demand is created to absorb the value of the aid commodities, so that there is no interference with the commercial demand for such commodities, is economic nonsense. This could be the case only if investments were created by labour alone, and if the extra wages were spent solely on the commodities concerned. For any given amount of commodity aid to be absorbed, there will be some extra demand for other things. If this extra demand for other things is not somehow accommodated, then commodity aid cannot be absorbed without displacing commercial sales. If commercial sales are displaced then there is no net extra consumption of the surplus commodity, and the surplus is shifted (to other countries, and possibly other commodities) rather than used. But the underdeveloped countries continue to benefit in that the burden of the shift is borne mainly by other developed exporters, principally Australia and Canada.³⁰

The real losers, according to Little and Clifford, are those developed countries who are the United States' trade competitors. The ultimate source of their suffering is the United States farm price support policies, which create the surpluses and leave much farm land and labor underproductive. Destruction of the surpluses out of hand is of course

³⁰International Aid: An Introduction to the Flow of Public Resources from Rich to Poor Countries (Chicago: Aldine Publishing Company, 1966), p. 167.

unthinkable. Equally unthinkable would be the release of the surpluses into the world market at commercial rates: the consequent drop in world prices for these commodities could hurt the exporters more than the reduction in their markets.

On the other hand, storage is costly and impractical for the United States, and makes commodity aid comparatively inexpensive. The unfortunate competitors, being themselves economically developed, have suffered no crushing setbacks because of United States surplus disposal; but, the authors warn, these competitors' opposition to United States policies, political and otherwise, could work against the effectiveness of the programs, and even minimize aid on their part.³¹

Whatever the adverse effects for other developed exporters, the principal effect has been the substitution of the United States' own commercial exports of wheat and flour and total grains. And the ultimate result of feeding hungry people in the LDCs has largely softened criticism of this effect:

. . .there are many . . .within these countries who know and appreciate that surplus food disposal has in fact made food available to the hungry peoples of the world - food which, in the absence of these programmes, would probably have been denied to them. And I do not think that either our economics or our commercial interests should become so important in our thinking that we lose sight of this important fact.³²

In the next chapter, this humanitarian aspect of P. L. 480 will be more fully examined.

³¹Ibid., pp. 168-74.

³²R. L. Kristjanson, "Discussion: Impact of Surplus Disposal on Foreign Competitors and the International Perspective on Surplus Disposal," JFE, XLII, No. 5 (1960), 1081.

A Note on the LDCs' Food Grain Elasticities and Propensities

The P. L. 480 trade effect was studied using the LDCs' income elasticities of imports and their marginal propensities to import wheat and flour and total grains; it would be in order here to look closely at the estimates of these elasticities and propensities in the two periods under study (1954-1956 and 1959-1961) with those of the base period, 1951-1953. In this chapter, P. L. 480 was found to cause a substitution effect on the LDCs' commercial grain imports from the United States and from the other developed countries. This trade effect can be attributed to

- A) a change in the slope of the regression equations (income elasticities in Method A, and propensities to import in Method B) of the period(s) under study in comparison with the corresponding estimates in the base period;
- B) a change in the intercept of the regression equations; and
- C) a change in both the slope and the intercept.

The dummy variable test is applied to find out whether or not the regression coefficients of each of the two periods under study (where the P. L. 480 trade effect occurs) are different from those of the base period; and, if they are different, whether the difference is in the intercept or the slope, or both. This test is used for both commodities, both periods, and both methods, and for the LDCs' four sources of grain imports (Tables XIII, XV, and XVI).

Assume, for example, that per capita annual food grain imports (Y for total grains, and Y' for wheat and flour) is linearly related to per capita annual incomes (X) for 1951-1953 and 1954-1956 (where per capita grain imports include P. L. 480 shipments) as follows:

Method A

$$\log Y_{it} = \log a_{i0} + a_{i1} \log D + a_{i2} \log X_t + a_{i3} \log (DX_t) + \log U_{it}$$

where:

- $t = 1, \dots, 22$ observations (Tables XIII and XV)
 $i = 1, 2, 3, 4$ sources of imports
 $\log D = 1$ if the observation lies in the base period
 $= 0$ if the observation lies in 1954-1956
 a_{i1} and a_{i3} = the differential intercept and differential slope coefficients, respectively
 U_{it} = the error terms

Similarly, Method B

$$Y_{it} = a_{i0} + a_{i1} D + a_{i2} X_t + a_{i3} (DX_t) + U_{it}$$

If, for example, $i = 1$, and if a_{11} is statistically significant, the intercept value of 1951-1953 set is $(a_{11} + a_{10})$, and a_{10} is the intercept value of 1954-1956 set. If a_{11} is statistically insignificant, a_{10} then gives an estimate of the common intercept term of both sets. If a_{13} is statistically significant, the slope value of the 1951-1953 set is $(a_{13} + a_{12})$, and a_{12} is the slope value of the 1954-1956 set. If a_{13} is statistically insignificant, a_{12} gives the slope value which is common to both sets.³³

The estimated regression on the following pages concludes that all a_{i3} for $i = 1, 2, \dots, 4$ are statistically insignificant at the 10% level, implying that the law's trade effect did not cause the slope coefficients for each of the two periods under study to be different from those of the base period. However, in producing its trade effect, P. L. 480 has caused the intercepts to be different from those of 1951-

³³Damodar Gujarati, "Use of Dummy Variables in Testing for Equality Between Sets of Coefficients in Two Linear Regressions: A Note," The American Statistician, XXIV, No. 1 (1970), pp. 50-52.

1953 for all sources of grain imports by the LDCs.

The estimated regressions are as follows:

I) For Total Grains

1 - from the United States

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}_1 = - 2.4623 + 1.6873 \log D - 1.3314 \log X + 0.5384 \log (DX)$$

(0.5373)* (1.5444) (0.7724)

$$R^2 = 0.60 \quad DF = 18$$

Method B

$$\hat{Y}_1 = - 0.3152 + 0.1085 D - 4.0723 X + 0.0083 DX$$

(0.0227)* (4.1390) (0.0319)

$$R^2 = 0.74 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}_1 = - 2.4621 + 1.6872 \log D - 0.0839 \log X - 0.1578 \log (DX)$$

(0.4398)* (1.4725) (0.7326)

$$R^2 = 0.62 \quad DF = 18$$

Method B

$$\hat{Y}_1 = - 0.3153 + 0.1085 D + 1.2264 X + 0.0786 DX$$

(0.0503)**(10.1221) (0.0807)

$$R^2 = 0.51 \quad DF = 18$$

2 - from Other Developed Countries

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}_2 = - 0.4681 + 0.6861 \log D - 0.3280 \log X + 0.1061 \log (DX)$$

(0.1569)* (0.4509) (0.2255)

$$R^2 = 0.72 \quad DF = 18$$

Method B

$$\hat{Y}_2 = 4.7458 + 0.0357 D - 2.7357 X + 0.0055 DX$$

(0.0142)** (2.5961) (0.0200)

$$R^2 = 0.48 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}_2 = -0.4681 + 0.6861 \log D - 0.7470 \log X + 0.3588 \log (DX)$$

(0.3282)*** (1.0987) (0.5467)

$$R^2 = 0.36 \quad DF = 18$$

Method B

$$\hat{Y}_2 = 4.7458 + 0.0357 D - 1.1815 X + 0.0270 DX$$

(0.0336) (6.7666) (0.0539)

$$R^2 = 0.17 \quad DF = 18$$

3 - from the Less Developed Countries

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}_3 = -2.2781 + 1.4511 \log D + 0.8621 \log X - 0.3765 \log (DX)$$

(0.6499)** (1.8681) (0.9343)

$$R^2 = 0.31 \quad DF = 18$$

Method B

$$\hat{Y}_3 = 0.9955 + 0.0532 D - 1.6550 X + 0.0142 DX$$

(0.0179)* (3.2606) (0.0251)

$$R^2 = 0.57 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}_3 = -2.2781 + 1.4512 \log D + 0.4183 \log X - 0.1427 \log (DX)$$

(0.6593)** (2.2073) (1.0982)

$$R^2 = 0.31 \quad DF = 18$$

Method B

$$\hat{Y}_3 = 0.9955 + 0.0532 D - 0.9641 X + 0.0144 DX$$

(0.0192)** (3.8574) (0.0307)

$$R^2 = 0.47 \quad DF = 18$$

4 - from All Sources

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}_4 = - 0.8380 + 1.1054 \log D - 0.3427 \log X + 0.1203 \log (DX)$$

$$(0.2386)^* \quad (0.6858) \quad (0.3430)$$

$$R^2 = 0.72 \quad DF = 18$$

Method B

$$\hat{Y}_4 = 6.5256 + 0.1952 D - 8.9427 X + 0.0292 DX$$

$$(0.0464)^* \quad (8.4667) \quad (0.0652)$$

$$R^2 = 0.70 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}_4 = - 0.8380 + 1.1054 \log D - 0.5707 \log X + 0.3430 \log (DX)$$

$$(0.3106)^* \quad (1.0400) \quad (0.5174)$$

$$R^2 = 0.61 \quad DF = 18$$

Method B

$$\hat{Y}_4 = 6.5257 + 0.1952 D - 1.8442 X + 0.1339 DX$$

$$(0.0875)^{**} (17.6017) \quad (0.1403)$$

$$R^2 = 0.49 \quad DF = 18$$

II) For Wheat and Flour Imports

1 - from the United States

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}'_1 = - 2.6137 + 1.7042 \log D - 1.1854 \log X + 0.4888 \log (DX)$$

$$(0.5226)^* \quad (1.5021) \quad (0.7513)$$

$$R^2 = 0.61 \quad DF = 18$$

Method B

$$\hat{Y}'_1 = - 0.3799 + 0.0827 D - 3.0055 X + 0.0118 DX$$

$$(0.0160)^* \quad (2.9205) \quad (0.0225)$$

$$R^2 = 0.78 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}'_1 = - 2.6136 + 1.7042 \log D - 0.2170 \log X + 0.2330 \log (DX)$$

$$(0.4804)^* \quad (1.6085) \quad (0.8003)$$

$$R^2 = 0.59 \quad DF = 18$$

Method B

$$\hat{Y}'_1 = - 0.3799 + 0.0827 D + 2.1773 X + 0.0644 DX$$

$$(0.0431)^{***} (8.6661) \quad (0.0691)$$

$$R^2 = 0.49 \quad DF = 18$$

2 - from Other Developed Countries

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}'_2 = - 0.6478 + 0.7566 \log D - 0.1835 \log X + 0.0372 \log (DX)$$

$$(0.1528)^* \quad (0.4393) \quad (0.2197)$$

$$R^2 = 0.74 \quad DF = 18$$

Method B

$$\hat{Y}'_2 = 4.0237 + 0.0362 D - 2.3246 X + 0.0035 DX$$

$$(0.0136)^{**} (2.4808) \quad (0.0191)$$

$$R^2 = 0.49 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}'_2 = - 0.6478 + 0.7566 \log D - 0.6277 \log X + 0.3023 \log (DX)$$

$$(0.3133)^{**} \quad (1.0490) \quad (0.5219)$$

$$R^2 = 0.41 \quad DF = 18$$

Method B

$$\hat{Y}'_2 = 4.0237 + 0.0362 D - 0.9903 X + 0.0230 DX$$

$$(0.0303) \quad (6.0912) \quad (0.0486)$$

$$R^2 = 0.19 \quad DF = 18$$

3 - from the Less Developed Countries

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}'_3 = - 2.3658 + 1.2115 \log D + 0.1475 \log X - 0.0601 \log (DX)$$

(0.5468)**
(1.5718)
(0.7861)

$$R^2 = 0.34 \quad DF = 18$$

Method B

$$\hat{Y}'_3 = - 2.7884 + 0.0424 D - 0.4207 X + 0.0022 DX$$

(0.0163)**
(2.9694)
(0.0229)

$$R^2 = 0.45 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}'_3 = - 2.3662 + 1.2117 \log D - 2.6621 \log X + 1.2075 \log (DX)$$

(0.6488)***
(2.1722)
(1.0808)

$$R^2 = 0.40 \quad DF = 18$$

Method B

$$\hat{Y}'_3 = - 2.7884 + 0.0424 D - 1.8572 X + 0.0143 DX$$

(0.0093)*
(1.8683)
(0.0149)

$$R^2 = 0.71 \quad DF = 18$$

4 - from All Sources

a) 1951-1953 and 1954-1956

Method A

$$\log \hat{Y}'_4 = - 1.3073 + 1.2513 \log D - 0.5134 \log X + 0.1956 \log (DX)$$

(0.2019)*
(0.5803)
(0.2902)

$$R^2 = 0.83 \quad DF = 18$$

Method B

$$\hat{Y}'_4 = 1.2777 + 0.1617 D - 5.9845 X + 0.0173 DX$$

(0.0304)*
(5.5383)
(0.0426)

$$R^2 = 0.78 \quad DF = 18$$

b) 1951-1953 and 1959-1961

Method A

$$\log \hat{Y}_4 = -1.3074 + 1.2513 \log D - 0.6592 \log X + 0.3948 \log (DX)$$

(0.2951)*
(0.9880)
(0.4916)

$$R^2 = 0.69 \quad DF = 18$$

Method B

$$\hat{Y}_4 = 1.2777 + 0.1617 D - 1.7599 X + 0.1138 DX$$

(0.0700)**
(14.0864)
(0.1123)

$$R^2 = 0.51 \quad DF = 18$$

Where:

- * means statistically significant at the 1% level.
- ** means statistically significant at the 5% level.
- *** means statistically significant at the 10% level.
- absence of asterisks means statistically insignificant at the 10% level.

