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A theoretical and applied approach towards the formulation of alternative agricultural sector policies in support of the Peruvian agricultural planning process

P. Lizardo De las Casas Moya
Iowa State University

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A theoretical and applied approach towards the formulation of alternative agricultural sector policies in support of the Peruvian agricultural planning process

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P. Lizardo de las Casas Moya

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CHAPTER 1. INTRODUCTION

Since 1968 the Peruvian government has been conducting a large number of structural reforms with the purpose of transforming the existing Peruvian society into one in which political and economic power is in the hands of autonomous and self-managed institutions. The government has emphasized the role of planning as the principal instrument for change.

Planning is viewed as a decision making process. It is not simply a document producing activity but rather plays an important and continuous advisory role assisting decision makers at different administrative levels. Planning also has an important task in the control of plans. At all stages of the planning process, the planning system is supposed to design, analyze, and choose policies and the corresponding specific actions which will facilitate the transition from a traditional to a new society.

The conduction of the planning process requires a knowledge of the possible reactions of the different agents who make decisions in the economic system. Their effective participation during a period of transition when their basic autonomous institutions are being created is practically impossible. This is so because the persons involved, i.e., farmers, landless workers, consumers, are numerous and hence anonymous. Therefore, the analysis of policies should be based on the simulation of the possible reaction of all those groups whose decisions condition the outcome of the economic system. This requires an explicit representation of the behavior of the various groups involved. This should be done in such a way that direct and indirect effects of their reactions to different sets of policies are captured.

This study is an attempt to build a system for policy analysis for the agricultural sector that takes into consideration the decentralized administrative process of policy generation. It considers explicitly the reactions of producers and consumers to the package of policies that are being analyzed.

The second chapter discusses, in a systematic way, the role of planning before and after 1968. It also presents the structure of the national and sectoral planning systems. The different stages of the agricultural planning process are summarized.

The third chapter presents the basic components of a system for agricultural policy analysis. The conceptualization of the system as well as some of its shortcomings and suggestions for complementary developments are presented. The reaction functions for producers and consumers are defined. The material balances for consistency checks and their role as additional policy reaction indicators are also discussed.

Chapters 4 and 6 give detailed discussions of the theoretical models used for the specification of the reaction functions of producers and consumers. They are intended to show how traditional economic theory can be used to develop the micro-foundations of the system. Chapter 4 presents a discussion of how this can be specifically adapted to the new types of production enterprises created by the agrarian reform process such as the agrarian production cooperatives (CAPs), agricultural societies of social interest (SAISs), and reformed peasant communities ("comunidades campesinas reformadas") as well as to the smaller family farms.

Chapters 5 and 7 discuss the sources of information available. A scant overview of the agricultural production process, both at the national and regional levels, is presented in Chapter 5. Some of the characteristics of regional consumption, differentiated by urban and rural areas as well as income strata, are shown in Chapter 7. Both chapters put forward the procedures for making estimations of policy elasticities that form the basis for the reaction functions. Illustrations of their use are also presented.

Chapter 8 gives the specification and estimation of the national reaction functions for producers and consumers. Some policies are analyzed in order to illustrate the use of the system. Chapter 9 presents a summary and some conclusions that can guide one in the use of the system on an operational basis.

Finally, the appendices present some technical notes on the specification of the reaction functions as well as a complete set of results of the estimates.

CHAPTER 2. PLANNING IN PERU

The objective of this chapter is to discuss the role that has been assigned to planning by the Peruvian government. It is intended that it will show the need for a study that attempts to develop a system for agricultural policy analysis. The first section is a brief presentation of the first steps to institute planning in Perú as well as the motivations behind it. It also discusses the role assigned to planning under different governments before 1968. The second section looks at planning as a continuous process since 1968. This is related to the characteristics of the government. The planning process is conceptualized as a set of activities clearly differentiated in three stages.

The third section focuses on the National Planning System after 1968. Although the structure of the National Planning System did not change since its creation in 1962, there were some changes in its implementation after 1968. The meaning of these changes is also explained. The elements of the new agricultural planning system are described.

The last three sections are dedicated to a brief description of the three stages of the agricultural planning process.

Planning Before 1968

It is recognized (41, 50) that planning in Perú did not begin because of an internally recognized need but rather as a result of the Punta del Este Conference (August, 1961). During that same month, the government created the "Oficina Central de Estudios y Programas" (OCEP) as a branch of the Ministry of Treasury. This was the first step to institute planning in Perú. This office was in charge of the implementation of instructions issued by the Organization of American States (OAS) in conjunction with the "Carta de Punta del Este." This office was unable to formulate the long-run development programs agreed on in the "Carta de Punta del Este."

In 1962 the Armed Force assumed the government. It was the first time that the Armed Force, acting as an institution, overthrew an elected government. The new military regime was concerned with the modernization of the country through a "developmentalist" approach. They gave priority to the institutionalization of planning in Perú. The Central Reserve Bank was instructed to prepare a plan which would conform with the Punta del Este agreement. The resulting "Plan National de Desarrollo Económico y Social 1962-1971" was presented to the OAS at the Mexico meeting on October 19, 1962.

More importantly, the military government decreed establishment of the National Planning System in October, 1962. It consisted of: (1) the National Council for Social and Economic Development; (2) the National Planning Institute; (3) the Planning Consultative Board; (4) several Sectoral Offices; and (5) several Regional Offices.

The National Council for Social and Economic Development, under the direction of the President of Perú, was the highest political body of the system. Its members were the ministers in charge of economic and social matters as well as the head of the National Planning Institute (INP). Occasionally, some of the other ministers and the president of the Central Reserve Bank would participate. They were to give the fundamental orientation to planning. The INP was the central technical branch of the system. Its head had the status of a minister. The Planning Consultative Board was designed to permit the participation of the private sector in planning.

The Sectoral Offices (OSs) were the planning units for each economic and social sector. They depended technically on the INP and administratively on the corresponding ministry. The Regional Offices were supposed to direct and coordinate the planning activities at the regional level.

Another important step to institute planning was made by the military government in December 1962. It adopted a new budgetary regime which was supposed to strengthen the role of planning. It introduced the "Presupuesto Funcional" (functional budget) or "Presupuesto por Programas" (program budget). It implied a change in the role of the government from that of supervising economic activity to that of initiating socio-economic development. This required the programming of the activities of the government in relation to the plans. Budgetary policy was to be an instrument of planning.

The 1962-1963 military regime signaled a break with the "laissez faire" approach of previous Peruvian governments. To understand this, and the future role of the Armed Force, it is convenient to briefly describe the changes in military doctrine.

The army moved socially from an aristocratic position, inherited from the Spanish colonialist army in the first years of the republic, to a more humble and dependent position, essentially that of an institution in the service of oligarchical groups. It was the outcome of changes in the power structure of Peruvian society. Beginning with the Spanish conquest, the Peruvian power structure was allied with foreign powers. After the army officials lost their Spanish ally, commercial interests took their place. This emerging bourgeoisie, whose fortunes were made in "guano," sugar, and cotton or in the import and financial trades, had an ingrained contempt for the army officials.

In the 1950s an intellectual change occurred in the Armed Force. It was linked to their studies in the "Centro de Altos Estudios Militares" (CAEM). It gave rise to a new theoretical framework for national defense and security analysis. The key to both rested upon agrarian reform and industrialization with an import substitution model. The 1962-1963 military regime provided the foundation for the central coordination of the development process.

In 1963 architect Belaunde was elected president. He used planning as a means to satisfy the requirements of the international agencies. The main concern during this period was the elaboration of technically sound plans. Several exercises were conducted which allowed the government to receive a considerable amount of technical and financial assistance.

The new government shelved the plan drafted by the previous interim military regime. Plans were not implemented nor given the orientation intended by the preceding military government. The INP and the Sectoral Planning Offices were assigned the role of preparing special documents often mistakenly labeled programs or plans.

The first three in this series were the "Análisis de la Realidad Socio-Económica del Perú" produced in 1963, the "Programa de Inversiones Públicas para los años 1964-1965" published in 1964, and the "Programa de Inversiones Públicas 1966" finished in 1965. These documents were followed by the "Plan de Desarrollo Económico y Social 1967-1970" which was published in late 1966.

To prepare this comprehensive development plan, the INP, together with the Sectoral Planning Offices, concentrated on a socio-economic diagnosis of the country, duplicating to some extent the work of the Central Reserve Bank. The guidance and coordination of public expenditures and policies became more difficult because of the large number of independent public institutions created during the Belaunde government. These institutions were not under the jurisdiction of the central government. Therefore, they did not depend directly on the ministers.

The emphasis on planning as that of preparing plans did not allow the planning system, especially the National Planning Institute, to perform the role of advisor to the President of the Nation and Council of Ministers in day-to-day matters of socio-economic policy. The same phenomenon occurred within the separate ministries. The Agrarian Economics Division (DEA) existed parallel to the Sectoral Planning Office (OSPA). The former assumed the functions of advising the minister and the secretary-general in matters of socio-economic policy, with OSPA having the responsibility for plan preparation. This lack of effective planning took place in a country where, until the late 1950s, the successive governments opposed planning on the pretext that it implied communism. This theme continued to dominate parliamentary debate.

The Executive branch represented two progressive political parties (Acción Popular and Democracia Cristiana), but Congress was controlled by an opposing coalition of two traditionalist parties (APRA and Unión Nacional Ordiista). The constant confrontation between these two political groups was perhaps the main reason that frustrated effective planning. The budget law was modified so as to reduce the participation of the planning system in the definition of the composition and level of the budget. The 1967-1970 plan was not taken into consideration by the government in the final budget. The resulting foreign exchange crisis was one of the aspects that precipitated the overthrow of the government by the Armed Force. The military, for the second time in that decade, took corporatively the responsibility of governing the nation.

Planning Process

On October 3, 1968, the "Gobierno Revolucionario de la Fuerza Armada" seized power with the intention of conducting the necessary structural transformations that would change the traditional Peruvian society into a social democracy of "participación plena." In the words of President Velasco, this meant ". . . a system based on a moral order of solidarity, not of individualism; in a fundamentally self-managed economy in which the means of production would be predominantly of social property, under the direct control of those who generate wealth with their work; and in a political order where the power of decision, far from being a monopoly of political and economic oligarchies, diffuses itself and takes root essentially in social, economic, and political institutions conducted, without intermediation or with a minimum of it, by the men and women that form them. . . ."