Figures in parentheses are standard errors of the regression coefficients.

CHAPTER V

P. L. 480 CONSUMPTION EFFECT IN THE LESS DEVELOPED COUNTRIES

P. L. 480's humanitarianism¹ has attracted the least controversy, having received generally favorable response. Most studies in this area recognize the capacity of the United States agricultural surplus to alleviate some of the food shortages in the LDCs, and the law itself states a commitment to this objective.

The law's programs are global, although some countries have received more aid than others. The law bows to politics only to the extent of specifying that its recipients should be "friendly" to the United States, and thus excludes the communist LDCs. Therefore, P. L. 480 is characteristically considered ". . . a means of narrowing the world's 'hunger gap'. . . and reinforcing economic development" among the emerging nations of the world."²

¹" . . . a desire to improve the living conditions and opportunities of people abroad without regard to the security or economic prosperity of the United States." Edward S. Mason, "United States Interests in Foreign Economic Assistance," in The United States and the Developing Economies, ed. by Gustav Ranis (New York: W. W. Norton & Company, 1964), p. 14.

²Sherwood O. Berg, "The Role of Food for Peace," in Foreign Agricultural Trade: Selected Readings, ed. by Robert L. Tontz (Ames: The Iowa State University Press, 1966), p. 192. For more on the international status of P. L. 480, see Elmer L. Menzie and Robert G. Crouch, Political Interests in Agricultural Export Surplus Disposal Through Public Law 480, Technical Bulletin No. 161 (Tucson: The University of Arizona Agricultural Experiment Stations, 1964), pp. 32-33.

Humanitarian measures have continued to occupy congressional attention as well as economic studies. All have recognized that food aid cannot be based on purely altruistic motives. There is always some connection with the donor's foreign policy: some return is always expected, in political or ideological influence, perhaps. It is impossible to simply give aid to whomever needs it, ideal as this may seem.³

The preceding chapter showed that P. L. 480's contribution to the LDCs' food consumption was considered important enough to partially justify the substitution trade effect. This welfare contribution will be examined next.

P. L. 480 Contribution to the LDCs' Food Grain Consumption

Usually the estimate for food grain consumption is expressed in terms of the grains' net "availability" for human consumption, and is obtained by adding domestic production to net imports (imports minus exports) and to the change in stocks, and deducting an estimate for waste (such as through pests and spoilage) and for non-food uses (livestock feed, industrial uses, and seed).⁴ Per capita grain consumption

³Much has been written about the humanitarianism of foreign aid. For more detail, see Lloyd D. Black, The Strategy of Foreign Aid (Princeton, New Jersey: D. Van Nostrand Company, 1968); Benjamin J. Cohen, ed., American Foreign Economic Policy: Essays and Comments (New York: Harper & Row, 1968); Jacob J. Kaplan, The Challenge of Foreign Aid (New York: Frederick A. Praeger, 1967); Little and Clifford, International Aid; and Alternatives for Balancing World Food Production and Needs.

⁴Gross availability (production and change in stocks + net imports) is also used in some studies to indicate consumption since non-food uses are indirectly added to food consumption through other products, such as livestock products. This study assumes that available food grains are actually consumed.

is calculated by dividing net availability by population estimate.

Tables XXII and XXIII present the P. L. 480 contribution to food grain consumption in the LDCs in the first period under study, 1954-1956. The law's annual average concessional sales as a percentage of their net availability of total grains was 1.4%, and of wheat and flour 5%, in these early years. However, in the rice-eating regions of South East and Other East Asia, P. L. 480 contributed much more to wheat and flour consumption, 21% and 37% respectively. It must be kept in mind that during 1954-1956 the law's programs were only beginning; the law did not yet pretend to concentrate on food and development problems. In fact, at this time, the LDCs taken together were net exporters of total grains, although they averaged only 595 thousand metric tons annually.

By 1959-1961, the second period under study, P. L. 480 had proved to contribute significantly to the LDCs' food grain consumption, especially of wheat and flour. It contributed an annual average of 5.6% of their consumption of total grains during this period (Table XXIV). North African countries benefited most: an annual average of 15% of their total grain consumption came from the United States on concessional terms. For the LDCs taken together, this period showed an increase in total grain production, net imports (reaching an annual average of 11,517 thousand metric tons), net availability, per capita net availability (approaching 307 pounds annually), and in the P. L. 480 contribution to their consumption of these commodities as compared with corresponding figures for 1954-1956.

P. L. 480 showed an even more significant contribution to the LDCs' consumption of wheat and flour during 1959-1961, with an annual average of 19.3%. Indeed, a significant contribution appeared in most

TABLE XXII

P. L. 480 ANNUAL CONTRIBUTION TO THE LDCS' TOTAL GRAIN CONSUMPTION, AVERAGE 1954 - 1956

LDCs	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)	(9) ^c	
	Production	Change in Stocks	Imports	Exports	Net Imports (3) - (4)	Total Supply (1) + (5)	Net Availability (6) x .75	Per Capita Availability	P.L. 480 Contribution	
		--	thousand	metric	tons --			-- pounds --	-- per cent--	
Latin America	39373.67	n.a.	3989.67	6196.67	-2207.00	37166.67	27875.00	337.29	1.88	
DEVELOPED COUNTRIES Africa	North	12622.33	n.a.	584.33	1241.00	-656.67	11965.67	8974.25	342.82	2.99
	West	3494.0	n.a.	523.67	87.67	436.00	3930.00	2947.50	71.62	.75
	East	5805.33	n.a.	313.33	212.00	101.33	5906.67	4430.00	143.53	-
	Total	21921.67	n.a.	1421.33	1540.67	-119.33	21802.33	16351.75	166.79	1.78
DEVELOPED COUNTRIES Asia	West	18616.33	n.a.	1434.67	1298.00	136.67	18753.00	14064.75	448.67	5.19
	South	89770.0	n.a.	2235.33	149.33	2086.00	91856.00	68892.00	296.24	.44
	South East	17972.67	n.a.	178.67	3471.00	-3292.33	14680.33	11010.25	391.96	.32
	Other East	10336.67	n.a.	1363.00	148.00	1215.00	11551.67	8663.75	330.96	4.26
	Total	136695.67	n.a.	5211.67	5066.33	145.33	136841.00	102630.75	318.16	1.40
LESS Far East & Oceania	14405.0	n.a.	1628.33	42.33	1586.00	15991.00	11993.25	279.44	.00	
All LDCs	212396.0	n.a.	12251.00	12846.00	-595.00	211801.00	158850.75	285.93	1.42	

^a1954/1955 - 1956/1957.^bNon-food utilization: 25% of total supply for total grains, 15% for wheat and flour. See "Trends and Patterns in World Grain Consumption," p. 11.^cConcessional Sales Net Availability; see Table XVIII for concessional sales.

TABLE XXIII

P. L. 480 ANNUAL CONTRIBUTION TO THE LDCS' WHEAT AND FLOUR CONSUMPTION, AVERAGE 1954 - 1956

LDCs	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)	(9) ^c	
	Production	Change in Stocks	Imports	Exports	Net Imports (3) - (4)	Total Supply (1) + (5)	Net Availability (6) x .85	Per Capita Net Availability	P.L. 480 Contribution	
			thousand	metric	tons - -			- Pounds -	- per cent -	
Latin America	10899.33	n.a.	3501.33	3214.33	287.00	11186.33	9508.38	115.05	5.05	
COUNTRIES	North	4546.33	n.a.	491.67	403.33	88.33	4634.67	3939.47	150.49	6.80
	West	12.00	n.a.	285.33	-	285.33	297.33	252.73	6.14	-
	East	325.00	n.a.	148.33	.33	148.00	473.00	402.05	13.03	-
	Total	4883.33	n.a.	925.33	403.67	521.67	5405.00	4594.25	46.86	5.84
	DEVELOPED	West	10415.00	n.a.	984.67	539.33	445.33	10860.33	9231.28	294.48	5.73
ASIA	South	12700.00	n.a.	1172.67	.33	1172.33	13872.33	11791.48	50.70	2.20
	South East	4.33	n.a.	126.00	-	126.00	130.33	110.78	3.94	20.94
	Other East	140.33	n.a.	776.33	-	776.33	916.67	779.17	29.76	36.92
	Total	23259.67	n.a.	3059.67	539.67	2520.00	25779.67	21912.72	67.93	5.01
	LESS	Far East & Oceania	-	n.a.	449.00	-	449.00	449.00	381.65	8.89
All LDCs	39042.33	n.a.	7935.33	4157.67	3777.67	42820.00	36397.00	65.51	5.07	

^a1954/1955 - 1956/1957.^bSee footnote b, Table XXII.^cConcessional Sales Net Availability ; see Table XVII.

TABLE XXIV

P. L. 480 ANNUAL CONTRIBUTION TO THE LDCS' TOTAL GRAIN CONSUMPTION, AVERAGE 1959 - 1961

LDCs	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)	(9) ^c		
	Production	Change in Stocks	Imports	Exports	Net Imports (3) - (4)	Total Supply (1) + (5)	Net Availability (6) x .75	Per Capita Availability	P. L. 480 Contribution		
		--	thousand	metric	tons --			-- pounds --	-- per cent --		
Latin America	45362.33	n.a.	4864.33	5578.33	-714.00	44648.33	33486.25	351.61	4.54		
COUNTRIES	Africa	North	10693.00	n.a.	2918.67	741.00	2177.67	12870.67	9653.00	326.27	15.00
		South	3752.67	n.a.	843.00	127.00	716.00	4468.67	3351.50	73.06	3.21
		East	5756.67	n.a.	490.00	268.00	222.00	5978.67	4484.00	126.45	.84
		Total	20202.33	n.a.	4251.67	1136.00	3115.67	23318.00	17488.50	157.40	9.11
DEVELOPED	Asia	West	20926.00	n.a.	2886.67	347.67	2539.00	23465.00	17598.75	491.00	6.25
		South	107970.67	n.a.	6386.33	75.67	6310.67	114281.33	85711.00	334.27	5.00
		South East	21748.33	n.a.	202.67	4067.67	-3865.00	17883.33	13412.50	418.47	.72
		Other East	12008.67	n.a.	1903.67	203.67	1700.00	13708.67	10281.50	337.23	8.74
		Total	162653.67	n.a.	11379.33	4694.67	6684.67	169338.33	127003.75	355.61	5.41
LESS	Far East & Oceania		16141.00	n.a.	2441.33	10.33	2431.00	18572.00	13929.00	288.33	1.10
		All LDCs	244359.33	n.a.	22936.67	11419.33	11517.33	255876.67	191907.50	307.05	5.60

^a1959/1960 - 1961-1962. ^bSee footnote b, Table XXIII. ^cConcessional Sales Net Availability; see Table XI for concessional sales.

TABLE XXV

P. L. 480 ANNUAL CONTRIBUTION TO THE LDCS' WHEAT AND FLOUR CONSUMPTION, AVERAGE 1959 - 1961

LDCs	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)	(9) ^c		
	Production	Change in Stocks	Imports	Exports	Net Imports (3) - (4)	Total Supply (1) + (5)	Net Availability (6) x .85	Per Capita Availability	P. L. 480 Contribution		
		--	thousand	metric	tons --			-- pounds --	-- per cent --		
COUNTRIES	Latin America	8726.33	n.a.	4186.33	1978.33	2208.00	10934.33	9294.18	97.59	14.45	
	Africa	North	3846.33	n.a.	2548.00	221.33	2326.67	6173.00	5247.05	177.35	24.07
		West	4.00	n.a.	468.00	.33	467.67	471.67	400.92	8.74	16.47
		East	281.33	n.a.	228.33	-	228.33	509.67	433.22	12.22	4.50
		Total	4131.67	n.a.	3244.33	221.67	3022.67	7154.33	6081.18	54.73	22.18
DEVELOPED	West	12268.00	n.a.	1938.00	160.33	1777.67	14045.67	11938.82	333.10	7.07	
	South	15812.33	n.a.	4850.67	-	4850.67	20663.00	17563.55	68.50	22.20	
	South East	5.67	n.a.	163.00	-	163.00	168.67	143.37	4.47	63.26	
	Other East	209.33	n.a.	1124.00	14.33	1109.67	1319.00	1121.15	36.77	59.46	
	Total	28295.33	n.a.	8075.67	174.67	7901.00	36196.33	30766.88	86.15	18.56	
LESS	Far East & Oceania	-	n.a.	494.33	1.67	492.67	492.67	418.77	8.67	.64	
All LDCs	41153.33	n.a.	16000.67	2376.33	13624.33	54777.67	46561.02	74.50	19.32		

^a1959/1960 - 1961/1962.^bSee footnote b, Table XXII.^cConcessional Sales Net Availability; see Table XIX for concessional sales.

of the less developed regions⁵ with a peak of 63.3% and 59.5% for South East and Other East Asia respectively. The sharp upswing in wheat consumption in traditionally rice-eating areas may have been stimulated by the aid programs, for wheat is the only commodity in large enough supply to meet the recipients' food needs.⁶ With such a positive P. L. 480 contribution, it is no wonder that, in the words of M. L. Upchurch: ". . . American agriculture is in good shape to help wage the world War on Hunger."⁷

The LDCs' Income Elasticities of Food Grain Consumption

The P. L. 480 consumption effect was expressed above to be the law's concessional sales as a percentage of the LDCs' total actual net availability (including P. L. 480 shipments) of total grains, and wheat and flour for an annual average of each of the two periods under study. However, the law has hoped to provide its recipients with additional food beyond what would have been imported in its absence, so that the increase may induce them to import more from the United States, besides helping ease their food shortage. Examining income elasticities of

⁵The P. L. 480 annual average contribution to all grains and wheat and flour, 1959-1961, in South Asia was estimated at 5% and 22% respectively. It is of interest to note that J. S. Mann reached closely similar results for India alone. For the years 1956-1963, P. L. 480 Title I imports were 4.48% of net availability of cereals in India, and 21.31% for wheat alone. See Mann's "The Contribution of United States Public Law 480 to Indian Economic Development" (Ph.D. dissertation, The University of Minnesota, 1966), p. 57.

⁶Hutchison, et al., World Demand Prospects for Wheat in 1980, p. 47.

⁷"The Capacity of the United States to Supply Food for Developing Countries," in Alternatives for Balancing World Food Production and Needs, p. 222.

demand for the commodities under study before and after the enactment of the law will allow general statements on how far the LDCs have actually preferred to change their food grain consumption with changes in income.

Therefore, income elasticities of demand may be used here as a basis for finding out whether or not these countries, beset by food shortages, having the opportunity of obtaining P. L. 480 concessional sales, have experienced higher income elasticities of demand for food grains after P. L. 480 was enacted than before. Differences in income elasticities can be evaluated, and the conditions under which P. L. 480 might have an influence on these elasticities.

Since income is of primary importance in determining per capita food consumption,⁸ per capita grain consumption (C for total grains and C' for wheat and flour) is assumed to depend on per capita incomes (X).

It has long been recognized that

. . .in developing countries annual series for food commodities are either non-existent, or unreliable or cover too short a time period. We can reasonably assume that time series results did not play a major role in deriving income elasticities for these countries.⁹

Therefore, the LDCs' income elasticities of demand for food grains will be calculated using a linear logarithmic regression in a region-by-region cross-sectional analysis as follows:

⁸Many studies have shown the importance of income in determining food consumption; see, for example, L. M. Goreux, "Income and Food Consumption," Monthly Bulletin of Agricultural Economics and Statistics, IX, No. 10 (1960), 1-13. Other factors should not be ignored, though, such as prices, taste and preference, urbanization, prices of related commodities, social and political factors.

⁹Quirino Paris, An Appraisal of "Income" Elasticities for Total Food Consumption in Developing Countries (Paris: Development Centre of the Organization for Economic Co-operation and Development, 1970), p. 12.

<u>Total Grains</u>	<u>Wheat and Flour</u>
$\log C_t = \alpha_t + \beta_t \log X_t + \epsilon_t$	$\log C'_t = \alpha'_t + \beta'_t \log X_t + \epsilon'_t$

where $t = 1, 2, \dots, 11$ observations; α_t and β_t are the regression parameters; and ϵ_t are the disturbance terms.

An advantage of this model is its similarity with that of the P. L. 480 trade effect. Both models have common references, since they both use per capita income as the independent variable. Also, this model will be helpful in testing the differences in income elasticities with the use of the dummy variable approach as it was applied in the final section of Chapter IV.¹⁰

Tables XXVI and XXVII give the LDCs' per capita consumption of total grains and wheat and flour in the base period, 1951-1953; these will be regressed on their per capita incomes for the same period from Table XIII. The estimated regression equations obtained by the method of least squares are

<u>Total Grains</u>	<u>Wheat and Flour</u>
$\log C = 1.5708 + 0.4189 \log X$ (0.1790)	$\log C' = -1.7577 + 1.6966 \log X$ (0.5506)
$R^2 = 0.38^{**}$	$R^2 = 0.51^{**}$

** indicates statistically significant at the 95% level.

These regression coefficients represent the LDCs' income elasticities for consumption of these commodities; each has a positive sign, which is consistent with economic reasoning that the LDCs, faced with a

¹⁰This model also allows the aggregate statement needed without using family budget surveys, which have been criticized for their deficiencies and information gaps, for the estimation of income elasticities and projections in the developing countries. For detail on this matter see Paris, An Appraisal of "Income" Elasticities.

TABLE XXVI

LDCS' ANNUAL TOTAL GRAIN CONSUMPTION, AVERAGE 1951 - 1953

LDCs	(1)a Production	(2) Change in Stocks	(3) Imports	(4) Exports	(5) Net Imports (3) - (4)	(6) Total Supply (1) + (5)	(7)b Net Avail- ability (6) x .75	(8) Per Capita Net Avail- ability	
		---	thousand	metric	tons ---			- pounds -	
Latin America	30889.00	n.a.	4156.67	3440.33	716.33	31605.33	23704.00	312.89	
DEVELOPED COUNTRIES Africa	North	10367.00	n.a.	1052.00	1121.00	-69.00	10298.00	7723.50	316.67
	West	5365.00	n.a.	319.33	104.00	215.33	5580.33	4185.25	109.24
	East	5671.00	n.a.	356.33	140.33	216.00	5587.00	4415.25	152.77
	Total	21403.00	n.a.	1727.67	1365.33	362.33	21765.33	16324.00	177.93
DEVELOPED COUNTRIES Asia	West	14812.00	n.a.	859.00	1252.67	-393.67	14418.33	10813.75	370.91
	South	75826.00	n.a.	4855.00	110.33	4744.67	80570.67	60428.00	277.97
	South East	13787.00	n.a.	111.00	3144.67	-3033.67	10753.33	8065.00	310.50
	Other East	8925.00	n.a.	1364.67	72.67	1292.00	10217.00	7662.75	320.30
	Total	113350.00	n.a.	7189.67	4580.33	2609.33	115959.33	86969.50	287.00
Far East & Oceania	713.00	n.a.	1949.33	34.67	1914.67	2627.67	1970.75	48.87	
LESS All LDCs	166355.00	n.a.	15023.33	9420.67	5602.67	171957.67	128968.25	257.94	

^aAverage 1948/49 - 1952/53.^bSee footnote b, Table XXII.

TABLE XXVII

LDCS' ANNUAL WHEAT AND FLOUR CONSUMPTION, AVERAGE 1951 - 1953

LDCs	(1) ^a	(2)	(3)	(4)	(5)	(6)	(7) ^b	(8)	
	Production	Change in Stocks	Imports	Exports	Net Imports (3) - (4)	Total Supply (1) + (5)	Net Availability (6) x .75	Per Capita Net Availability	
			-- thousand	metric	tons --			-- pounds --	
Latin America	7972.00	n.a.	3409.33	1727.00	1682.33	9654.33	8206.18	108.32	
DEVELOPED COUNTRIES	North	3374.00	n.a.	982.00	313.67	668.33	4042.33	3435.98	140.88
	West	59.00	n.a.	201.67	.67	201.00	260.00	221.00	5.77
	East	310.00	n.a.	128.33	10.67	117.67	427.67	363.52	12.58
	Total	3743.00	n.a.	1312.00	325.00	987.00	4730.00	4020.50	43.82
	Asia	West	8061.00	n.a.	631.67	417.00	214.67	8275.67	7034.32	241.28
South	11603.00	n.a.	3096.00	12.67	3083.33	14686.33	12483.38	57.42	
South East	4.00	n.a.	109.67	-	109.67	113.67	96.62	3.72	
Other East	98.00	n.a.	549.67	-	549.67	647.67	550.52	23.01	
Total	19766.00	n.a.	4387.00	429.67	3957.33	23723.33	20164.83	66.54	
Far East & Oceania	-	n.a.	781.33	-	781.33	781.33	664.13	16.47	
LESS	All LDCs	31481.00	n.a.	9889.67	2481.67	7408.00	38889.00	33055.65	66.11

^aAverage 1948/49 - 1952/53.^bSee footnote b, Table XXII.

food shortage, will increase their food grain consumption as their per capita income rises, other factors remaining constant. That is, with a 10% increase in per capita income in the LDCs in 1951-1953, per capita wheat and flour consumption increases by 16%, total grains by 4%.

For the use of the dummy variable test,¹¹ assume that the food grain consumption (C for total grains and C' for wheat and flour) for 1951-1953 and for 1954-1956 is written as follows:

$$\log C_i = \log a_0 + a_1 \log D + a_2 \log X_i + a_3 \log (DX_i) + \log U_i$$

$$i = 1, \dots, 22 \text{ observations}$$

where $\log D = 1$ if the observation lies in the base period.

= 0 if the observation lies in the 1954-1956 period

X = per capita incomes, and

a_1 and a_3 = the differential intercept and differential slope coefficients, respectively.

The estimated regression equations are¹²

1) for total grains

$$\log C_i = 1.5708 - 0.1926 \log D + 0.4189 \log X_i + 0.0955 (\log DX_i)$$

$$(0.6724) \quad (0.2339)** \quad (0.3363)$$

$$R^2 = 0.35 \quad DF = 18$$

2) for wheat and flour

$$\log C'_i = -1.7577 - 0.0702 \log D + 1.6966 \log X_i + 0.0194 (\log DX_i)$$

$$(1.6093) \quad (0.5599)* \quad (0.8049)$$

$$R^2 = 0.50 \quad DF = 18$$

¹¹Gujarati, "Use of Dummy Variables," pp. 50-52.

¹²Estimates of per capita incomes and per capita total grains consumption for (1951-1953 - 1954-1956) and for (1951-1953 - 1959-1961) are obtained from Tables XIII, XV, XVI, XXVI, XXVII, XXII, XXIII, XXIV, and XXV.

By the same method, regression equations for 1951-1953 and 1959-1961 are

1) for total grains

$$\log C_i = 1.5708 - 0.3390 \log D + 0.4189 \log X_i + 0.1702 (\log DX_i)$$

(0.8598) (0.2568) (0.4278)

$$R^2 = 0.24 \quad DF = 18$$

2) for wheat and flour

$$\log C'_i = -1.7578 - 0.8769 \log D + 1.6966 \log X_i + 0.4374 (\log DX_i)$$

(1.8764) (0.5605)* (0.9336)

$$R^2 = 0.49 \quad DF = 18$$

* indicates significance at better than 1%

** indicates significance at better than 10%

Figures in parentheses are standard errors of the regression coefficients.

The above four equations indicate that both the differential intercept and the differential slope coefficients are statistically insignificant, meaning that the intercept and income elasticity for food grain consumption functions in the LDCs before P. L. 480 (1951-1953) are not different from those in evidence during the law's operation (1954-1956 and 1959-1961).

With the exception of a few regions, P. L. 480 has caused the LDCs' actual commercial grain imports from all sources to be less than their expected levels in the absence of the law in the two periods under study and for both commodities in question (Tables XXVIII and XXIX). In other words, no addition to the LDCs' food grain consumption beyond the law's shipments was attributable to the law having expanded these countries' commercial imports of grains. However, the adverse effect on the LDCs' total commercial imports was compensated partially by the law's shipments themselves and by other factors such as the increase in domestic production, leaving income elasticities almost unchanged. In most of

TABLE XXVIII

LDCS: ANNUAL EXPECTED AND ACTUAL COMMERCIAL IMPORTS,
FROM ALL SOURCES, AVERAGE 1954 - 1956

		A) Total Grains			B) Wheat and Flour			
		Expected Commercial Imports		Actual Commercial Imports	Expected Commercial Imports		Actual Commercial Imports	
		Method A	Method B		Method A	Method B		
		-- thousand metric tons --			-- thousand metric tons --			
C O U N T R I E S	Latin America	4879.339	4239.207	3465.922	3659.504	3168.942	3021.433	
	D E V E L 	North	793.194	811.932	315.858	544.764	564.252	223.217
		West	580.658	773.495	501.666**	360.700	470.655	285.333**
		East	433.025	578.006	313.333	268.673	351.240	148.333
		Total	2018.627	2332.695	1130.858	1317.647	1526.928	656.883
		South	2027.273	1728.583	705.087	1538.871	1301.781	455.416
	L E S S	Other East	2867.442	4042.643	1930.965	1749.767	2387.760	913.717
		South East	398.596	529.604	143.816	247.697	322.610	102.800
		Total	1057.068	1002.260	993.429	754.188	721.835	488.633
		Far East & Oceania	5341.935	6678.524	3768.219	3387.097	4198.783	1960.567
	All LDCs	n.a.	n.a.	1627.931	n.a.	n.a.	449.000	
			13816.667	15014.269	9992.932	9244.444	10139.321	6087.883

** means that the level of domestic production is less than that of the base period, 1951-1953.

TABLE XXIX

LDCS: ANNUAL EXPECTED AND ACTUAL COMMERCIAL IMPORTS,
FROM ALL SOURCES, AVERAGE 1959 - 1961

		A) Total Grains			B) Wheat and Flour			
		Expected Commercial Imports		Actual Commercial Imports	Expected Commercial Imports		Actual Commercial Imports	
		Method A	Method B		Method A	Method B		
		-- thousand metric tons --			-- thousand metric tons --			
C O U N T R I E S	Latin America	5946.667	5106.138	3344.241	4493.333	3834.770	2843.533	
	D E V E L O P E D	North	963.609	966.726	1470.672*	668.343	678.356	1284.750*
		West	849.083	1018.668	735.371**	546.330	654.179	401.950**
		East	516.667	679.296	452.382	322.305	416.140	208.833**
		Total	2586.667	2869.353	* 2658.225**	1715.556	1917.332	1895.533*
L E S S	West	1617.204	1492.599	1787.388*	1170.609	1087.945	1093.534*	
	South	3846.154	5196.632	2098.763	2589.744	3244.815	950.434	
	South East	508.654	646.500	105.739	320.833	403.053	72.300	
	Other East	843.293	887.032	1004.832*	572.256	608.652	457.300	
	Total	6721.429	8016.337	4506.930	4335.714	5163.855	2364.934	
Far East & Oceania	n.a.	n.a.	2288.499	n.a.	n.a.	491.633		
All LDCs	17006.250	17968.168	12182.672	11512.500	12298.539	7004.667		

* means actual commercial imports > expected commercial imports, according to at least one method.