The concept of "participación" is a key element to understand the transformations that occurred in Perú after 1968. The creation of a participatory society requires the transfer and diffusion of power and wealth in all its manifestations. The decisive forms of power are directly or indirectly functions of control and ownership of wealth in its economic and political dimensions. The structural transformation was, therefore, immediately directed towards the socialization of power.

The government concluded that in order to carry on the vast program of structural transformations required for the indicated objective, they would require planning as an essential instrument for change. They were knowledgeable about the state of planning in Perú and the needed changes so that it could fulfill the role assigned to it.

One of the first acts of the government was the approval of the "Plan del Gobierno Revolucionario de la Fuerza Armada" known later as the "Plan Inca." The emphasis on planning is reflected in the second section of that plan.

President Velasco, in a speech at CAEM (Centro de Altos Estudios Militares) on December 22, 1971, said ". . . a few months after the beginning of the Revolutionary Government, we publically declared that, for us, development in a country such as Perú should be understood as a set of structural transformations. We also clearly indicated that, in our judgment, the revolutionary process manifests itself in the transformation of the fundamental structures of a society. For us, then, the concepts of "development" and "structural transformations" and "revolutionary process" always were, in reality, synonyms. In strict coherence with this theoretical position, in that now far away period of the revolution, we argued that development planning was nothing other than the planning of the revolutionary process. . . ."

Therefore, planning was given a different role than the one it had had before 1968. The President insisted in several of his speeches that ". . . it is essential that all of us understand the necessity of planning the development of the country. . . . In our case, the revolution governs and plans in order to construct a just society in Perú, where material well-being would be compatible with a freer and more human life for all. . . ."

Planning was conceptualized as a three-stage process, respectively, that of "formulación," "ejecución," and "control" (41). The planning system must guide and lead in all stages of this process. The rest of the public and the private sectors have increased participation in both the formulation and control of the plans.

The "formulación" stage refers to a sequence of activities directed towards the preparation of a document called "plan." It involves the interaction of the groups in charge of its preparation and decision makers. This stage of the process is oriented towards the search for the optimal conditions so as to achieve national objectives. It is accomplished by consecutive approximations requiring the preparation, discussion, and modification of preliminary working papers.

The "ejecución" stage refers to the activities that the planning system performs after the plan is formulated. It is, generally, parallel to the implementation of plans which is done by the production system. It considers aspects related to dissemination of plans, support to elements of the production system for the implementation of plans, and advice to decision making levels relative to unforeseen problems. This stage of the planning process can run parallel to the formulation of a new plan or to the control of the current one.

The "control" stage refers to a group of activities that allows one to measure the results of the implementation of the plan and compare them with the norms defined in the plans. This permits the evaluation of the implementation and the recommendation of corrective measures. Such corrective measures may result in the acceleration of selected activities or the reformulation of objectives.

The planning process can also be viewed as the integration of two processes. One is called the "Proceso Orientador" and the other the "Proceso Operativo." The former is concerned with planning in a medium- and long-term perspective. The latter refers to the short run which has a sufficient degree of detail so as to make implementation and control possible.

Planning System

The National Planning System has retained its basic structure since its creation in 1962, but since 1968 all ministers were made members of the National Council for Social and Economic Development, in accordance with the increased role assigned to planning as a continuous process. The Council of Ministers, with the head of the National Planning Institute as one of its members, became the National Council for Social and Economic Development. The Council of Ministers meets every week. All ministries since 1968 have Sectoral Planning Offices, with the exception of the ministries of defense, foreign relations, and economics and finance. The coordination with the latter is established through the "Comité del Plan Económico." Four regional offices were created covering the north, center, south, and eastern parts of the country. Two related weaknesses of the National Planning System pointed out in 1973 by the Agricultural Planning Office in (41) should be noted. One refers to the lack of regional public budgets that would allow the Regional Planning Offices to relate the budget to the regional plans. The other concerns the existence of a Ministry of Economics and Finance without a Sectoral Planning Office.

The sectoral planning offices located administratively in each ministry have a technical dependence on the National Planning Institute. The heads of the sectoral planning offices meet regularly with the technical director of the National Planning Institute to discuss matters related to the development of the planning process.

The Agricultural Planning System was created in 1969. It has national as well as regional elements. The Agricultural Planning Office (OSPA) is located in the Ministry of Agriculture as a technical advisory office to the minister and vice-minister. It has the technical direction of the Agricultural Planning System. This system is also integrated by Programming Offices (OP) located in each national division of the ministry and regional offices (Oficina Zonal de Planificación Agraria, OZPA). The OPs and OZPAs have with OSPA the same type of relations that the latter has with the INP. The OPs and OZPAs are supposed to have with their corresponding Directors a relationship similar to that which OSPA has with the vice-minister and minister.

The "Formulación" Stage of the Agricultural Planning Process

Planning is generally associated only with this stage. The activities under this stage are oriented towards the preparation of the plan. This is a process of consecutive approximations. They are called, respectively, "niveles," "preliminar," "ante-proyecto," and "proyecto." Each of these distinguishes in turn between two substages, i.e., orientation and preparation. The orientations are originally prepared by the National Planning

Institute (INP) and the Ministry of Economics and Finance (MEF). They are presented to the Council of Ministers for their approval. From the Council of Ministers a set of general orientation-instructions come out for the National Planning Institute (INP) and the Ministry of Economics and Finance (MEF). The general political orientations as well as budget guidelines are sent to the Sectoral Planning Offices. The Sectoral Planning Office (OSPA) prepares the sectoral instructions for the national and regional divisions of the sector. The preparation defines the status of the sector and its critical aspects; the major lines of action, goals, means (policies and specific actions), and resources (budget) to achieve the goals.

The "nivel preliminar" produces a document that serves as a general framework that should guide the preparation of programs and the preliminary allocation of resources. The objective of this document is to present the socio-economic diagnosis of the sector, as well as the strategy for the medium and long term. It also presents the goals and a tentative structure of programs. This document is initially prepared by the sectoral planning system. It is presented to the board of general directors for their consideration and approval. Then, it is used by those responsible for different programs in order to prepare the orientations of their programs. The National Planning Institute (INP) uses it as a basis for the first consolidation of the global document. The national and regional divisions of the ministry use it for the elaboration of their first proposal. This is done in consultation with selected representatives of the producers.

The "nivel ante-proyecto" is the result of a first round of policy negotiations between the specialized administrative levels and the planning system. The latter performs a intrasectoral consistency check. It establishes the degree of program priority and interprogram support. It yields a first approximation of physical and financial targets and inputs. The INP and MEF, in turn, perform a global and intersectoral consistency check.

The "nivel proyecto" is the document that is presented to the Council of Ministers for their approval. It is the product of the final round of negotiations over sectoral adjustments within programs between OSPA and the different administrative levels of the sector reflecting the final instructions of the INP and the MEF.

The "Ejecución" Stage of the Agricultural Planning Process

Planners are not usually directly involved in this stage. It depends on the importance that the decision maker assigns to planning. After 1968 planners were given the important role of continuous advisors to the decision makers at different administrative levels. It is the "one activity" that demands most of the time of the planning system. It requires constant consultation with knowledgeable people within and without the planning system. The planning system must have access to extremely flexible tools of analysis. An important aspect of this is the simulation of the participation of specific groups involved. The time available for the analysis and design of alternative policies varies from a few hours to a few days. The subject of analysis varies from intrasectoral matters to those concerned with foreign relations.

This stage is also concerned with the dissemination of the plans among various population groups and special interest groups. This is done through a series of meetings throughout the country by means of speeches by high officials published in the mass media and other publications.

These activities are not equivalent to the implementation of plans. The implementation of plans revolves around productive activities. The planning system supports the production system in several ways, e.g., from programming such activities to the solution of particular problems generated during implementation.

The "Control" Stage of the Agricultural Planning Process

This stage of the planning process corrects irreversible deviations in the implementation of plans. In some cases, it questions the objectives laid down by the plans. There are two types of control. One is called "control de realizaciones" and the other "control de resultados." The former verifies the conformity between means used and those expected to be used. The latter looks at the correspondence between accomplishments and goals.

The "control de realizaciones" compares physical quantities indicated in the programs with quantities used in the implementation. This allows one to evaluate the effectiveness of the programs. It also compares financial quantities considered in the programs with those used. This allows one to evaluate the effectiveness of budgetary programs.

The "control de resultados" allows one to make a judgment concerning the changes that should be made in the activities ("realizaciones") to insure the accomplishment of objectives.

The elements of the control process are: (1) the characteristics to be measured; (2) the center of measurement; (3) the center of revision and evaluation; and (4) the center of decision. This process is initiated by providing the centers of measurement with information about the meaning and scope of the characteristic to be measured as well as the index to be used. The center of measurement is responsible for the measurement of the indices. Its report should also include an explanation of the causes of a given behavior. The center of revision and evaluation is the one that verifies the correspondence between characteristics and indices measured with the ones considered in the plans. It establishes the deviations from the norms and explains the origin of them. It also studies the possible behavior of groups involved in order to simulate their reaction to a package of policies that would help to correct the deviations. Then, it recommends a set of policies to follow to the center of decision. The centers of decision are the executive units. They decide on the alternatives to follow and the variables to be used in order to modify the program or plan.

The control process is performed at different administrative levels. At the regional level of the agricultural sector, centers of measurement are the agrarian agencies and offices; the centers of revision and evaluation are the Agrarian Zonal Planning Offices (OZPAs); the centers of decision are the zonal committee and the Zonal Director. At the national level, within the agricultural sector, the centers of measurement are the OZPAs and Programming Offices (OPs) of the national divisions; the center of revision and evaluation is the Agrarian Sectoral Planning Office (OSPA); the centers of decision are the Committee of General Directors, the vice-minister, or the minister. At the multisectoral national level, the Sectoral Planning Offices (OSs) are the centers of measurement; the National Planning Institute is the center of revision and evaluation; the centers of decision are special committees of ministers or the Council of Ministers, or the President.

The centers of revision and evaluation are members of the planning system at different administrative levels. These centers prepare two types of reports. One refers to the result of their analysis. The other refers to the actions taken by the centers of decision. The former goes to the centers of decision while the latter goes to the centers of measurement. There are three types of reports that are produced monthly, quarterly, and annually. The first one puts emphasis on the critical aspects identified as immediate ("coyunturales") problems or bottlenecks. These reports, generally, are not concerned with the budget. The second is concerned with short-run problems. It includes an evaluation of the budget. The third type is concerned with structural problems. It is considered, more properly, as an evaluation of the plans.

Therefore, since 1968 the elements of the Peruvian planning system are, throughout the planning process ("formulación," "ejecución," and "control"), constantly analyzing policies in terms of their possible impact on the selected objective indicators.

CHAPTER 3. BASIC COMPONENTS OF A SYSTEM FOR POLICY ANALYSIS

The goal of this chapter is to present the general aspects of a system for policy analysis. Such a system is best thought of as a supporting element in the design, analysis, and choice of policies which involve the participation of the Peruvian agricultural planning system. Its use facilitates the quantification of the direct and indirect effects of single policies or combinations thereof.

The first section presents the conceptualization of the system for policy analysis. Some of its shortcomings are noted as are some suggestions for further research. The second section focuses on the levels of specification and estimation of the reaction functions for producers and consumers. The third section explains the role of material balances. Some extensions are suggested.

Conceptualization of the System

The Peruvian agricultural planning system must constantly look for procedures which enable it to improve its assigned role. This role of conducting the stages of the planning process, i.e., "formulación," "ejecución," and "control," requires the continuous design, analysis, and negotiation of policies and specific actions. A procedure which views these operations in a consistent and systematic manner would be valuable. Such a procedure should take, as a point of departure, the salient aspects of the planning system and its environment. It requires explicit consideration of: (1) the decentralized administrative process of policy generation and (2) the self-willed reaction of the agents that participate in the several decision making processes of the economic system.

The concept of "participación plena," as was indicated in the last chapter, a key concept in Peru's approach to development, underscores the importance of decentralized policy generation. It requires a planning system with simple and powerful tools for policy analysis. The policy negotiation process has to be based on policy analysis which considers the possible reactions generated by producers, consumers, and other agents of the economic system. These should be judged in relation to the objectives that are being pursued.

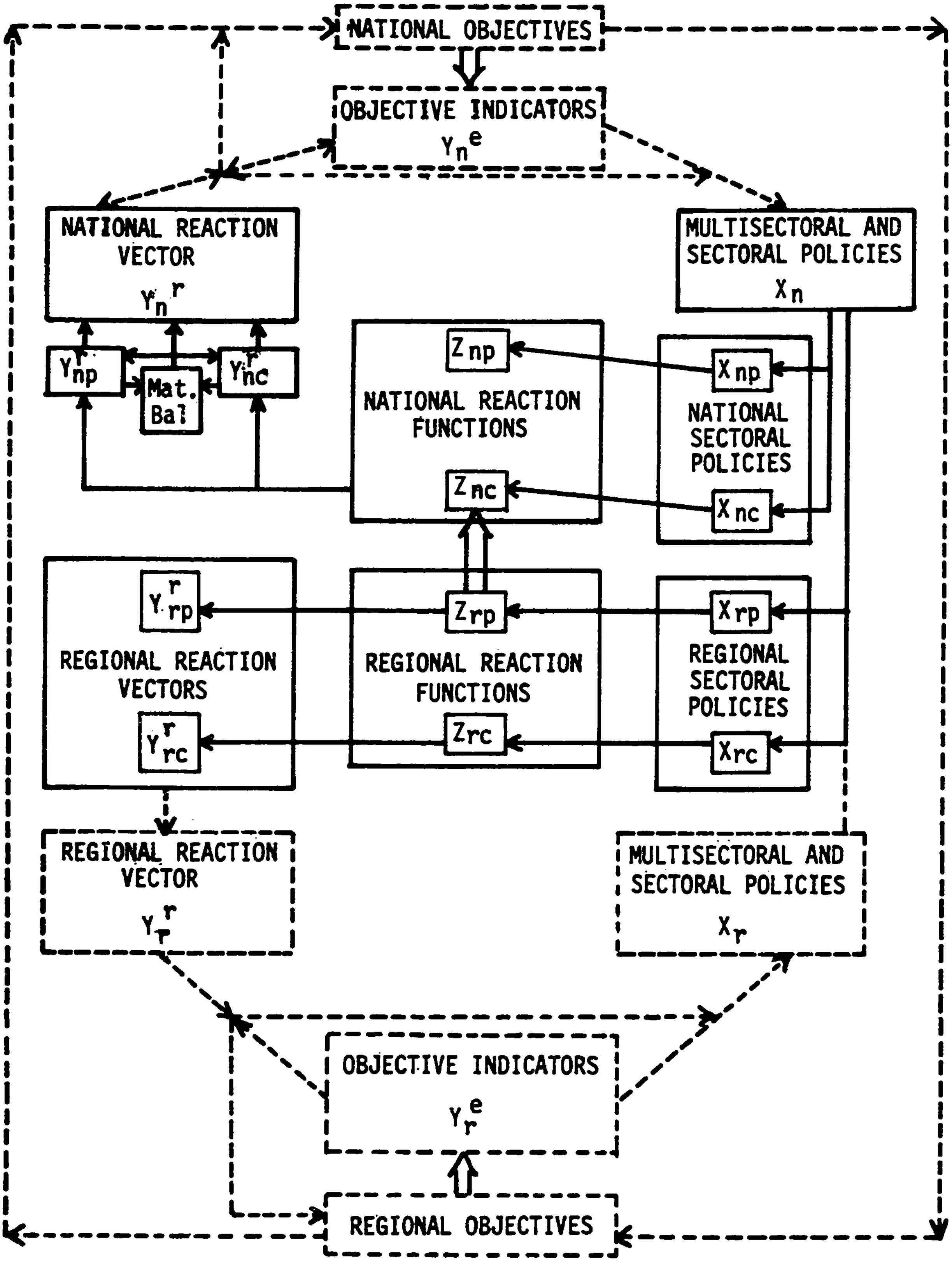
The above implies that an important element of the methodology should be the explicit incorporation of the behavior of those agents whose decisions will determine the outcome of the economic process. This is done by developing the corresponding reaction functions.

This study centers on the specification, estimation, and use of these reaction functions at the regional level. The aggregation of the regional estimated reaction functions permits the generation of national reaction functions. These national reaction functions will allow the judgment of the policies in terms of their deviations from the indicators of the objectives pursued.

This is just the first step in the construction of a policy analysis system. The policy negotiation process does not stop at pointing out the deviations of the possible reactions to some policies from the postulated objectives. It continues by showing alternative policies that may reduce the gaps or even eliminate some of them. This is done through an iterative process where the different administrative levels participate. Policies and specific actions for each administrative unit are the outcome of the process. Then the system here discussed has to link policy formulation with administrative actions and the corresponding cost for their implementation. Thus, this study should be continued in order to incorporate the last two aspects mentioned. There are some techniques available which are suitable for the problem being addressed. In this respect, an effort should be made to explore the possibilities of techniques such as goal programming and planning programming and budgeting (PPB). Then, an effort should be made to establish a clear link with the private nonagricultural sector of the economy. This requires an explicit macro-model that will generate endogenously some of the variables (such as income, industrial consumption, etc.) that are being treated exogenously now.

Figure 3-1 is an attempt to summarize the structure of the system being designed by this study. It should be noted that there is an effort to systematize the participatory nature of the design of policies at different levels. This is accomplished by an explicit consideration of the administrative levels of the government as well as the reaction of producers and consumers. This figure also allows one to see the sequence of activities involved in the use of the system. The "national objectives" have to be translated into "objective indicators" at the sectoral level (Y_n^e). This task is performed by the Sectoral Planning Office (OSPA) in consultation with the agricultural minister and vice-minister. In the same way, the "regional objectives," which have previously been coordinated with the national ones, are also translated into "objective indicators" at the regional level (Y_r^e). This task should be performed by the Zonal Planning Offices (OZPA) of each agrarian zone in consultation with the Zonal

Figure 3-1. A general view of the structure and mechanics of the system for policy analysis


NATIONAL OBJECTIVES
OBJECTIVE INDICATORS
Y_n^e
NATIONAL REACTION VECTOR
Y_n^r
MULTISECTORAL AND SECTORAL POLICIES
X_n
Y_{np}^r
Mat. Bal
Y_{nc}^r
Z_{np}
NATIONAL REACTION FUNCTIONS
Z_{nc}
X_{np}
NATIONAL SECTORAL POLICIES
X_{nc}
Y_{rp}^r
REGIONAL REACTION VECTORS
Y_{rc}^r
Z_{rp}
REGIONAL REACTION FUNCTIONS
Z_{rc}
X_{rp}
REGIONAL SECTORAL POLICIES
X_{rc}
REGIONAL REACTION VECTOR
Y_r^r
MULTISECTORAL AND SECTORAL POLICIES
X_r
OBJECTIVE INDICATORS
Y_r^e
REGIONAL OBJECTIVES

Directors. All the objectives cannot be translated into specific indicators; some will be expressed in terms of ranges.

OSPA, together with the programming offices (OP) at the national level, receives the proposal for "multisectoral and sectoral policies" (X_n) from the National Planning Institute (INP) and specialized divisions at the national level. OSPA and OPs disaggregate these policies for the regional level. A similar procedure is followed in the agrarian zones by the OZPAs in coordination with regional multisectoral offices and specialized divisions of the Agrarian Zone. The set of policies is interchanged between OSPA and each OZPA. They perform a consistency analysis which produces the "regional-sectoral policies."

This study considers the identification of these policies with the processes (mainly production and consumption) they try to affect. X_{rp} represents those policies which relate to the production process. X_{rc} is used for those which correspond to the consumption process. The exchange process is not considered explicitly. This implies that it should be a minimum relation between the set of prices that are used for production and consumption and an infinite elastic marketing capacity. It should be noted that these are restrictive assumptions which require special studies to be removed.

Producers and consumers react to the regional-sectoral policies in a certain way. Their behavior is represented in a simple way by policy elasticity matrices or "regional reaction functions." These matrices (Z_{rp} for producers and Z_{rc} for consumers) allow OSPA and OZPAs together to translate the given sets of policies into producer and consumer reactions through a set of policy performance indicators. These are collected as vectors of regional reaction (Y^r_{rc} for consumption and Y^r_{rp} for production).

The "regional reaction functions" (Z_{rp} and Z_{rc}) can generate the "national reaction functions" (Z_{np} and Z_{nc}) by an appropriate weighting scheme. OSPA can use the national reaction functions to obtain the vectors of national reaction (Y^r_{np} for production and Y^r_{nc} for consumption). The national balances allow for the estimation of additional policy performance indicators as well as the consistency check. Then, OSPA and each OZPA can compare the corresponding vectors of expected results or objective indicators (Y^e_n and Y^e_r) with the reaction vectors (Y^r_n and Y^r_r). This will permit them to assess the viability of the policies based on the magnitude of the gaps (Y^e_n - Y^r_n and Y^e_r - Y^r_r).