** where the level of domestic production is less than that of the base period, 1951-1953.

the less developed regions, for example, domestic production of the two commodities under study has increased for 1954-1956 and 1959-1961, as compared with the base period (Tables XXVIII and XXIX). Whether or not this increased production was influenced by the law (P. L. 480 production effect) is the subject of the next chapter.

P. L. 480 should not be held solely responsible for the insignificant variation in the LDCs' income elasticities, since food consumption in these countries is influenced by many different variables related to production and foreign trade. Considering the inadequacy of domestic agriculture, population problems, food shortages, more grain imports, and the struggle for a better standard of living in these countries, a massive concessional food aid program like P. L. 480 may be expected to cause some impact (hopefully a positive one) on their grain consumption pattern with respect to their income. Whether the foreign currencies the LDCs saved by substituting P. L. 480 concessional shipments for commercial food grain imports went to buy more foreign capital goods for development purposes, or to buy more foreign non-grain food raises a serious question: why not more food grains which, besides being inexpensive even in commercial purchases by comparison with other food products, already dominate the diet in these countries?¹³ This question can be answered in a comprehensive study that goes beyond food grains to include all non-grain food consumption in the LDCs.

¹³"In the less developed countries. . . .Where the caloric intake is extremely low, the first need is for increased supplies of high energy foods." Pollock, "Is the World Changing Its Eating Habits?" pp. 6-7.

CHAPTER VI

P. L. 480 PRODUCTION EFFECT IN THE LESS DEVELOPED COUNTRIES

P. L. 480 was enacted mainly to rid the United States of accumulated agricultural surpluses. The United States hoped that these supplies would not replace the recipients' commercial imports of these commodities, and hoped also that this surplus food might help to feed the world's hungry and promote their economic development.

The necessary conditions under which these goals might be accomplished had been defined in studies done on agricultural aid programs. Nurkse, for example, indicated that

A transfer of consumable resources from the rich to the poor may increase the world total of human happiness. It may be desirable on grounds of welfare economics, though even on this level the system might not be without its drawbacks.¹

These possible drawbacks were seriously investigated by both the United States and international agencies.² From the early 1960's it was recognized that unless United States food aid programs were carefully planned, they might cause "trade disruptions, growth interruptions,

¹Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries and Patterns of Trade and Development (New York: Oxford University Press, 1967), pp. 93-94.

²See, for example, United Nations, Food and Agriculture Organization, Uses of Agricultural Surpluses to Finance Economic Development in Under-developed Countries: A Pilot Study in India (Commodity Policy Studies, No. 6), 1955.

and scandalous waste."³

It should be noted here that food aid is not, and should not be, considered the sole approach to the LDCs' food problem. Others must be population control, increased agricultural productivity, and the development of non-conventional sources of food supply.⁴ When the LDCs' food shortage is considered as a short-run problem, population control and an increase in food aid are usually recommended. Over the long run, however, these countries should overcome most of their food shortage through increased productivity and some degree of population control.

Relating P. L. 480 programs and food aid in general to the economic development issues in the LDCs is beyond the scope of this chapter. It will rather examine the conditions under which P. L. 480 programs might have contributed to the LDCs' agricultural development, particularly their food grain production. Hopefully, this examination will provide perspectives by which the P. L. 480 production effect may be judged.

Food Aid and Agricultural Development in the LDCs

Agriculture in most of the LDCs provides food and raw materials for domestic and foreign markets, and occupies most of the labor force and land resources; thus its development is a priority requiring serious programs on many fronts. These programs must be aided by agricultural policies concerning land (area, productivity, tenure, and reform), labor

³Willard W. Cochrane, Arthur B. Mackie, and Grover C. Chappell, "Potential Uses of Farm Products as Aid to Developing Countries," JFE, XLV, No. 5 (1963), 973.

⁴"Panel Discussion: Optimal Strategies for Balancing Future World Food Production and Needs," in Alternatives for Balancing World Food Production and Needs, pp. 243-66.

productivity and disguised unemployment and incentives to farm, capital, climate, prices, credit and marketing facilities, use of fertilizers and pesticides, technological advance, and education.⁵ Most of these policies are initiated and put into effect by the LDCs themselves.

However, foreign aid can supplement these internal efforts. According to Robert Stern, agricultural surplus disposal can contribute to recipients' consumption and economic development without replacing their commercial imports if certain conditions are met:

- 1) Additional consumption made possible by the surplus aid in the recipient countries should be matched concurrently by additional investment beyond what had been originally planned. Where added consumption is not matched by increased investment, these countries would gain relatively little capital formation for their economic development except indirectly through improved diets which might make possible improved productivity. Inflation would occur, however, if added investment were not met by a sufficient supply of consumption goods. Long-term guarantees should assure the recipients that these aid-investment programs will not be abruptly terminated.
- 2) The prices of these surplus aid commodities, when sold for local currency, should not be higher than the world market prices, unless they are received as grants. Nor should they be lower than current prices in the recipient countries. In the first case, the recipients would be paying more than the alternative value of the resources; and in the second, possible substitution of these aid commodities for

⁵For detailed analysis of these factors, see John W. Mellor, The Economics of Agricultural Development (Ithaca, New York: Cornell University Press, 1966).

domestic products would occur.⁶

Other studies emphasized further conditions. When workers in development projects, for instance, are paid partially in kind, in terms of the food aid commodities, little impact on domestic food prices will occur. In doing this, however, the LDCs require not only food commodities (wage fund) but also a supply of many capital goods and services such as clothing, housing, and capital equipment.⁷ Therefore, food aid should encourage, and not substitute, other forms of aid. Nor should food aid reduce the efforts of the recipient governments to develop domestic agriculture. These efforts may be in the form of coordinated plans (agricultural price policies, for example) to absorb food aid without adverse effect on domestic prices and thus on production; the incorporation of food aid into long-run economic plans; and provisions for required additional investment to match concurrently the increased consumption made possible by the food aid. Finally, the local currencies received for the sale of food aid commodities can, under favorable conditions, contribute to the recipients' agricultural development.⁸

⁶"Agricultural Surplus Disposal as a Means of Financing Economic Development," Economia Internazionale, XII (1959), 643-57. For full treatment, see Stern's "World Food Exports and United States Agricultural Policies: A Study of the Development of World Trade in Food with Special Reference to United States Food Surplus Disposal and Foreign Aid" (Ph.D. dissertation, Columbia University, 1958), Chapter VII.

⁷"Food aid for economic development alone could not be expected to amount to more than one-sixth to one-fifth of the total capital aid required by underdeveloped countries." United Nations, Food and Agriculture Organization, Development Through Food: A Strategy for Surplus Utilization (Rome, 1961), p. 3.

⁸For full treatment of these conditions, see Dubey, "Food Aid and Economic Development," pp. 167-98.

P. L. 480 and Agricultural Development in the LDCs:
 Emphasis on Food Grain Production

In spite of P. L. 480's intention of expanding trade among the United States and friendly nations and of providing food for needy people abroad, its commitment to economic development in recipient countries was too general: it did not emphasize agricultural productivity or increased food grain production. This deficiency was recognized:

Our basic objective is not to help the developing countries achieve self-sufficiency in food production. Rather, it is to help the recipient countries develop their economies to the point that at some future date they can import on commercial terms what they can not produce economically themselves.⁹

P. L. 480, therefore, is attempting to balance its consequences, for it would be self-defeating if, on the one hand, it expanded United States agricultural exports, and at the same time stimulated the LDCs' agricultural production, reducing their commercial imports from the United States and other exporters. Absolute self-sufficiency, however, is not a relevant goal for the LDCs. The viable priorities are for greater efficiency through increased agricultural productivity and the application of modern agricultural methods. Such activities would help solve, at least in part, the problems of food shortage, population density on limited land areas, and balance of payments.

Lester R. Brown discovered, empirically, that the main agricultural problem faced by the LDCs is low per-acre yields: this factor has limited their capacity to feed themselves and has perpetuated low agri-

⁹Irwin R. Hedges, "Foreign Economic Development and United States Agricultural Policy," in United States Agricultural Policy: Foreign and Domestic, Agricultural Policy Institute Series 28 (Raleigh: North Carolina State University, n.d.), p. 36.

cultural productivity. Brown borrowed Rostow's concept of a "take-off" stage of economic development, applied it to the low-yield-per-acre dilemma, and concluded that the LDCs need a "yield take-off" in their agriculture, which would generate a sustained trend of rapidly rising yields.¹⁰ Table XXX shows the persistence of the dilemma even with P. L. 480 programs in operation.

TABLE XXX

INDEX OF GRAIN PRODUCTION, AREA, YIELD, POPULATION,
AND OUTPUT PER PERSON BY ECONOMIC GROUPS OF THE
WORLD, 1934-1938, 1957/58-59/60, AND 1960/61

	1934-1938	Developed ^a		Less Developed ^b	
		1957/58-59/60	1960/61	1957/58-59/60	1960/61
Grain Production	100	140	151	135	142
Area in Grain	100	101	100	126	132
Yield Per Acre	100	138	151	107	108
Population	100		120		146
Output Per Person	100	119	126	96	97

^aNorth America, Western Europe, Eastern Europe and the U. S. S. R., and Oceania.

^bAsia, Africa, and Latin America.

Source: Several tables in Brown, Man, Land, and Food.

¹⁰"Population Growth, Food Needs, and Production Problems," Development Digest, III, No. 3 (1965), 80-89. For full detail on this subject, see Brown, Man, Land, and Food.

Table XXX indicates that rising per-acre yields in the developed regions produced a 51% increase in grain output between 1934-1938 and 1960. Four-fifths of the less developed regions' output increase of 42% came from expanded grain area rather than improved productivity.

A yield take-off could occur in the less developed regions if agricultural policies offered favorable farm incentives, such as increases in farm prices. Other measures, such as an increase in farm literacy and in available capital, would also be helpful. The development of a market-oriented economy would make it easier to finance the capital required to raise yields, and the support of non-agricultural sectors of the economy would facilitate agricultural inputs such as fertilizers, tractors, and insecticides.

In view of the situation, the question arises: what did, or could, P. L. 480 do to affect the LDCs' agricultural productivity in general, and their food grain production in particular?

P. L. 480 programs have saved the recipients foreign exchange: the law's substitution effect on the LDCs' commercial imports of food grains underlines this conclusion. But there are no guarantees that the foreign exchange thus released has been used to purchase foreign investment goods beyond what had been planned for in the absence of P. L. 480. It has been shown, for example, that ". . . a portion of U. S. wheat shipments to India has released exchange for the purchase of arms."¹¹ Similar claims have been made about other LDCs.

There are strong reasons, as the above discussion shows, for skep-

¹¹Raymond F. Mikesell, The Economics of Foreign Aid (Chicago: Aldine Publishing Company, 1968), p. 198.

ticism about the law's aggregate impact on agricultural productivity, particularly grain production, in the LDCs. The use of the counterpart funds which have accumulated under Title I, and which should contribute to the recipients' agricultural development, is questionable. As in the case of released foreign exchange funds, these local currencies carry no provisions for use. Too often the United States government approves the allotment of these funds as loans or grants, or for project use, without requiring specific plans. And the LDCs themselves tend to delay using these funds. As an example, on December 31, 1964:

. . .of the total accumulated local currencies earmarked for loans or grants to the recipients under P. L. 480 commodity sales agreements, nearly \$1.6 billion had not been disbursed, of which \$623 million equivalent represented Indian rupees.¹²

Lack of planning has resulted in spreading the counterpart funds too thinly over too many projects where agricultural development was not a priority; criticism of the use of the funds has centered on this weakness. Some of these uses are listed below; Table XXXI following indicates the share of economic development in these funds. Section 104 of Title I¹³ specifies allocation of counterpart funds to

- 1) agricultural market development
- 2) supplemental stockpiles
- 3) common defense
- 4) purchase of goods for other countries
- 5) grants for economic development
- 6) payment of U. S. obligations
- 7) loans to foreign governments

¹²Ibid., p. 190.