In summary, the system for policy analysis, at this stage of its development, considers the following sequence of activities: (1) definition of objective in terms of indicators; (2) policy design at different administrative levels; (3) regional disaggregation of policies; (4) generation of regional and national producer and consumer reaction vectors; (5) comparison of reactors' vector with objective indicators' vector; and (6) evaluation of different policies in terms of goal-reaction gaps.

Reaction Functions

It should be noted that the heart of the outlined system for policy analysis is a set of reaction functions. There are three levels of treatment of these reaction functions. The first one considers the conceptualization of the process under study and specification of the economic behavioral model for the agents participating in that process. The other two refer to the estimation of the coefficients of the endogenous and exogenous variables. This is done at the regional and national levels.

The analytical approach is based on the identification of: (1) a set of exogenous variables which represent the policy instruments (X); (2) a set of endogenous variables which represent the reactions of the agents in terms of policy performance indicators (Y); and (3) a set of structural relations which relate the policy instruments with the policy performance indicators. This is presented in a symbolic way in Table 3-1.

Table 3-1. Set of structural relations differentiating endogenous and exogenous variables

Structural relations	Endogenous variables				Exogenous variables			
	y_1	y_2	...	y_n	x_1	x_2	...	x_m
(1)	a_{11}	a_{12}	...	a_{1n}	b_{11}	b_{12}	...	b_{1m}
(2)	a_{21}	a_{22}	...	a_{2n}	b_{21}	b_{22}	...	b_{2m}
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(n)	a_{n1}	a_{n2}	...	a_{nn}	b_{n1}	b_{n2}	...	b_{nm}

The structure of the analytical procedure can be represented in matrix notation as follows

$$Ay = Bx$$

The vectors y and x represent the endogenous and exogenous variables, respectively. These variables are expressed in terms of percentage rates of change. The matrices A and B are the corresponding set of coefficients.

The solution of the system of structural equations can be expressed in the following way.

$$y = (A^{-1}B)x \qquad y = Zx$$

The matrix Z represents the set of policy elasticities which are the basis of the reaction functions. The first relation of the system could be written

$$y_1 = Z_{11}x_1 + Z_{12}x_2 + \ldots + Z_{1m}x_m$$

If the set of policies under analysis are increases in x_1 and x_2 on the order of 1.5% and 2%, respectively, the reaction to these policies in terms of the policy performance indicator y_1 would be calculated in the following way.

$$y_1 = Z_{11}(1.5) + Z_{12}(2)$$

This calculation would tell us that the implementation of those policies would mean a specific percentage change in y_1. The comparison of this reaction with the postulated objective in terms of y_1 would allow us to judge the set of policies under analysis.

It has been indicated that the matrix of regional production policy elasticities Z_{rp} allows OSPA and OZPAs to make an estimation of the possible impact of the regional production policy vector (X_{rp}) in the regional production reaction vector (Y^r_{rp}).

A simple theory of the behavior of the associative enterprises created by the Peruvian agrarian reform is not available. In order to simulate the reaction of producers, a simple theory of their behavior has to be constructed. It has to capture some of the basic structural characteristics of Peruvian agriculture. The most productive land has been taken from the old "latifundista" and given to the permanent workers. They administer these enterprises collectively. A large number of landless workers still exist. They sell their labor to their old co-workers. These two worker groups, together with the ecological heterogeneity of the sector, have to be incorporated in a model that tries to simulate the outcome of the economic behavior of the Peruvian agricultural enterprises. An effort along these lines is presented in the next chapter as a basis for the specification of the producers' reaction function.

The estimation of the producers' reaction functions is a matter that also presents some difficulties. There is not a consistent source of information available. Agrarian reform is changing the power structure. It is eliminating some social classes and creating others. The demands for information are different than before. The traditional agricultural statistics with their concentration on area of land per crop is not enough any more. Then, in this study, information is adapted from different sources, and it is combined with specialists' judgments. In some cases "educated guesses" are made. The estimates have therefore an illustrative purpose. The Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA) is conducting a series of studies that are designed to provide information for a better estimation of the reaction functions.

The consumers' reaction functions are based on the regional consumption policy elasticities Z_{rc}. These policy elasticity matrices allow OSPA and OZPAs to make an estimation of the possible impact of the regional consumption policy vector (X_{rc}) in the regional consumption reaction vector (Y^r_{rc}).

The consumers of agricultural products are the whole population. More than 50% of the economically active population participate in the production process of sectors other than the agricultural sector. This study concentrates only on the agricultural production process. Therefore, relations of production and distribution and the corresponding generation of income distribution, although basic for the determination of the structure of consumption, are not incorporated endogenously. It could be said that the theoretical specification of the consumers' reaction functions is based on a study of the consumption process. This is limited to its superficial relations without going into the deeper problems of its dependence on the relations of production. The policy elasticity matrix is formed by a complete set of price and income elasticities for the food basket of different regions.

The estimation of the regional reaction functions is based on the data collected by the Peruvian national consumption survey (ENCA).

Material Balances

The material balances are used to confront availabilities or sources with requirements or uses of products, labor force, and means of production. The last two types are used at the regional level. The material balance of products is used at the national level. It serves as the principal relation with the rest of the economy as well as with the rest of the world.

The relation of the agricultural sector with the rest of the economy is done through human consumption, industrial consumption, and changes in inventories. The relation with the rest of the world is done through exports and imports of agricultural products. This can also serve to establish the impact of the policies in foreign exchange requirements of the sector. The components of the material balance for products are expressed in Table 3-2.

Table 3-2. Material balance for agricultural products

Availability or sources	Requirements or uses
•National production	•Human consumption
•Imports	•Animal consumption
•Change of inventories	•Industrial consumption
•Waste	•Reproduction consumption
	•Exports
Total supply	Total demand

By definition, total supply will equal total demand for each agricultural product. Otherwise, one or more mechanisms of reconciliation will have to be used in order to restore this equilibrium. Some of these mechanisms could be: (1) changes in price of the product in question; (2) changes in prices of other products; (3) import quotas; (4) export subsidies; (5) redistribution of income to increase human consumption; (6) subsidies or taxes for selected inputs; and (7) others.

The material balances can serve as the basis for a sectoral accounting system for the agricultural sector. This would be very helpful for the activities of data collection. This is something that should be included in the list of extensions indicated above.

The next five chapters present the studies conducted for the specification, estimation, and use of the basic components of the system for agricultural policy analysis described in this chapter. The calculations are performed with the purpose of testing the methodology developed.

CHAPTER 4. A THEORETICAL APPROACH TO PRODUCERS' REACTION FUNCTIONS

The objective of this chapter is to present the theoretical basis for the producers' reaction function defined in the last chapter. It starts with a conceptualization of the production process. This is important for the definition of the structural parameters of the Peruvian agricultural process. Beginning in 1969, these parameters are being modified by the implementation of agrarian reform. These changes are sketched in the first section. They establish a context for the production model that is developed later.

The second section presents an outline of the economic theory of the firm. It begins with the traditional theory of the firm. Its basic structural parameters are identified in order to appreciate its relevance for the study of Peruvian associative enterprises. Then a brief presentation of the economics of family farms and labor-managed enterprises is made. This is done keeping in mind the alternative forms of production enterprises in the Peruvian agricultural sector.

The third section presents a simple model of an associative enterprise that uses hired labor. It also presents, as special cases, models of enterprises that do not hire labor and of family-operated farms. Conclusions from these cases are contrasted with the ones derived from the model of labor-managed enterprises.

Finally, a generalization of the model is presented in the last section. This model is used in the next chapter for the estimation of producers' reaction functions.

Structural Parameters of the Peruvian Agricultural Production Process

The study of producers' reaction functions has to start by making explicit structural parameters that characterize the production process. It has been pointed out (14) that, from a structural point of view, the production process can be characterized by: (1) the labor process, by means of which the human being transforms nature to satisfy his needs and (2) the social relations of production among producers in a historically determined society.

In order to transform nature or a determined object into a determined product, human activity (human energy) uses the means of production (nature, raw materials, machinery, animals, roads, etc.) through a process which is conceptualized as a labor process. The type of control that labor has over the means of production to perform the transformation is identified as technical relations of production. The labor process is conducted under concrete historical conditions. Its participants are not isolated. They establish some type of relations that depend on their property relations with the means of production. These are identified as the social relations of production.

This qualitative vision of the production process is incomplete. It just looks at structural aspects of production. It lacks the dynamic point of view that would allow one to see how the production process reproduces both its material as well as its social conditions. As has been pointed out before, this is just a starting point. It is a first approximation that already creates problems because of the limitations of the analytical tools available. It is not within the scope of this research to solve these problems.

Since 1969 the structural parameters of the Peruvian agricultural sector have been changed by agrarian reform. Peruvian agrarian reform has two important characteristics. It has eliminated the big-land-holder ("latifundista," "hacendado") through expropriation of land, livestock, permanent crops, machinery, and all types of installations and equipment. It has also reorganized agricultural firms into associative enterprises. These enterprises are mainly agrarian production cooperatives (CAP) and agricultural societies of social interest (SAIS).

The CAP is an indivisible unit of production administrated by its members. The members of a CAP are the full-time field workers, together with technical and administrative workers. They are the worker-owners. Part-time workers ("eventuales") are not considered members. They are landless workers. The economically more important CAPs are those that were established in former sugar plantations. There are estimates that the difference in monthly income (monetary and in kind) between a field worker and a landless worker for these CAPs is as much as four times in favor of the worker-owner.

The SAIS is composed of one or more expropriated "haciendas" transformed into an agrarian service cooperative (CAS) and the surrounding peasant communities ("comunidades campesinas"). The communities are considered members of the enterprise. Their participation is restricted to administrative and economic levels. The former refers to its participation in the Administration Board and in the General Assembly. The latter refers to its participation in the distribution of the economic surplus. They do not participate in the labor process.

The third type of associative enterprise created by agrarian reform is the Communal Cooperative ("cooperativa comunal") and the Communal Enterprise ("empresa comunal"). This is the old peasant community restructured. The peasant community is a continuation of the "Ayllu," a pre-Colombian social and agricultural unit integrated by relatives who collectively worked the land. The "Ayllu" was modified under Spanish domination. Communal linkages were destroyed; land was mainly in the hands of individual holders, and only a small portion was reserved for the community. In the case of the communal cooperative, the land first is given to the community by the government. The community, in turn, transfers it to the communal cooperatives for exploitation under the cooperative system. In the case of the communal enterprise, the land given is considered one unit by production. The administration is done by the board that governs the community.