¹³Items 1 through 8 were included in the original Act. Item 9 was added on June 18, 1956; 10 on August 3, 1956; 11 on June 30, 1958; 12 through 15 on September 6, 1958; 16 through 18 on September 21, 1959; and 19 on August 8, 1961. Menzie and Grouch, Political Interests in Agricultural Export Surplus Disposal, p. 31.

- 8) international educational exchange
- 9) translation of books and periodicals
- 10) American-sponsored schools and centers
- 11) scientific, medical, cultural, and educational activities
- 12) buildings for U. S. government use
- 13) trade fairs
- 14) acquisition, indexing, and dissemination of foreign publications
- 15) American educational institutions
- 16) workshops and chairs in American studies
- 17) purchase of nonfood items for emergency uses
- 18) audiovisual materials
- 19) sales for dollars to U. S. tourists

Only 2.3% of planned foreign currency allocations under P. L. 480, Title I, July, 1954 to June, 1958, went for multilateral trade and economic development, as compared with 38.2% to pay for United States obligations and military procurement. Table XXXI illustrates the distribution of these funds, in millions of dollars.

TABLE XXXI

DISTRIBUTION BY REGIONS OF PUBLIC LAW 480 TITLE I SALES
AGREEMENTS, JULY 1954 TO JUNE 1958

Region	Total Agreements	Percent	Earmarked for Development	Percent
Europe	\$ 1,105.9	39.0	\$ 513.0	31.8
Latin America	362.4	12.8	283.4	17.6
Near East	287.2	10.2	171.3	10.6
Far East	1,078.9	38.0	646.3	40.0
Total	\$ 2,834.4	100.0	\$1,614.0	100.0

Source: Stern, "Agricultural Surplus Disposal," p. 645.

As the law put more emphasis on economic development in the 1960's, grants for economic development from July, 1954 to June, 1963 came to be 1739.8 million dollar equivalents, or 18.5% of the total foreign currency agreements to all developed and less developed recipients. Loans for food and agricultural development were only 275.2 million dollar equivalents, or 15% of total loans for economic development to all recipients (including such developed countries as Japan and Spain).¹⁴

Allocations aside, a closer look at the nature of these counterpart funds reveals their real shortcomings as means for financing economic development in the LDCs: "Why. . . should a country having an adequate fiscal and banking system want to borrow its own currency at 4 percent and have to listen to American advice on how this currency should be used. . . ?"¹⁵ In a similar vein, Little and Clifford indict strongly the present conduct of the counterpart funds; if a country needs funds for development projects, they maintain, it can issue or borrow currency itself and thus be relieved of external obligations in the use of the money:

[A recipient country] will use these counterpart funds only for things it wants to do anyway, and only then in order to please the Americans. This is the reason why so much remains unspent. . . . This clumsy device. . . was born from a belief in the economic obtuseness of Congress and the American public, who might be gulled into thinking that the commodities were being sold and not given away.¹⁶

Several attempts were made to encourage agricultural development

¹⁴Dubey, "Food Aid and Economic Development," pp. 188-90.

¹⁵Mason, "Foreign Money We Can't Spend," p. 83.

¹⁶International Aid, p. 173.

through work projects where money wages were partially supplemented by P. L. 480 Title II food grants.¹⁷ Besides possibly motivating the recipients to start such projects, P. L. 480 produced little success. Besides the inconvenience of its barter system,¹⁸ many workers could not prepare their favorite dishes from the aid commodities and so asked for a different kind of payment, since they were unwilling to change their customary diets. Tunisia, a major participant in agricultural food-for-work projects, was supplementing the money wage with American hard red winter wheat. The workers were eventually allowed to exchange these supplies for a coarse meal called semolina, made from local durum wheat and used in preparing the national dish, "couscous." After a time the money wage was being supplemented not with P. L. 480 wheat, but with bags bearing the phrase "Tunisian Semolina donated by the people of the United States of America."¹⁹

During the decade of 1956-1965 the United States shifted the emphasis of her economic aid to food aid under P. L. 480 programs. Table XXXII shows that economic aid under the Agency for International Development (AID) and under the Export-Import Bank has declined, while P. L. 480 and other sources of aid have become much more prominent.

¹⁷Such programs were tried in Tunisia, India, Algeria, Peru, Iran, Morocco, Afghanistan, Ethiopia, Libya, Tanganyika, Brazil, and Bolivia. Goals included water resource development, irrigation, and rural rehabilitation.

¹⁸Jacob Viner criticizes these food-for-work projects in that it seems "paradoxical that in our economic development activities abroad we should help laborers who have probably in many cases but recently emerged from a near-barter economy to return to it." "Economic Policy on the New Frontier," Foreign Affairs, XXXIX, No. 4 (1961), 568.

¹⁹Menzie, et al., Policy for Export Surplus Disposal, p. 64.

TABLE XXXII
SOURCE OF U. S. ECONOMIC ASSISTANCE COMMITMENTS TO LDCS^a

	1956-1960		1961-1965		1956-1965	
	\$ billion	percent	\$ billion	percent	\$ billion	percent
A. I. D.	7.2	58	9.7	48	16.9	52
Export-Import Bank	1.6	13	1.8	9	3.4	11
P. L. 480	3.0	24	6.3	31	9.2	28
Other	0.6	5	2.4	12	3.1	10
Total	12.4		20.2		32.6	

^aExcludes Egypt; includes Greece.

Source: Kenneth M. Kauffman and Helena Stalson, "U. S. Assistance to Less Developed Countries, 1956-1965," Foreign Affairs, XLV, No. 4 (1967), 720.

Greater contribution to multilateral agencies caused the increase in the "Other" category. Further, for the United States to use her counterpart funds meant a displacement of these funds for dollars and added to the LDCs' scarcity of foreign exchange.

The most controversial aspect of the P. L. 480 food grain production effect in the LDCs is the possibility of reducing government incentives for beginning and maintaining agricultural development programs, or depressing domestic prices which in turn causes a drop in the production of these commodities. Debates over these issues have concentrated on whether or not food production is affected by changes in the prices of food products; and on the differences in the conclusions of

empirical studies on what is called here the P. L. 480 production effect in particular and economic development in general in recipient countries. The results are different, the emphases were varied, and they were by no means conclusive. However, this empirical evidence can shed some light on common factors attributable to the P. L. 480 food grain production effect in the LDCs.²⁰ Both Pakistan and Israel, for example, used P. L. 480 grain to divert land from wheat to other purposes, export crops in the case of Pakistan; poultry, dairy production, and fruits and vegetables in the case of Israel. Governments in Colombia and Egypt, on the other hand, used P. L. 480 commodities to provide greater stability for internal market prices which were to a great extent government-controlled.

A comparative study of the impact of P. L. 480 Title I imports on domestic agricultural production in Colombia, India, Israel, Japan, Pakistan, and Turkey provided three conclusions that seem appropriate for a general statement on the P. L. 480 production effect in the LDCs:

- 1) P. L. 480 imports had very little adverse effect on agricultural production in the recipient countries;
- 2) the law has allowed additional flexibility in the recipients' public policy; and
- 3) differences in public policies among the recipients were the most important cause of differences in the impact of P. L. 480 shipments on

²⁰For details on this empirical evidence see Barlow and Libbin, Food Aid and Agricultural Development; and Mikesell, The Economics of Foreign Aid, pp. 191-98. Also see Appendix E for selected reference to the P. L. 480 economic impact on individuals and groups of recipients.

domestic agricultural prices and production from one recipient country to another.²¹ This third conclusion is also the main factor in the different outcomes in the empirical evidence mentioned earlier. Thus government agricultural policies in recipient countries have been mainly responsible for the direction of the P. L. 480 production effect. In addition to conclusion (1) above, which indicates that the law had very little adverse effect on agricultural production, it has been found that

. . .for many cases examined, changes in these shipments had relatively insignificant price-output effects and these could have been offset by a modest growth in population. Estimates of parameters for India indicate that a 20-percent increase in the quantity of food grain shipments between 1956-57 and 1961-62, other things being equal, would have decreased food grain prices 1.6 percent and domestic food grain output 0.4 percent.²²

This chapter must conclude that P. L. 480 surplus food has not fulfilled the condition that it provide more consumption and capital formation for economic development with no adverse effect on the LDCs' commercial imports of the same commodities. This study showed that the LDCs substituted P. L. 480 food grains for commercial imports of these products from the United States and other developed countries. And the United States has apparently come to consider P. L. 480 food aid as a substitute, rather than as a supplement, for dollar aid. Both are required for additional investment in the LDCs.

²¹See Wayne Alan Schutjer, "The Relationship Between P. L. 480 Title I Imports and Domestic Agricultural Production in Six Receiving Nations" (Ph.D. dissertation, Michigan State University, 1964).

²²Gary L. Seevers, "An Evaluation of the Disincentive Effect Caused by P. L. 480 Shipments," American Journal of Agricultural Economics, L, No. 3 (1968), 630.

Admittedly, P. L. 480 was not enacted to solve the LDCs' economic development problems,²³ nor to promote the development of self-sufficient food grain production. But even the relatively limited goals of contributing to agricultural efficiency and yield take-off, especially of food grains, have been blocked by the weaknesses of limited counterpart fund allocation, and food-for-wage shortcomings. The P. L. 480 production effect has depended primarily upon the public policies of the recipients themselves. Its effectiveness thus impeded, the law has made no demonstrable difference in its recipients' income elasticities of food grain consumption.

²³Matthew J. Kust, however, proposed a commodity exchange union for directing the world's surpluses into economic development. "Economic Development and Agricultural Surpluses," Foreign Affairs, XXXV, No. 1 (1956), 105-15.

CHAPTER VII

SUMMARY AND CONCLUSIONS

World attention has been focused on the development problems of the LDCs since World War II, and numerous intensive studies on their food problem have made familiar such issues as world hunger, the population explosion, the need for and supply of food and its shortage and balance, and food aid. These studies have also made apparent the complexity of the food problem, and have shown that any proposed general solutions must be accepted cautiously, in view of political, social, and economic differences among the LDCs.

Concurrently, the United States was coming to grips with another problem: the accumulation of agricultural surpluses. Between the LDCs' food needs on the one hand and the United States' surplus disposal needs on the other, certain meeting points occur, which this study has recognized. One is that the LDCs' food problem is primarily one of food grain availability, and that P. L. 480 food aid has been principally in the form of food grains. The P. L. 480 contribution to the LDCs' food grain consumption was studied on an aggregate basis, and referred to as the law's consumption effect. It was estimated that P. L. 480 contributed 1.4% and 5.6% of the LDCs' total grain consumption in 1954-1956 and 1959-1961 respectively, and for wheat and flour in the same periods 5% and 19.3%. This study has not presumed to offer normative statements about whether the law's consumption effect should be different in order

to be more efficient,¹ but simply to measure it, and to determine how far the LDCs might reasonably count on such a massive food aid program to help solve their food problem. Further, it was found that the LDCs' income elasticities of food grain consumption showed statistically insignificant variations before and after the enactment of the law. Such aggregate estimates are helpful in evaluating the extent of the LDCs' food problem and understanding why, for example, "give-away food is giving out - and still the world hungers."²

P. L. 480 was intended in theory to add to, and not replace, "usual marketings", or "normal" commercial foreign trade of the recipient countries, so that it could offer a net contribution to their economic development in general, and consumption in particular. The law, therefore, did not intend to ". . . save the recipient country foreign exchange. . ."³, nor to help the LDCs' food grain production to become self-sufficient to the point of reducing or competing with the commercial exports of the United States or her competitors.

This study found that the actual P. L. 480 trade effect on the LDCs was substitution, mainly of some of their expected commercial imports from the United States in 1954-1956; by 1959-1961, however, substitution had occurred for some of their expected commercial imports from other

¹William and Paul Paddock have introduced what they call "The Thesis of 'Triage'", suggesting that American food aid should be given only to those whom immediate aid can save. They list 111 recipients of P. L. 480 food (in 1965), and ask where within the triage each belongs. Famine - 1975! (Boston: Little, Brown & Company, 1967), pp. 205-09.

²The title of an article in U. S. News and World Report, June 2, 1967, pp. 38-39.

³Raymond F. Mikesell, Agricultural Surplus and Export Policy (Washington, D. C.: American Enterprise Association, 1958), p. 32.

developed countries as well as from the United States. In addition, the law did not cause a change in the LDCs' marginal propensities to import, or in their income elasticities of imports, in either period under study from what they were before the advent of the law, in the base period of 1951-1953. This result may come as no surprise; many studies posited similar results descriptively. However, this systematic attempt has sought to establish these results precisely and to test their validity.

Obviously, a program of the extent of P. L. 480 might contribute to the improvement of the complicated and deeply-rooted agricultural inadequacy of the LDCs. However, increasing the LDCs' agricultural productivity requires far more than food resources, especially when the counterpart funds were spread so thinly over many development projects, rather than concentrating on food production alone. According to existing studies, P. L. 480 seems to have had, on an aggregate basis, at best a negligible effect on food grain production in the LDCs.

The above conclusions on the law's three effects are based in part on the following considerations:

First, there was a need for such an aggregate study of the P. L. 480 effects. Its conclusions promote better understanding of the connection between the law and these countries' food problems. All the free LDCs were given the opportunity of becoming recipients, and in varying amounts the law's shipments did indeed reach all the less developed regions. However, it was beyond the scope of this study to propose a plan for the distribution of its shipments.⁴

⁴For such a proposal, see Franklin M. Fisher, "A Proposal for the Distribution Abroad of the United States' Food Surplus," The Review of Economics and Statistics, XLIV, No. 1 (1962), 52-57.

Second, concentrating on the law's most controversial effects - trade, consumption, and production - enabled this study to investigate them in depth, in light of the LDCs' food problem. Further, concentration on food grains alone was most relevant, because grains make up the bulk of the diet in these countries. Grains dominate P. L. 480 shipments, and statistics on grains are relatively more available from the LDCs than are statistics for many other commodities.

Finally, the methodology of the predictive model used in this study is not new,⁵ but its application to both food grains and the LDCs may be considered a contribution. Because of the aggregate nature of the study, the model was kept simple to avoid the uncertainty and built-in errors in the data on the LDCs, and to prevent the estimate from running into too many of these sources of inaccuracy. As was pointed out before, complete and accurate statistics on these countries are not available; nevertheless, existing evidence as revealed in this study points consistently in the same direction. Such consistency cannot be ignored simply because it is not absolute. In Arnold Harberger's words:

When all or most of a set of uncertain and imprecise pieces of evidence point in the same direction, we have the sort of situation where ignorance turns into hunch, hunch into belief, and, ultimately, belief into knowledge.⁶

⁵See, for example, a summary taken from 42 books and articles published between 1937 and 1957 of the numerous uses of elasticities and propensities for predictive purposes in international trade: Hang Sheng Cheng, "Statistical Estimates of Elasticities and Propensities in International Trade: A Survey of Published Studies," International Monetary Fund Staff Papers, VII, No. 1 (1959), pp. 107-58.

⁶"Some Evidence on the International Price Mechanism," JPE, LXV, No. 6 (1957), p. 508.

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APPENDIX A

GRAIN IMPORTS OF THE LDCS

Total Grains

Country or Region	Fiscal Year	LESS DEVELOPED COUNTRIES											Far East Oceania	Total Imports
		Latin America	AFRICA				ASIA							
			North	West	East	Total	West	South	South East	Other East	Total			
U. S. Exports to LDCs	1951	1899	386	100	16	502	438	2938	-	387	3763	1280	7444	
	1952	2846	587	91	16	694	326	2174	-	714	3214	110	6864	
	1953	1659	355	79	54	488	297	1324	-	707	2328	87	4562	
	Avg 51-53	2134.66	442.66	90	28.66	561.33	353.66	2145.33	-	602.66	3101.66	492.33	5290	
	1954	1272	45	75	2	122	315	50	-	448	813	14	2221	
	1955	1248	68	196	2	266	922	149	37	467	1575	36	3125	
	1956	2083	704	201	5	910	995	1349	68	903	3315	441	6749	
	1957	2814	98	208	5	311	1131	1977	45	1235	4388	160	7673	
	1958	2678	102	182	51	335	773	3319	82	1505	5679	93	8785	
	1959	2119	821	229	63	1113	951	3809	100	645	5505	109	8846	
	1960	2467	1665	264	25	1954	1330	6389	97	994	8810	258	13489	
	1961	3471	2563	281	117	2961	2262	3141	116	1254	6773	166	13371	
	1962	2778	3086	330	154	3570	2124	3759	164	1037	7084	244	13676	
	1963	3139	2602	426	46	3074	2078	6207	166	1840	10291	552	17056	
	1964	3681	2798	441	29	3268	1201	7837	124	1143	10305	52	17306	
1965	2355	1899	456	151	2506	1865	7890	372	1481	11608	15	16484		

Country	Year	AFRICA					ASIA					Far East	Total Imports
		Latin America	North	West	East	Total	West	South	South East	Other East	Total	Oceania	
Free Developing Countries (excluding U. S.) Exports to LDCs	1951	638	677	133	202	1012	279	583	106	175	1143	330	3123
	1952	937	423	113	133	669	272	1163	113	321	1869	418	3893
	1953	927	245	163	142	550	302	1725	111	562	2700	402	4579
	Avg 51-53	834	448.33	136.33	159	743.66	284.33	1157	110	352.66	1904	383.33	3864.99
	1954	1216	182	203	134	519	225	688	118	274	1305	363	3403
	1955	613	104	146	172	422	383	598	88	229	1298	414	2747
	1956	871	346	224	163	733	404	1065	77	433	1979	623	4206
	1957	508	612	180	168	960	536	1601	63	279	2479	471	4418
	1958	558	681	267	210	1158	615	1011	45	234	1905	445	4066
	1959	715	1032	324	212	1568	835	825	61	243	1964	455	4702
	1960	479	957	311	211	1479	1051	753	52	284	2140	488	4586
	1961	477	946	373	247	1566	680	923	62	317	1982	520	4545
	1962	639	330	350	232	912	474	748	56	347	1625	414	3590
	1963	754	455	323	241	1019	614	374	82	358	1428	449	3650
	1964	1084	530	210	195	935	514	839	52	499	1904	441	4364
1965	1216	1229	335	318	1882	724	926	43	327	2020	429	5547	
LDCs Exports to LDCs	1951	1332	92	107	158	357	181	1652	-	331	2164	1017	4870
	1952	456	34	89	180	303	192	1100	-	364	1656	1278	3693
	1953	1776	31	83	168	282	284	877	3	524	1688	926	4672
	Avg 51-53	1188	52.33	93	168.66	314	219	1209.66	1	406.33	1835.99	1073.66	4411.66
	1954	1712	15	101	129	245	301	829	77	273	1480	937	4374
	1955	1878	72	237	179	488	477	562	19	393	1451	824	4641
	1956	1076	91	188	152	431	282	719	52	573	1626	1222	4355
	1957	1424	274	347	173	794	335	1250	69	509	2163	1158	5539
	1958	1471	354	179	197	730	259	789	57	439	1544	1460	5205
	1959	1730	253	228	189	670	521	856	15	401	1793	1328	5521
	1960	1662	62	227	190	479	447	987	13	567	2014	1641	5796
	1961	690	89	200	216	505	546	829	75	673	2123	1590	4908
	1962	1305	23	265	247	535	401	800	47	432	1680	1575	5095
	1963	1137	83	138	231	452	499	656	67	744	1966	1759	5314
	1964	1881	60	312	239	611	390	815	51	700	1956	1757	6205
1965	2305	49	206	355	610	500	1032	96	1043	2671	984	6570	

Country	Year	AFRICA					ASIA					Far East Oceania	Total Imports
		Latin America	North	West	East	Total	West	South	South East	Other East	Total		
Communist Countries Exports to LDCs	1951	-	28	-	-	28	6	486	-	-	492	-	520
	1952	-	243	-	-	243	-	278	-	6	284	-	527
	1953	-	55	-	-	55	-	265	-	3	268	-	323
	Avg 51-53	-	108.66	-	-	108.66	2	343	-	3	348	-	456.66
	1954	-	-	-	2	2	-	218	-	-	218	-	220
	1955	-	-	-	-	-	-	122	-	44	166	-	166
	1956	-	126	-	-	126	-	357	-	52	409	11	546
	1957	-	353	-	-	353	-	209	-	94	303	41	697
	1958	-	320	12	-	332	-	318	-	177	495	180	1007
	1959	5	322	42	-	364	-	369	-	89	458	453	1280
	1960	282	-	25	-	25	24	250	-	95	369	199	875
	1961	496	46	25	-	71	13	28	17	149	207	117	891
	1962	864	65	40	-	105	18	34	-	173	225	138	1332
	1963	890	40	6	-	46	31	183	1	251	466	177	1579
	1964	625	6	5	-	11	35	301	-	171	507	233	1376
	1965	898	157	1	19	177	40	204	-	136	380	134	1589
Total Imports by LDCs	1951	3869	1183	340	376	1899	904	5659	106	893	7562	2627	15957
	1952	4239	1287	293	329	1909	790	4715	113	1405	7023	1806	14977
	1953	4362	686	325	364	1375	883	4191	114	1796	6984	1415	14136
	Avg 51-53	4156.66	1052	319.33	356.33	1727.66	859	4855	111	1364.66	7189.66	1949.33	15023.33
	1954	4200	242	379	267	888	841	1785	195	995	3816	1314	10,218
	1955	3739	244	579	353	1176	1782	1431	144	1133	4490	1274	10679
	1956	4030	1267	613	320	2200	1681	3490	197	1961	7329	2297	15856
	1957	4746	1337	735	346	2418	2002	5037	177	2117	9333	1830	18327
	1958	4707	1457	640	458	2555	1647	5437	184	2355	9623	2178	19063
	1959	4569	2428	823	464	3715	2307	5859	176	1378	9720	2345	20349
	1960	4890	2684	827	426	3937	2852	8379	162	1940	13333	2586	24746
	1961	5134	3644	879	580	5103	3501	4921	270	2393	11085	2393	23715
	1962	5586	3504	985	633	5122	3017	5341	267	1989	10614	2371	23693
	1963	5920	3180	893	518	4591	3222	7420	316	3193	14151	2937	27599
	1964	7271	3394	968	463	4825	2140	9792	227	2513	14672	2483	29251
	1965	6774	3334	998	843	5175	3129	10052	511	2987	16679	1562	30190

Wheat and Flour

Country or Region	Fiscal Year	LESS DEVELOPED COUNTRIES											Far East Oceania	Total Imports
		Latin America	AFRICA				ASIA							
			North	West	East	Total	West	South	South East	Other East	Total			
U. S. Exports to LDCs	1951	1450	378	72	16	466	382	2317	-	212	2911	1222	6049	
	1952	2549	587	87	16	690	294	1562	-	226	2082	70	5391	
	1953	955	346	79	9	434	269	1181	-	322	1772	36	3197	
	Avg 51-53	1651.3	437	79.33	13.66	530	315	1686.66	-	253.33	2255	442.66	4879	
	1954	923	45	75	2	122	283	49	-	382	714	14	1773	
	1955	1011	68	136	2	206	674	140	27	441	1282	20	2519	
	1956	1722	704	150	5	859	879	1050	67	618	2614	101	5296	
	1957	1714	98	180	5	283	894	1653	45	788	3380	36	5413	
	1958	1447	102	134	51	287	488	3039	77	1093	4697	7	6438	
	1959	1750	704	131	35	870	537	3560	97	630	4824	15	7459	
	1960	2002	1552	213	23	1788	830	5729	84	909	7552	120	11462	
	1961	3143	2223	187	43	2453	1798	2730	114	1011	5653	28	11277	
	1962	2439	2660	158	66	2884	1661	3296	122	869	5948	4	11275	
	1963	2475	2411	246	33	2690	1593	5799	140	1545	9077	321	14563	
	1964	3265	2374	137	24	2535	775	7444	113	817	9149	7	14956	
1965	1902	1679	214	57	1950	1356	7444	175	1192	10167	14	14033		

Country	Year	AFRICA					ASIA					Far East Oceania	Total Imports
		Latin America	North	West	East	Total	West	South	South East	Other East	Total		
Free Developing Countries (excluding U. S.) Exports to LDCs	1951	632	673	119	107	899	260	571	106	175	1112	301	2944
	1952	918	420	106	98	624	252	1148	112	306	1818	335	3695
	1953	910	240	142	111	493	282	1691	111	408	2492	380	4275
	Avg 51-53	820	444.33	122.33	105.33	672	264.66	1136.66	109.66	296.33	1807.33	338.66	3638
	1954	1153	177	193	117	487	214	637	118	239	1208	344	3192
	1955	594	93	136	166	395	376	593	88	229	1286	392	2667
	1956	782	262	166	153	581	393	1049	77	420	1939	476	3778
	1957	392	530	135	152	817	502	1600	63	279	2444	403	4056
	1958	539	645	213	191	1049	587	1011	45	234	1877	348	3813
	1959	705	1017	284	189	1490	716	824	61	233	1834	422	4451
	1960	455	943	271	191	1405	1018	750	52	273	2093	437	4390
	1961	448	658	318	184	1160	644	919	62	313	1938	439	3985
	1962	598	287	317	221	825	351	741	56	340	1488	394	3305
	1963	624	447	284	217	948	531	373	82	298	1284	404	3260
	1964	1023	511	205	104	820	466	837	52	470	1825	394	4062
	1965	1171	1213	326	226	1765	667	926	43	323	1959	427	5322
	LDCs. Exports to LDCs	1951	1148	26	-	-	26	28	483	-	-	511	-	1685
1952		203	-	-	-	-	43	100	-	-	143	-	346
1953		1463	-	-	28	28	79	235	-	-	314	-	1805
Avg 51-53		938	8.66	-	9.33	18	50	272.66	-	-	322.66	-	1278.66
1954		1556	-	-	-	-	65	-	-	-	65	-	1621
1955		1768	-	-	-	-	60	-	-	-	60	-	1828
1956		995	-	-	-	-	10	-	-	-	10	-	1005
1957		1234	195	-	30	225	-	-	-	-	-	-	1459
1958		1240	304	-	-	304	27	-	-	-	27	-	1571
1959		1483	166	-	-	166	137	-	-	-	137	-	1786
1960		1526	28	-	-	28	91	-	-	-	91	15	1660
1961		390	-	-	20	20	19	-	19	3	41	7	458
1962		1032	1	28	10	39	6	-	4	10	20	10	1101
1963		926	59	-	-	59	39	-	21	8	68	12	1065
1964		1360	18	1	22	41	89	1	7	22	119	32	1552
1965		2023	23	10	35	68	87	11	3	40	141	85	2317