A fourth group created by agrarian reform is one known as "Peasant Groups" ("grupos campesinos"). They are small groups formed to receive land which eventually will become cooperatives.

Table 4-1 shows the relative importance of each of the above associative enterprises in terms of land received. It can be seen that CAPs and SAISs together have received almost 70% of all the land subjected to the reform. It should be added that in general the most productive land is included in these two types of enterprises.

Table 4-2 shows the number of families that have benefited so far. The importance of the total number of families that are beneficiaries of agrarian reform can be shown by comparing their number to the size of the

Table 4-1. Land allotted by types of enterprises (July 1976)

Type	Hectares (Has.)	%
SAIS	2,113,206	38.16
CAP	1,622,355	29.29
Groups	1,165,011	21.04
Communities	528,719	9.55
Individuals	108,582	1.96
Total	5,537,873	100.00

Table 4-2. Types and number of beneficiaries by the redistribution of land (July 1976)

Type of beneficiary	Number of families	%
Members CAPs	102,819	36.93
Members communities	66,939	24.04
Members SAISs	57,385	20.61
Members groups	32,906	11.82
Individuals	34,557	6.60
Total	294,606	100.00

entire agricultural labor force. CEEB (10) projected for 1975 an agricultural labor force composed of women and men of six years and over of 1,928.8 thousand workers. CEEB (9) calculated an average of 2.3 labor units per family. Then, the 294,606 families who are beneficiaries of agrarian reform represent approximately 677,594 labor units. These correspond to 35.13% of the agricultural labor force.

Two of the most important characteristics of agrarian reform in Perú are: (1) the creation of associative enterprises administered by their worker-owners and (2) the division of the agricultural workers into two classes, worker-owners and landless workers.

Figure 4-1 outlines the qualitative parameters of the Peruvian agricultural production process. This matrix of social relations of production is generated by considering the two worker classes created by the Peruvian agrarian reform on the axes. The north-west quadrant represents the old "latifundio" or big "hacienda," belonging to a few owners. They put an administrator in charge who hired their workers. This situation has been eliminated by agrarian reform.

The north-east quadrant represents the agro-industrial plantations of the coast. They have been allotted to their permanent workers. Roca (49) has estimated that approximately 20% of the workers ("eventuales") of these enterprises were not incorporated as members of the cooperatives.

The south-east quadrant corresponds to CAPs, SAISs, and communities of a variety of sizes with a relatively high participation of hired labor in some of them to zero participation of landless workers in others. These last types of enterprises group around 70% of the beneficiaries of agrarian reform.

The south-west quadrant represents a mixture of reform and nonreform enterprises. They vary from medium-sized farms (modern and traditional) to the small or family farms (modern and traditional). In general the former have more than 10 Has. while the latter have less. The medium-sized farms use a relatively high number of temporary workers and a very small number of permanent workers (between 3 and 19). The permanent workers are supposed to have participation (20%) of the net economic surplus of the enterprises as well as in the main decisions as a result of agrarian reform. The small or family farms have less than 10 Has. down to 3 Has. for the modern commercial family farm. This may decrease to limits that do not allow the owner to survive on its production for the traditional peasant family or sub-family farm. Caballero (7) has estimated that this last group of peasants owns around 10.9% of the agricultural land and, together with the landless workers, constitute 49.3% of the agricultural labor force.

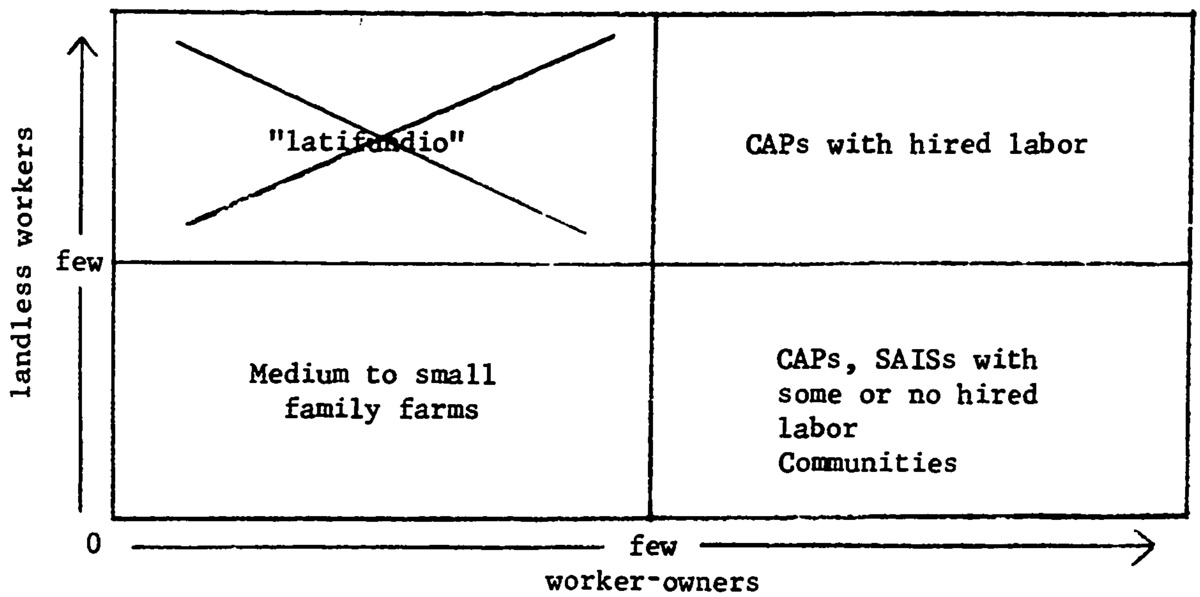


Figure 4-1. Matrix of social relations of production

The Economic Theory of the Firm

This section outlines the theoretical developments used by economists to study production in firms. This is done keeping in mind that the main objective of this chapter is the development of the theoretical basis for the specification of the producers' reaction function. This critical review is done within the framework of the matrix of social relations of production created by Peruvian agrarian reform.

The traditional theory of the firm

The main stream of what is called modern economics, in relation to the explicit study of production, can be clearly identified in Mill's Principles (33). This influential book was the textbook on the subject from 1848 until the appearance of Marshall's Principles (30) in 1890. Following Smith's (55) teaching, he thought that the subject of inquiry of political economy was wealth. Mill summarizes his study of production saying (33, p. 199) ". . . the laws and conditions of the Production of Wealth partake of the character of physical truths. There is nothing optional or arbitrary in them." The study of the production process is restricted to the technical relations in which the labor process is performed and it is clearly separated from the distribution process. They are treated as self-contained independent spheres (31) as if production and distribution together with exchange and consumption were not members of one entity; different sides of one unit, the economic structure (26).

This line of economic thought can be traced to modern economic theory. The late professor C. E. Ferguson (18) helped to establish this connection with his book The Neoclassical Theory of Production and Distribution published in 1969. In this book, he explained that a great part of the theory of production can be developed without regard to economic considerations such as input and output prices.

The preoccupation for "more realism" within this line of thought has brought about the discussion on how to express the behavior of the representative unit of the production process. A lot of effort has been directed to simulate the economic behavior of the firm in order to predict its response to changes in policy instruments. Crew (12) summarizes the uneasiness of some economists when he says ". . . at first sight the neoclassical theory of the firm seems to ignore the nature of firms entirely. The firm is regarded as a primitive concept, a device in an economically decentralized system for transforming inputs into outputs . . ." (12, p. 2). The emphasis of the neoclassical theory of the firm goes to market coordination between competing firms and its effect on the allocation of goods.

The search for "more realism" together with the influence of behavioral science and management science gave birth in the 1960s to economic theories that were trying to put emphasis on "realism in the process of decision making" (behavioral theories) and "realism in managerial motivations" (managerial theories). Machlup's (29) methodological "defense" of the neoclassical theory was brought about by these developments in the theory of the firm. He argued that the theoretical firm of neoclassical economics is a mental construct which does not have to correspond to any actual firm.

Another preoccupation in the theory of the firm is the neglect of the internal organization of the firm. First, Coase (8) and then Alchian and

Demsetz (1) have looked within the framework of the neoclassical theory of the firm at the nature of internal organization of firms. In contrast with a political democracy and market coordination that is supposed to exist at the macro level of the system, Coase made the existence of hierarchical forms of decision making and coordination explicit. On the other hand, Alchian and Demsetz exaggerate the use of the market mechanism to represent the internal activities of the enterprises. They ignore the fundamental obstacles of labor mobility, the social aspects of wage contracts, the issue of property rights as well as that of creating and maintaining non-hierarchical organizations within a hierarchical capitalist environment.

In general, if one looks under the surface of this approach, keeping in mind the qualitative parameters of the production process, a very clear pattern of social relations will be found. First, the emphasis was on the separation of a capitalist (owner of the capital) from the workers (owners of their labor force). The so-called alternative theories made the existence of a manager, who is hired by the capitalist explicit. The manager is supposed to make decisions with the final objective of profit maximization (return to fixed assets owned by the capitalist). This implies that the manager values highly additional income in relation to the marginal cost necessary to obtain it.

This theory of the firm, with the type of social relations of production indicated, with its emphasis on one decision maker who decides how many workers will participate in the labor process, does not help as a basis for the development of the reaction function of the associative enterprises discussed in the last section. It is not very helpful for the study of family nor sub-family farms either.

The economics of family farms

Sen (53) has studied the economic equilibrium of a peasant family. He does so in the context of the theory of surplus labor and disguised unemployment. He was interested in developing the response of peasant output to a withdrawal of the working population.

He develops the simplest model where peasants maximize the happiness of the family. The welfare of family is given by the net utility from income and effort of all members taken together. The welfare maximization gives the rule for the supply of labor. In this case, labor is applied up to the point where its marginal product equals the real cost of labor. The real cost of labor is given by the individual rate of substitution between income and labor.

If the peasants, instead of consuming all that is produced, sell all their production, the maximization of family welfare gives a similar rule for labor supply. In this case, the real cost of labor corresponds to the marginal rate of substitution between labor and product. The rate at which their product can be substituted for the commodity they have to buy for their consumption must be kept in mind.

He also worked out the somewhat more complicated case when a part of the production is consumed directly and the rest is sold in the market. The maximization of family welfare gives two rules of allocation. The first one states that the production should be divided in such a manner that the marginal rate of substitution between the two commodities equals their price ratio. The second one equates the marginal product of labor with the real cost of labor at the margin. In summary, Sen's approach integrates production and consumption theory into one unit of analysis.

Nakajima (44) follows a similar approach to the one used by Sen. He expounds the assumptions of his models and works out the achievement of equilibrium and its comparative status in greater detail both graphically and mathematically.

Nakajima shows that the rule that determines the supply of family labor (equality of marginal productivity of labor and marginal valuation of family labor or Sen's real cost of labor) is replaced by two relations that equate these two concepts to the wage rate when the family farm hires labor from a competitive market. Then the equality value of marginal productivity of labor and wage rate determines the total labor force required by the farm. The farm family's income relation, simultaneously with the relation that equates marginal valuation of family labor to wage rate, will determine the amount of family labor and the family's income.

The key relation in this approach is the explicit derivation of the labor supply curve for the family. This is done within an income-leisure choice framework.

The economics of labor-managed enterprises

During the last 20 years, inspired by the Yugoslav experience, economists have made efforts to produce a formal economic theory of labor management. Vanek (61) presented a comprehensive microeconomic, as well as macroeconomic, theory of labor-managed systems that go beyond the original efforts related to the theory of the firm.

Ward (66, 67) is recognized as the pioneer in the development of an economic theory of labor-managed enterprises. He assumes that the workers' council instructs the manager to produce up to the point at which the average income per unit of labor is maximum. In order to show the principal features of the model, Ward uses a production function with labor as the only variable.

$$Q = G(L)$$

where Q and L are physical output and labor, respectively. Instead of receiving wages, the workers share equally the net income of the enterprise in the form of a dividend.

$$W = (PQ - R)/L$$

R is a fixed rent paid by the enterprise. Then the manager's job is to calculate the output that will satisfy the worker's council's criterion. In terms of Figure 4-2(b), this implies the maximization of the vertical distance between the average value product of labor ($AVP_L = PQ/L$) and the average cost per unit of labor (R/L). The maximum is reached at an employment level L^*, where W is at point A (which corresponds to the distance ab).

It is important to notice that at its maximum the net income per unit of labor must also equal the marginal value product of labor (MVP_L). Figure 4-2(a) shows that total value product of labor (PQ) diminished by the fixed cost (R) is the total net income of labor corresponding to different levels of employment. The net income per unit of labor is measured by the slope of a line connecting point R and any point of the total value product curve. Then the slope is maximum when it corresponds to the slope of the total product curve. This happens at point A of Figure 4-2(a). Then it is evident that in equilibrium the net income per unit of labor must equal the marginal value product of labor.

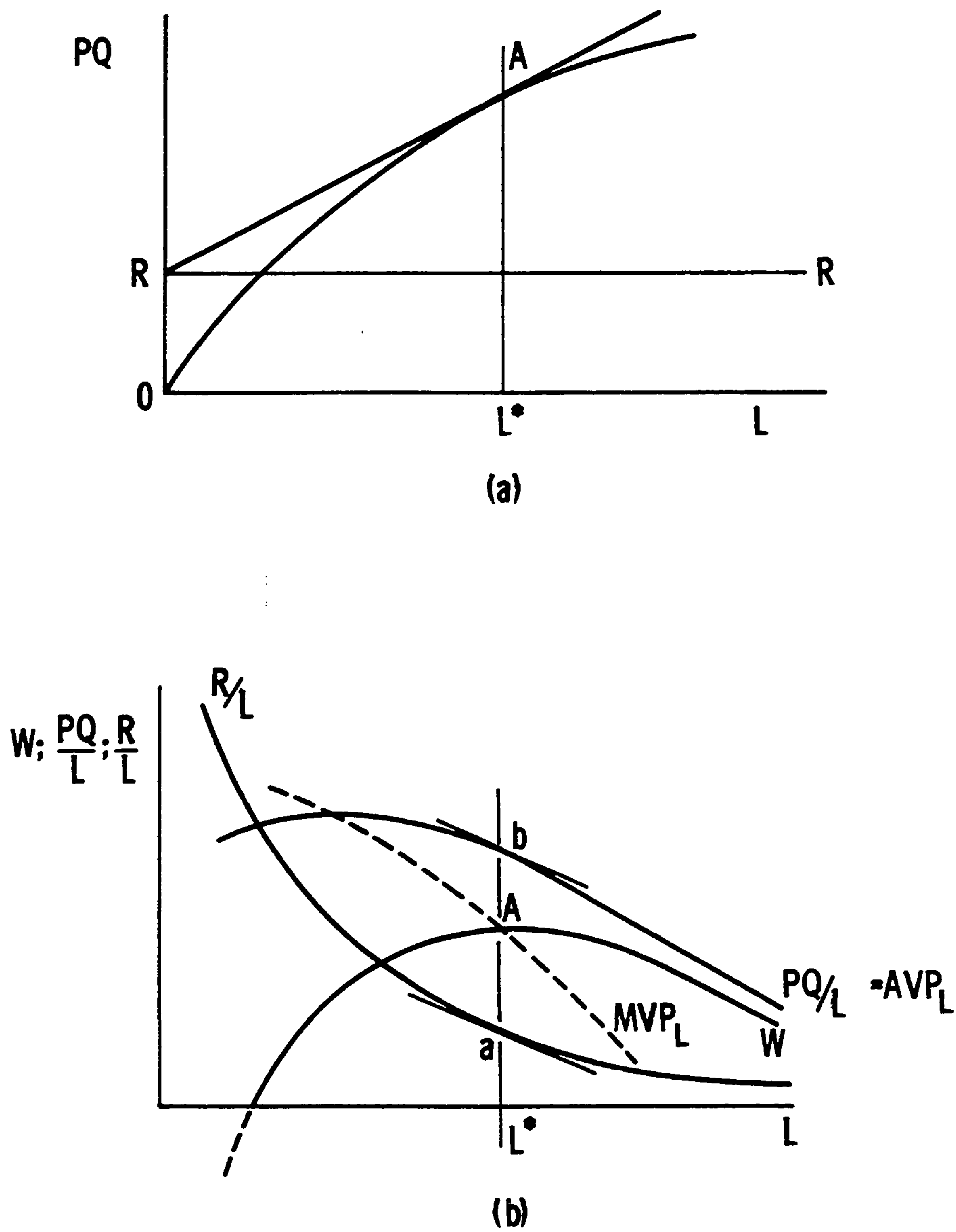


Figure 4-2. Employment in Ward's Illyrian firm

On the basis of this simple model, Ward generalized his results into theorems as follows, "A change in the fixed costs of the competitive Illyrian firm leads to a change in output in the same direction . . ." (67, p. 190). "A change in price to the competitive Illyrian firm leads to a change in output in the opposite direction" (67, p. 191). It is obvious that the same is true for employment.

Ward also works a model with two variable means of production. He concludes that workers react to changes in the means of production in the same manner as do capitalists. For a given number of workers, anything that increases total profits will increase the income per worker. Total profits will increase if the value of the marginal product of the additional nonlabor factor is greater than its cost. On the other hand, workers will be hired if the net addition to enterprise income is not less than the current dividend per worker.

Domar (15) calls Ward's model the "pure model" of a cooperative. He points out that the difference between Ward's firm and the corresponding capitalist firm depends on the differences between the wage rate and the dividend per worker. Domar shows that increasing the generality of the model diminishes the differences between the "pure model" of a cooperative and the capitalist firm. He worked out the case of several factors of production and several outputs to prove his point. However, he concludes that the "pure model" is unreal. This is so because ". . . it assumes that labor input can be varied with changing prices and rent in order to maximize the dividend rate, a highly unlikely situation once the co-op has been organized. Surely the co-op, by its very nature, cannot admit and expel members at will . . ." (15, p. 742).

The last observation allowed Domar to avoid the nondesirable conclusion (negatively sloped supply functions) of Ward's "pure model." This is so because if the number of workers is fixed, the hours of labor force contributed by each member of the cooperative can be varied. They will not want to maximize their dividend without restriction in the number of hours worked. Then, the cooperative faces a supply schedule of labor. The intersection of the dividend rate with the labor supply curve determines the labor contributed by the members.

On the other hand, Domar failed to develop all the implications of his contribution. He started with the same objective for a cooperative as the one used by Ward. Vanek (60, p. 30) has called it ". . . the individualistic maximization of income per worker within the collective. The term individualistic is used . . . to indicate that maximization will be pursued at all costs, even if, under changing economic conditions, it implies the expulsion of some of the members. . . ." Domar's observation that the cooperative cannot admit and expel members implicitly means that the objective of a cooperative would be the maximization of income per worker of all members of the collective. Vanek (60, p. 30) calls this second objective the "social objective."

More recently, Horvat, whose work is mentioned in Wachtel (65) and in Milenkovitch (32), and Vanek (61), among others, have used the individualistic criterion of maximization. Vanek (61) argues that there are two "solutions" for the case which call for a reduction in employment. First, he says that voluntary cessation of work and retirement may be near 10% per year while the reduction in the labor force called by the behavior of the firm would only be a few percentage points per year. His second observation is called the "bee-swarm effect." This implies that the released employees would be integrated into a newly generated firm.

In general, the above formulations are not very helpful for the study of the reaction functions of the Peruvian agricultural enterprises. In these enterprises: (1) the decision making responsibility is not transferred to a manager; (2) the manager cannot change the number of members of the enterprise; (3) the number of hours and working days is a collective decision; and (4) there is outside labor participating in the labor process. On the other hand, Domar's implicit "social objective" formulation is useful as a special case when there is not hired labor.

A Model of Economic Behavior of Agricultural Associative Enterprises

The first section of this chapter has indicated the existence of a necessary condition for the modeling of any production process. This can be summarized as the explicit representation of the labor process and the social relations of production. The collectivist orientation of the Peruvian agrarian reform was also explained. The new enterprises created by the reform were designed with the intention of giving their control to the workers. This completes the broader and more general framework imposed by the requirements of the methodology presented in Chapter 3. The second section of this chapter has outlined the tools created by economists for the purpose of the study of the firm under capitalist as well as noncapitalist economic systems. Some of its limitations have been pointed out.

The present section is an effort to adapt the new developments on the theory of the firm to the needs of the analysis of the Peruvian situation.

This section is devoted to the development of a simple model of associative enterprises. It is designed to capture the main components of the economic reaction of these enterprises to alternative policies. Therefore, it should identify: (1) a group of exogenous variables which are policies that will be analyzed; (2) a group of endogenous variables which represent the reaction of enterprises; and (3) a system of structural relations which allows one to derive "reaction functions."