Country	Year	AFRICA					ASIA				Total	Far East Oceania	Total Imports
		Latin America	North	West	East	Total	West	South	South East	Other East			
Communist Countries Exports to LDCs	1951	-	21	-	-	21	6	-	-	-	6	-	27
	1952	-	200	-	-	200	-	-	-	-	-	-	200
	1953	-	55	-	-	55	-	-	-	-	-	-	55
	Avg 51-53	-	92	-	-	92	2	-	-	-	2	-	94
	1954	-	-	-	-	-	-	-	-	-	-	-	-
	1955	-	-	-	-	-	-	-	-	-	-	-	-
	1956	-	126	-	-	126	-	-	-	-	-	-	126
	1957	-	351	-	-	351	-	-	-	-	-	-	351
	1958	-	317	-	-	317	-	-	-	-	-	-	317
	1959	-	307	-	-	307	-	40	-	-	40	-	347
	1960	263	-	-	-	-	24	-	-	-	24	-	287
	1961	394	46	-	-	46	-	-	-	-	-	-	440
	1962	682	65	-	-	65	-	5	-	-	5	-	752
	1963	527	39	-	-	39	5	18	1	133	157	-	723
	1964	266	-	1	-	1	-	36	-	-	36	-	303
1965	563	149	-	1	150	-	4	-	3	7	-	720	
Total Imports by LDCs	1951	3230	1098	191	123	1412	676	3371	106	387	4540	1523	10705
	1952	3670	1207	193	114	1514	589	2810	112	532	4043	405	9632
	1953	3328	641	221	148	1010	630	3107	111	730	4578	416	9332
	Avg 51-53	3409.33	982	201.66	128.33	1312	631.66	3096	109.66	549.66	4387	781.33	9889.66
	1954	3632	222	268	119	609	562	686	119	621	1988	358	6587
	1955	3373	161	272	168	601	1110	733	115	670	2628	412	7014
	1956	3499	1092	316	158	1566	1282	2099	144	1038	4563	577	10205
	1957	3340	1174	315	187	1676	1396	3253	108	1067	5824	439	11279
	1958	3226	1368	347	242	1957	1102	4050	122	1327	6601	355	12139
	1959	3938	2194	415	224	2833	1390	4424	158	863	6835	437	14043
	1960	4246	2523	484	214	3221	1963	6479	136	1182	9760	572	17799
	1961	4375	2927	505	247	3679	2461	3649	195	1327	7632	474	16160
	1962	4751	3013	503	297	3813	2018	4042	182	1219	7461	408	16433
	1963	4552	2956	530	250	3736	2168	6190	244	1984	10586	737	19611
	1964	5914	2903	344	150	3397	1330	8318	172	1309	11129	433	20873
1965	5659	3064	550	319	3933	2110	8385	221	1558	12274	526	22392	

The absence of data means negligible trade or trade of less than 500 metric tons.

Source: These tables are based on data found in Mackie, et al., World Trade in Selected Agricultural Commodities, 1951 - 1965.

APPENDIX B

GRAIN EXPORTS OF THE LDCS

To All Free Developed Countries, 1951 - 1965, Thousand Metric Tons

Year	Latin America	Total Grains									Far East & Oceania	All LDCs
		Africa				Asia						
		North	West	East	Total	West	South	South East	Other East	Total		
1951	1953	1167	102	43	1312	602	38	678	74	1392	-	4657
1952	1454	862	61	141	1064	891	1	590	62	1544	31	4093
1953	2385	1048	64	34	1146	1348	-	722	54	2124	-	5655
Avg 51-53	1930.66	1025.66	75.66	72.66	1174	947	13	663.33	63.33	1686.66	10.33	4801.66
1954	5783	1134	50	102	1286	1609	25	1002	43	2679	13	9761
1955	3427	1048	62	184	1294	542	11	905	183	1641	10	6372
1956	3664	1018	99	192	1309	800	9	695	90	1594	1	6568
1957	3587	566	40	158	764	477	-	584	115	1176	10	5537
1958	4042	943	129	234	1306	614	-	439	204	1257	-	6605
1959	3900	623	102	178	903	488	-	499	202	1189	1	5993
1960	5239	542	104	114	760	71	-	729	72	872	-	6871
1961	3236	284	17	263	564	16	4	620	82	722	-	4522
1962	5246	189	92	406	687	845	3	475	96	1419	1	7353
1963	4187	517	76	262	855	262	9	704	92	1067	-	6109
1964	5139	475	78	100	653	217	7	1124	132	1480	-	7272
1965	7047	171	125	16	312	249	5	957	293	1504	4	8867

Wheat and Flour												
1951	883	292	-	16	308	11	38	-	-	49	-	1240
1952	49	252	2	16	270	178	-	-	-	178	-	497
1953	686	397	-	-	397	451	-	-	-	451	-	1534
Avg 51-53	539.33	313.66	.66	10.66	325	213.33	12.66	-	-	226	-	1090.33
1954	1665	410	-	-	410	700	-	-	-	700	-	2775
1955	1812	480	-	1	481	167	1	-	-	168	-	2461
1956	1574	320	-	-	320	186	-	-	-	186	-	2080
1957	1411	286	-	-	286	139	-	-	-	139	-	1836
1958	1003	425	-	-	425	169	-	-	-	169	-	1597
1959	897	300	1	-	301	239	-	-	-	239	1	1438
1960	845	220	-	-	220	10	-	-	-	10	-	1075
1961	587	104	-	-	104	8	-	-	-	8	-	699
1962	1507	100	-	-	100	205	-	-	-	205	-	1812
1963	756	67	-	12	79	26	-	-	-	26	-	861
1964	863	88	2	-	90	36	-	-	-	36	-	989
1965	2049	35	-	-	35	12	-	-	-	12	-	2096

To Less Developed Countries, 1951 - 1965, Thousand Metric Tons

Total Grains												
Year	Latin America	Africa				Asia					Far East & Oceania	All LDCs
		North	West	East	Total	West	South	South East	Other East	Total		
1951	1847	112	42	44	198	96	215	2483	5	2799	26	4870
1952	581	47	33	99	179	246	29	2626	20	2921	12	3693
1953	2066	61	10	60	131	202	48	2187	3	2440	35	4672
Avg 51-53	1498	77.33	28.33	67.66	169.33	181.33	97.33	2432	9.33	2720	24.33	4411.66
1954	1566	49	8	31	88	307	98	2241	4	2650	70	4374
1955	1882	134	17	78	229	141	186	2146	27	2500	30	4641
1956	1182	186	27	49	262	99	104	2608	97	2908	3	4355
1957	1513	222	11	144	377	155	41	3408	39	3643	6	5539
1958	1487	252	69	113	434	122	3	2840	10	2975	309	5205
1959	1881	241	50	42	333	212	63	2994	35	3304	3	5521
1960	1755	302	62	64	428	40	64	3363	126	3593	20	5796
1961	688	195	34	105	334	151	96	3556	76	3879	7	4908
1962	1272	52	38	94	184	114	114	3291	25	3544	95	5095
1963	1178	63	13	94	170	244	116	3384	87	3831	135	5314
1964	1842	77	17	33	127	202	173	3692	133	4200	36	6205
1965	2521	27	2	42	71	218	160	3439	66	3883	95	6570
Wheat and Flour												
1951	1665	-	-	-	-	20	-	-	-	20	-	1685
1952	172	-	-	-	-	174	-	-	-	174	-	346
1953	1726	-	-	-	-	79	-	-	-	79	-	1805
Avg 51-53	1187.66	-	-	-	-	91	-	-	-	91	-	1278.66
1954	1404	-	-	-	-	217	-	-	-	217	-	1621
1955	1770	-	-	-	-	58	-	-	-	58	-	1828
1956	995	-	-	-	-	10	-	-	-	10	-	1005
1957	1370	-	-	-	-	89	-	-	-	89	-	1459
1958	1240	-	-	-	-	27	-	-	-	27	-	1571
1959	1585	40	-	-	40	161	-	-	-	161	304	1786
1960	1611	-	-	-	-	34	-	-	-	45	4	1660
1961	410	-	-	-	-	19	-	-	-	29	-	458
1962	1046	-	28	-	28	1	-	-	-	24	2	1101
1963	986	-	5	-	5	37	-	-	-	36	1	1065
1964	1360	17	11	12	40	87	1	-	-	64	-	1552
1965	2145	13	-	1	14	24	8	1	62	95	63	2317

Total Grain Exports (Including Exports to Communist Countries)
1951 - 1965, Thousand Metric Tons

Year	Total Grains											
	Latin America	Africa				Asia					Far East & Oceania	All LDCs
		North	West	East	Total	West	South	South East	Other East	Total		
1951	3819	1331	144	87	1562	698	253	3205	79	4235	26	9642
1952	2042	921	94	240	1255	1413	30	3271	82	4796	43	8136
1953	4460	1111	74	94	1279	1647	48	2958	57	4710	35	10484
Ave 51-53	3440.33	1121	104	140.33	1365.33	1252.66	110.33	3144.66	72.66	4580.32	34.66	9420.66
1954	7914	1201	58	133	1392	2167	123	3297	47	5634	83	15023
1955	5728	1250	79	262	1591	723	212	3489	210	4634	40	11993
1956	4948	1272	126	241	1639	1004	113	3627	187	4931	4	11522
1957	5116	914	51	302	1267	725	41	4295	154	5215	16	11614
1958	5591	1266	198	347	1811	810	3	3471	214	4498	309	12209
1959	5783	868	164	258	1290	747	63	3644	247	4701	4	11778
1960	7004	869	166	178	1213	119	64	4247	198	4628	20	12865
1961	3948	486	51	368	905	177	100	4312	166	4755	7	9615
1962	7082	294	130	554	978	997	132	3979	121	5229	96	13385
1963	5448	736	89	356	1181	574	174	4375	179	5302	135	12066
1964	8467	829	95	133	1057	506	279	5134	265	6184	36	15744
1965	13083	319	127	58	504	491	267	4723	359	5840	99	19526

Wheat and Flour												
1951	2548	292	-	16	308	31	38	-	-	69	-	2925
1952	221	252	2	16	270	628	-	-	-	628	-	1119
1953	2412	397	-	-	397	592	-	-	-	592	-	3401
Ave 51-53	1727	313.66	.66	10.66	325	417	12.66	-	-	429.66	-	2481.66
1954	3186	410	-	-	410	1163	-	-	-	1163	-	4759
1955	3838	480	-	1	481	237	1	-	-	238	-	4557
1956	2619	320	-	-	320	218	-	-	-	218	-	3157
1957	2781	286	-	-	286	246	-	-	-	246	-	3313
1958	2243	425	-	-	425	196	-	-	-	196	304	3168
1959	2482	340	1	-	341	410	-	-	-	410	1	3234
1960	2456	220	-	-	220	44	-	-	11	55	4	2735
1961	997	104	-	-	104	27	-	-	32	59	-	1160
1962	2757	100	28	-	128	206	-	-	24	230	2	3117
1963	1803	67	5	12	84	63	-	1	36	100	1	1988
1964	3467	118	13	12	143	123	1	-	64	188	-	3798
1965	6849	48	-	1	49	36	8	1	62	107	63	7068

The absence of data means negligible trade or trade of less than 500 metric tons.

Source: Mackie, et al., World Trade in Selected Agricultural Commodities, 1951 - 1965.

APPENDIX C

LDCS' POPULATION, 1951 - 1966 AND AVERAGE 1951 - 1953
(THOUSAND INHABITANTS)

		1951	1952	1953	Average 51-53	1954	1955	1956	1957	
Countries	Latin America	161058	167582	172272	166970.66	177116	182132	187345	192734	
	Africa	North ^a	52402	53693	55045	53713.33	56278	57729	59201	60639
		West	82700	84356	86268	84441.33	88942	90817	92705	94688
		East	62398	63699	65246	63781	66568	68017	69492	71183
		TOTAL	197500	201748	206559	201935.66	211788	216563	221398	226510
Developed	West	62622	64205	65794	64207	67427	69125	70955	73007	
	South	474286	483120	492436	483280.66	502082	512092	522575	533427	
	South East	55769	57230	58725	57241.33	60284	61871	63472	65015	
	Other East ^b	51085	52716	54344	52715	56118	57660	59481	61269	
	TOTAL	643762	657271	671299	657444.99	685911	700748	716483	732718	
Less	Far East Oceania	86875	88688	90644	88735.66	92625	94649	96556	98958	
	GRAND TOTAL	1089195	1115289	1140774	1115086.97	1167440	1194092	1221782	1250920	

^aSpanish Sahara (48,000 inhabitants in 1965) is excluded because of the wide variation in estimates due to migration of nomads.

^bPortuguese Asia is referred to as Timor.

Sources: Organization for Economic Co-operation and Development, National Accounts of Less Developed Countries, 1950 - 1966 (Paris, July, 1968), pp. 14-17; and United Nations, Demographic Yearbook, 1961, pp. 136-37, supplemented by the 1967 issue, p. 125.

1958	1959	1960	1961	1962	1963	1964	1965	1966
198319	203955	209771	215687	221824	228250	234867	241585	248554
62153	63762	65265	66825	68305	69808	71827	74130	76099
96867	99029	101302	103473	105660	107990	110187	112472	114858
74650	76298	78105	79864	81939	83861	85834	87871	89983
233670	239089	244672	250162	255904	261659	267848	274473	280940
74988	77072	79102	81112	83250	85526	87716	89999	92374
544639	556490	568976	582539	597748	612216	627045	642338	658231
66697	68911	70617	72474	74456	76377	78356	80350	82487
63171	65155	67181	69271	71505	74036	76313	78605	80901
749495	767628	785876	805396	826959	848155	869430	891292	913993
101305	104151	106587	109130	111779	114432	116990	119683	122596
1282789	1314823	1346906	1380375	1416466	1452496	1489135	1527033	1566083

APPENDIX D

UNITED STATES EXPORTS OF WHEAT AND FLOUR, RICE, OTHER GRAINS, AND
AND TOTAL GRAINS UNDER THE TERMS OF CONCESSIONAL SALE^a

Wheat and Flour

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/	
Latin America	101.9	857.9	842.1	453.8	734.8	1396.4	1289.2	2267.0	1656.2	1828.1	
Africa	North	38.1	498.8	105.4	78.1	476.9	1120.5	1406.0	2540.7	2327.5	2305.0
	West	-	-	-	12.4	17.3	65.6	66.5	94.0	85.5	127.5
	East	-	-	-	6.1	38.3	18.0	21.0	31.0	35.1	8.8
	Total	38.1	498.8	105.4	96.6	532.5	1204.1	1493.5	2665.7	2448.1	2441.3
	West	521.5	537.0	968.9	524.0	306.3	729.3	1497.8	2098.9	971.2	727.6
Asia	South	147.7	370.2	2357.9	2750.8	3939.4	4135.3	4466.7	3098.7	4945.2	6211.9
	South East	1.0	45.4	98.8	52.3	90.7	64.7	116.7	78.4	101.4	133.7
	Other East	252.3	323.1	632.2	666.4	428.5	661.3	672.1	683.3	1012.3	967.2
	Total	922.5	1275.7	4057.6	4008.8	4779.3	5599.6	6753.3	5959.3	7030.1	8040.4
	Far East Oceania	-	-	94.2	3.7	1.7	254.8	1.1	77.8	82.8	7.2
All LDCs	1062.5	2632.4	5099.5	4562.9	6048.3	8454.9	9537.1	10969.8	11217.2	12317.0	
Total PL 480	4300.8	6550.6	10209.1	6715.4	8246.3	10193.7	12457.1	13364.8	13210.1	13700.7	
Total U.S. Wheat & Flour Exports (PL 480 & Cash)	7447.2	9404.8	14930.8	10951.5	12065.9	13875.3	18021.4	19551.8	17355.5	23359.8	

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/
Total U.S. concessional wheat and flour programs to the LDCs, as a percentage of total U.S. concessional wheat and flour programs.	.2470	.4018	.4995	.6795	.7334	.8294	.7656	.8208	.8491	.8990
Total U.S. concessional wheat and flour programs to the LDCs, as a percentage of total U.S. wheat and flour exports.	.1427	.2799	.3415	.4166	.5013	.6093	.5292	.5611	.6463	.5273
Total U.S. concessional wheat and flour programs as a percentage of total U.S. wheat and flour exports.	.5775	.6965	.6838	.6132	.6834	.7347	.6912	.6835	.7611	.5865

Rice

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/	
Latin America	2.268	14.821	13.398	24.093	14.429	35.295	10.689	2.812	32.700	74.400	
Africa	North	-	.050	.145	.712	1.714	47.635	4.754	2.449	2.300	-
	West	7.545	36.454	-	-	4.051	4.141	23.117	48.616	54.700	110.200
	East	-	-	-	-	.726	.100	.036	-	-	-
	Total	7.545	36.504	.145	.712	6.491	51.876	27.907	51.065	57.000	110.200
Asia	West	-	4.458	11.311	1.411	8.586	7.950	24.008	15.590	7.100	4.900
	South	-	90.235	440.470	184.163	97.074	234.410	414.008	143.693	271.00	364.100
	South East	-	23.299	46.685	2.631	7.389	9.266	5.967	46.518	-	-
	Other East	-	10.342	132.569	56.204	64.984	17.979	20.690	3.759	63.00	18.300
	Total	11.159 ^b	124.334	631.035	244.409	178.033	269.605	464.673	209.56	278.400	387.300
Far East & Oceania	-	.804	279.393	7.928	37.941 ^b	149.943	122.695	150.543	254.500	88.800	
All LDCs	20.972	176.463	923.971	277.142	236.894	506.719	625.968	413.980	622.600	660.700	
Total PL 480	21.607	287.499	973.652	281.485	306.610	578.730	651.399	416.343	628.000	693.800	
Total U.S. Rice Exports (PL 480 & Cash)	414.753	562.187	1228.509	548.500	646.676	940.416	976.923	924.867	1099.500	1440.500	

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/
	----- per cent -----									
Total U.S. concessional rice programs to the LDCs, as a percentage of total U.S. concessional rice programs.	.9706	.6138	.9489	.9846	.7726	.8756	.9609	.9943	.9914	.9523
Total U.S. concessional rice programs to the LDCs, as a percentage of total U.S. rice programs.	.0506	.3139	.7521	.5053	.3663	.5388	.6407	.4476	.5662	.4587
Total U.S. concessional rice programs as a percentage of total U.S. rice exports.	.0521	.5114	.7925	.5132	.4741	.6154	.6668	.4502	.5712	.4816

Other Grains^c

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/	
Latin America	4.9	65.7	100.0	410.9	297.3	192.5	116.1	202.2	130.7	200.4	
Africa	North	-	-	.6	2.5	11.2	148.0	169.1	629.5	227.6	453.5
	West	-	-	-	-	25.2	29.8	26.1	68.1	68.1	83.5
	East	-	-	-	-	10.4	16.8	19.3	128.3	35.3	12.2
	Total	-	-	.6	2.5	46.8	194.6	214.9 ^b	826.0 ^b	331.0	549.2
Asia	West	184.9	215.3	174.4	274.6	341.0	512.6	426.9	390.8	278.3	236.5
	South	.6	-	2.2	7.1	245.9	98.6	155.4	115.9	157.2	173.7
	South East	-	-	44.4	6.2	25.5	32.1	11.3	12.2	19.3	67.1
	Other East	64.7	87.7	476.8	343.2	297.8	128.1	297.5	165.6	333.4	154.9
	Total	250.2	303.0	698.0 ^b	632.9 ^b	910.2	771.4	891.1	684.7 ^b	788.2	632.2
Far East & Oceania	-	-	-	.1	1.1	1.3	1.4	1.1	.4	13.1	
All IDCs	255.1	368.7	802.6	1046.4	1255.4	1159.8	1223.5	1714.0	1250.3	1394.9	
Total PL 480	985.9	4573.4	3792.8	2014.6	2342.8	3103.5	2773.0	3100.6	2072.8	1842.2	
Total U.S. Other Grains Exports (PL 480 & Cash)	4135.7	7686.3	6372.8	8443.1	10889.5	11598.8	11139.3	11678.4	15357.3	16141.3	

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/
	----- per cent -----									
Total U.S. concessional other grains programs to the LDCs, as a percentage of total U.S. concessional other grains programs.	.2587	.0806	.2116	.5194	.5358	.3737	.4412	.5528	.6032	.7572
Total U.S. concessional other grains programs to the LDCs, as a percentage of total U.S. other grains exports.	.0617	.0479	.1259	.1239	.1153	.1000	.1069	.1168	.0814	.0864
Total U.S. concessional other grains programs as a percentage of total U.S. other grains exports.	.2384	.5950	.5951	.2386	.2151	.2677	.2424	.2113	.1949	.1141

Total Grains^d

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/	
Latin America	109.068	938.421	959.498	888.793	1046.529	1624.195	1415.989	2472.012	1819.600	2102.900	
Africa	North	38.100	498.850	106.145	81.312	489.814	1316.135	1579.854	3172.649	2557.400	2758.500
	West	7.545	36.454	-	12.400	46.551	99.541	115.717	210.716	208.300	321.200
	East	-	-	-	6.100	49.426	34.900	40.336	159.300	70.400	21.000
	Total	45.645	535.304	106.145	99.812	585.791	1450.576	1736.307	3542.765	2836.100	3100.700
Asia	West	706.400	752.758	1154.611	800.011	655.886	1249.850	1948.708	2505.290	1256.600	969.000
	South	148.300	460.435	2800.570	2942.063	4282.374	4468.310	5036.108	3358.293	5373.400	6749.700
	South East	1.000	68.699	189.885	61.131	123.589	106.066	133.967	137.118	120.700	200.800
	Other East	317.000	421.142	1241.569	1065.804	791.684	807.379	990.290	852.559	1346.000	1140.400
	Total	1183.859	1703.034	5386.835	4886.109	5867.533	6640.605	8109.073	6853.560	8096.700	9059.900
Far East & Oceania	-	.804	373.593	11.728	40.741	406.043	125.199	229.443	337.700	109.100	
All LDCs	1338.57	3177.56	6826.07	5886.44	7540.59	10121.42	11386.57	13097.78	13090.10	14372.60	
Total PL 480	5308.31	11111.50	14975.55	9011.49	10895.71	13875.93	15881.50	16881.74	15910.90	16236.70	
Total U.S. Grain Exports (PL 480 & Cash)	11997.65	17653.29	22532.11	19943.10	23602.08	26409.52	30437.62	35150.07	33812.30	40941.60	

	1954/	1955/	1956/	1957/	1958/	1959/	1960/	1961/	1962/	1963/
Total U.S. concessional grains programs to the LDCs, as a percentage of total U.S. concessional grains programs.	.2522	.2785	.4558	.6532	.6921	.7294	.7169	.7752	.8227	.8852
Total U.S. concessional grains programs to the LDCs, as a percentage of total U.S. grains exports.	.1116	.1799	.3029	.2952	.3195	.3883	.3741	.3726	.3872	.3511
Total U.S. concessional grains programs as a percentage of total U.S. grains exports.	.4424	.6464	.6646	.4519	.4616	.5254	.5218	.4803	.4706	.3966

Absence of data means negligible exports or exports of less than 50 metric tons.

^aIncludes Public Law 480: Title I, Title II, Barter (Title III), Title IV (no exports occurred under this Title before 1961/62), Section 402 (Mutual Security Act), Section 302 (Amendment of Section 416 of the Agricultural Act of 1949).

^bIncludes a few tons to unspecified countries in the region.

^cIncludes corn, oats, barley, grain sorghum, and by-products; cornmeal, corn grits and hominy, cornstarch, oatmeal (packaged and bulk), pearl barley and malt.

^dWheat and flour, rice, and other grains.

Source: Several tables in U. S., Department of Agriculture, U. S. Grain Exports Under Government Programs (Washington, D. C.: Foreign Agriculture Service), issues of 1954-1955 through 1959-1960 (M-115, June, 1961), 1960-1961 (M-127, February, 1962), 1961-1962 (M-142, January, 1963), 1962-1963 (M-142, Rev., May, 1964), and 1963-1964 (M-142, Rev., August, 1965).

APPENDIX E

SELECTED STUDIES RELATING PUBLIC LAW 480 TO DIFFERENT ASPECTS
OF ECONOMIC DEVELOPMENT IN INDIVIDUAL COUNTRIES
AND GROUPS OF COUNTRIES

Brazil

Hillman, Jimmie S. "Agricultural Surplus Disposal - A Case Study: Brazil." Proceedings of the Western Farm Economics Association. Pullman, Washington, 1958.

Johnson, Robert W. Operation of the P. L. 480 Program in Brazil. Washington, D. C.: U. S. Department of Agriculture, Economic Research Service, Foreign 59, 1963.

Colombia

Adams, Dale W., et al. Public Law 480 and Colombia's Economic Development. Medellin, Colombia, March, 1964.

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