The structural parameters identified in the first section should guide one to the definition of the system of structural relations. The limitation of available analytical procedures should not preclude explicit representation of the social relations of production. They should express the existence of two classes of workers: worker-owners and landless workers. The explicit representation of these two classes will allow one to capture the social aspects of distribution. The technical relations of production are represented by input-output type relationships. They permit one to focus on the technical aspects of allocation.

<u>A model of economic behavior of associative enterprises with labor market</u>

The assumptions that characterize the first approximation of the model follow:

1. The associative enterprise is managed by the worker-owners. Decisions are the result of an interaction of many persons. There is full participation of worker-owners on the main decisions.
2. Worker-owners try to satisfy several objectives, which are not all pecuniary. They are not willing to trade nonmonetary objectives, without restriction, for additional income.

3. Labor is supplied by both worker-owners and landless workers. The number of worker-owners is fixed, none of them can be expelled. They decide the number of hours each of them should contribute. The landless workers participate in the labor process according to residual requirements.

4. The equilibrium position of the enterprise requires the definition of the total demand for labor and the labor supply of worker-owners. The former is obtained by a maximization of the net income per worker-owner for the fixed number of worker-owners. The labor supply of worker-owners is based on their labor-leisure preference. Therefore, the two essential relationships of the model are the labor supply of worker-owners and the net income of the worker-owners. The labor supply of landless workers is assumed to be perfectly elastic.

5. The labor of each worker is assumed technically homogeneous. The technical relations of production do not distinguish the contribution of worker-owners and landless workers to the labor process. Their marginal physical productivity is the same. On the other hand, from the point of view of the social relations of production, the labor force is not considered homogeneous. The landless worker receives only a wage while the worker-owners receive the net income of the enterprise or dividend.

6. The enterprise produces only one product. Its production function and its first and second partial derivatives are continuous. The corresponding partial elasticities of production are constant.

7. The exogenous variables are prices of product and means of production (i.e., fertilizer), wage rate, number of worker-owners, and availability of means of production (i.e., land, machinery, and fertilizer). The endogenous variables are the quantity of production, employment of landless workers, use of labor, and generation of income per worker class.

These assumptions suggest a system of structural relations subdivided into: (1) a group of relations that represent technical aspects of allocation and (2) a group of relations that represent social aspects of distribution.

The "allocation relations" will estimate total requirements of labor force. This will permit estimation of physical production as well as its value. This is possible due to the exogenously given means of production. It is also simplified by consideration of only one product. The sub-system that focuses on the "allocation problem" has two equations: the production function and the rule for determination of optimal requirements of labor.

The production function is a technical relation. The physical amount of production, Q, is a function of the labor force, L, and two other variables that represent the means of production, T, for those owned by the enterprise, and F, for those bought outside.

$$Q = G(L,T,F) \tag{4-1}$$

Maximization of the net income per worker-owner allows one to derive the rule for determination of optimal requirements of labor. According to this rule, the enterprise will utilize labor until the value of marginal productivity of labor equals the value of the given wage rate for outside labor.

$$P(\partial Q/\partial L) = P_e \tag{4-2}$$

The "distribution relations" will permit one to estimate the distribution of value of production among enterprise worker-owners, landless workers, and other owners of means of production bought by the enterprise. The sub-system that focuses on the "distribution problem" has four equations: (1) one that explains net income per worker-owner; (2) the worker-owner labor force supply function; (3) the relation that estimates total labor force supplied by all worker-owners; and (4) one that estimates residual requirements of landless workers' labor force.

The net income per worker-owner is derived from the relation that shows how gross value of production, PQ, is distributed among three types of owners: (1) income of the worker-owners, I_sS; (2) income of landless workers, P_eL_e; and (3) income of owners of means of production bought by the enterprise, P_fF.

$$PQ = I_sS + P_eL_e + P_fF$$

Then, residual income per worker-owner is easily obtained.

$$I_s = (PQ - P_eL_e - P_fF)/S \tag{4-3}$$

The worker-owner labor force supply function is determined by values they attach to multiple objectives they try to achieve. This can be summarized by a process of maximization of a preference function of one "representative" worker-owner. The arguments of preference function are income generated by his participation in the labor process of the enterprise and "leisure" for his participation in other activities either inside or outside the enterprise. First order conditions allow one to generate a relation between income for each worker-owner and days (or hours) he is willing to offer to the labor process of the enterprise.

$$D = H(I_s) \tag{4-4}$$

The total labor force supply of worker-owners is the product of that offered by the representative times the number of them.

$$L_s = S \cdot D \tag{4-5}$$

The last equation is an accounting relation. It explains that total labor force, L, is provided by two types of workers. L_s is the labor force provided by worker-owners. L_e is the labor force provided by landless workers.

$$L = L_s + L_e \tag{4-6}$$

Therefore, the system of structural relations is composed of six equations which contain six endogenous variables (Q, L, L_s, L_e, D, and I_s) and six exogenous variables (P, P_e, P_f, S, T, and F).

Figures 4-3 and 4-4 help to focus on two of the key relations of the above model, the net income per worker-owner and the worker-owner labor force supply. Figure 4-3(a) shows the average value product per worker-owner (PQ/S) as a function of the labor force (owned and hired) per worker-owner (L/S). The distance OA is the payments of the enterprise for other than hired labor. OAC represents the total cost of the enterprise when the worker-owners do not work and all the labor force is hired labor ($L_s = 0$, $L = L_e$). OAGD represents the total cost when worker-owners decide to work OH. If the enterprise decides not to use outside labor ($L_e = 0$), the total cost would be OAE. This case is analyzed in the next section. If the total cost is represented by OAC, the enterprise will maximize the net

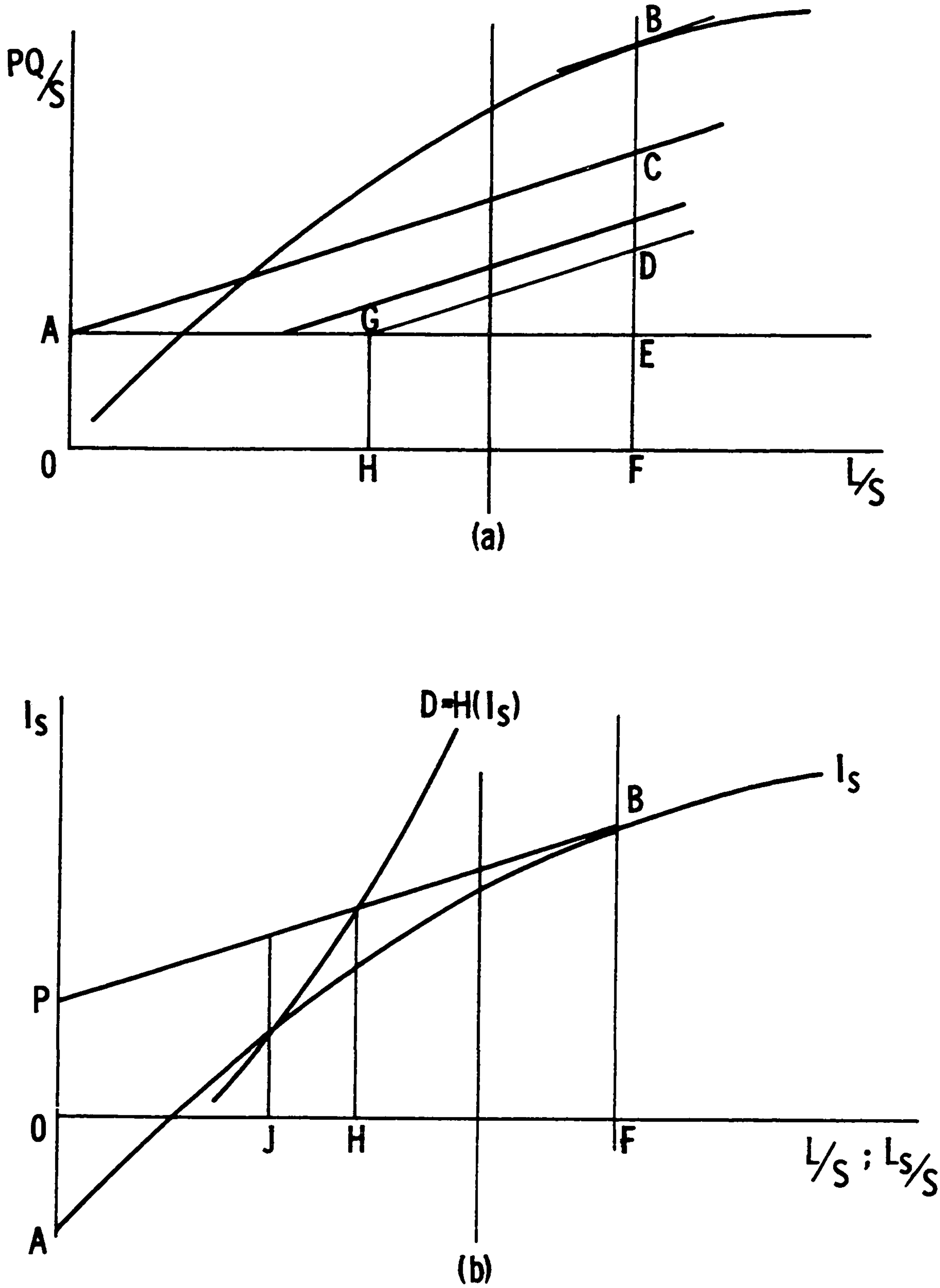


Figure 4-3. Employment in an associative enterprise (adapted from (62) and (63))

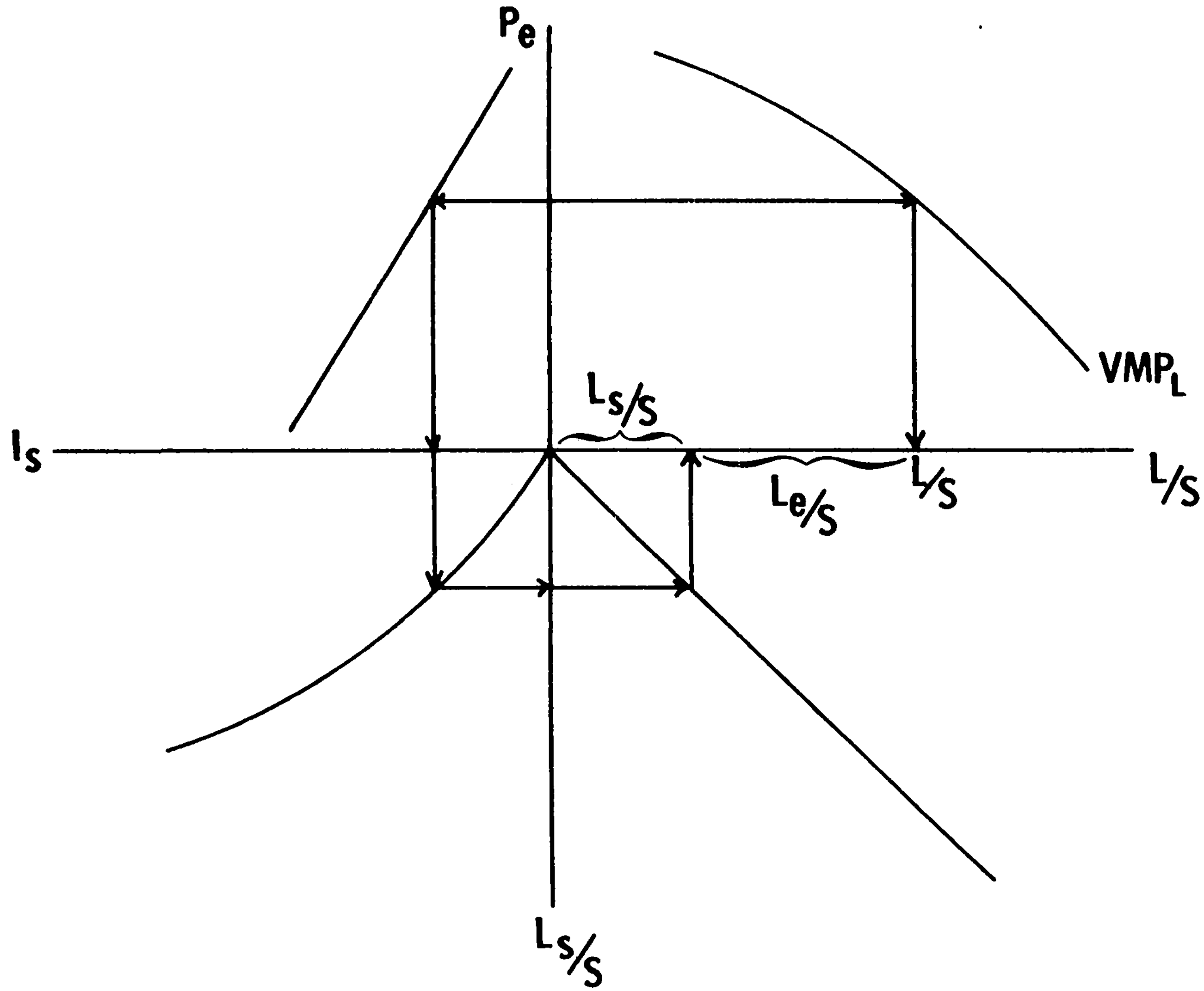


Figure 4-4. Employment in an associative enterprise

income per worker-owner (I_s) by hiring OF labor force per worker-owner. The net income per worker-owner would be BC. If each of the worker-owners works OH, the net income per worker-owner would be maximized by hiring HF labor per worker-owner. The net income would be BD.

The above analysis implies that the net income per worker-owner would increase as the proportion of labor supplied by the worker-owner increases. Then, this could imply that the worker-owners would not want to hire landless workers. This is not necessarily correct. Figure 4-3(b) shows the net income per worker-owner as a function of the labor of worker-owners. Two cases are shown: (1) AB represents the net income per worker-owner (I_s) as a function of the labor per worker-owner ($L_s/S = D$) when there is no hired labor; (2) PB represents the net income per worker-owner (I_s) as a function of the labor per worker-owner when the labor force is composed of worker-owners and landless workers. It should be noted that PB is higher than AB to the left of B. $D = H(I_s)$ represents the worker-owner labor supply function. If the enterprise could not hire labor, the worker-owner would want to work OJ. If the enterprise could hire labor, they would be able to increase the net income per worker-owner; the worker-owner would increase his labor up to OH; and the labor hired would be HF. If the worker-owner labor supply is shifted to the right, the amount of hired labor will decrease. At B the value of the marginal product of labor equals the wage rates.

Figure 4-4 helps to make an analysis similar to the one presented above with the help of Figure 4-3. At a given wage rate P_e, its equality with the value of the marginal product of labor will allow the enterprise to determine the amount of labor it will utilize. This is shown in quadrant I. Quadrant II shows the net income per worker-owner (I_s) which corresponds to the given wage rate P_e. Quadrant III shows the amount of labor worker-owners are willing to supply at I_s. Quadrant IV helps to transfer the labor supply by worker-owner onto the total labor (owned and hired) per worker-owner (L/S) axis. Then, the hired labor is determined by substracting the labor supplied by the worker-owners (L_s/S) from the total amount of labor (L/S) determined in quadrant I.

In order to simplify the algebraic analysis, system of structural relations (4-1) to (4-6) is linearized by transforming variables to percentage changes. A detailed procedure for making the transformations is found in Appendix A. The new linear system of equations is as follows:

$$q = E_l \cdot l + E_t \cdot t + E_f \cdot f \qquad (4\text{-}7)$$

$$p + q - l = p_e \qquad (4\text{-}8)$$

$$a_1 i_s + a_1 s + a_2 p_e + a_2 l_e + a_3 p_f + a_3 f = p + q \qquad (4\text{-}9)$$

$$d = E_d i_s \qquad (4\text{-}10)$$

$$l_s = d + s \qquad (4\text{-}11)$$

$$l = c_1 l_s + c_2 l_e \qquad (4\text{-}12)$$

In this system of linear equations, lower case letters are percentage changes of corresponding capital letters of the nonlinear system. E_l, E_t, and E_f are partial elasticities of production with respect to labor force, means of production owned by the enterprise, and means of production bought by the enterprise, respectively. E_d is elasticity of worker-owners labor supply. The parameters a_1, a_2, and a_3 refer to income distribution among the three types of owners. Parameters c_1 and c_2 pertain to composition of the labor force according to worker class.

The two new relations that correspond to the "allocation problem" are (4-7) and (4-8). They can be combined as follows:

$$(1 - E_1)l = p - p_e + E_t t + E_f f \tag{4-13}$$

Relation (4-13) implies that, given the policies related to changes in price of the product, p, in salary, p_e, in the availability of means of production owned by the enterprise, t, in the availability of means of production bought by the enterprise, f, it is possible to estimate the impact of the reaction of the enterprise in total employment, l. Then, relation (4-7) will allow estimation of the impact of these policies in production, q.

In the same way, relations (4-9) to (4-12) correspond to the "distribution problem." They can also be combined into two new equations. First relation (4-9) can be combined with relation (4-7) in order to get:

$$a_1 i_s + a_2 l_e - E_1 \cdot l = p - a_2 p_e - a_3 p_f - a_1 s + E_t t + (E_f - a_3)f \tag{4-14}$$

The relations (4-10) to (4-12) are combined into one equation:

$$c_1 E_d i_s + c_2 l_e - l = -c_1 s \tag{4-15}$$

Then, the system of equations is reduced to relations (4-13) to (4-15). They can be ordered as shown in Table 4-3.

Table 4-3. Reduced system of structural equations for an associative enterprise with labor market

Equations	Endogenous variables i_s	l_e	l	Exogenous variables p	p_e	p_f	s	t	f
(4-14)	a_1	a_2	$-E_1$	1	$-a_2$	$-a_3$	$-a_1$	E_t	(E_f-a_3)
(4-15)	c_1E_d	c_2	-1	0	0	0	$-c_1$	0	0
(4-13)	0	0	$(1-E_1)$	1	-1	0	0	E_t	E_f

This sytem can be expressed in matrix form as follows:

$$\begin{bmatrix} a_1 & a_2 & -E_1 \\ c_1E_d & c_2 & -1 \\ 0 & 0 & (1-E_1) \end{bmatrix} \begin{bmatrix} i_s \\ l_e \\ l \end{bmatrix} = \begin{bmatrix} 1 & -a_2 & -a_3 & -a_1 & E_t & (E_f-a_3) \\ 0 & 0 & 0 & -c_1 & 0 & 0 \\ 1 & -1 & 0 & 0 & E_t & E_f \end{bmatrix} \begin{bmatrix} p \\ p_e \\ p_f \\ s \\ t \\ f \end{bmatrix} \quad (4\text{-}16)$$

The structure of (4-16) can be represented as

$$Ay = Bx$$

where y is the vector of endogenous variables and x is the vector of exogenous variables. A and B are matrices of coefficients that correspond to endogenous and exogenous variables, respectively. The system of equations is solved as follows

$$y = (A^{-1}B)x \qquad y = Zx$$

where Z is the reduced matrix of policy elasticities.

Policy elasticity Z_{ij} measures the impact of a 1% change in the jth policy on the ith endogenous variable.

$$Z_{ij} = (\Delta Y_i/Y_i)/(\Delta X_j/X_j) = (\Delta Y_i/\Delta X_j)(X_j/Y_i)$$

Table 4-4 shows matrix Z^* which corresponds to the complete system. Once Z has been obtained, it is used to transform relations (4-7), (4-10), and (4-11). Then, they are incorporated with the elements of Z into Z^*. This new matrix Z^* is the "complete matrix of policy elasticities."

Table 4-4 allows one to conduct a qualitative analysis. It is important to see if the sign of the determinant of matrix A, $|A|$, which appears as a common denominator of all the elements of Z^*, could be evaluated.

$$|A| = (1 - E_1)(a_1c_2 - a_2c_1E_d) \qquad (4\text{-}17)$$

The first parentheses of (4-17) is positive by assumptions made about partial elasticities, namely the absence of economies or diseconomies of scale.

$$0 < E_1 < 1 \qquad\qquad (1 - E_1) > 0$$

The second parentheses of (4-17) is evaluated by going back to the original variables

$$(a_1c_2 - a_2c_1E_d) = (I_sS/PQ)(L_e/L) - (P_eL_e/PQ)(L_s/L)(\Delta D/\Delta I_s)(I_s/D)$$

Relation (4-5) allows one to write $S = L_s/D$

$$= (I_sL_sL_e/PQDL)(1 - P_e(\Delta D/\Delta I_s)$$

$$(I_sL_sL_e/PQDL) > 0 \text{ by definition}$$

$$(1 - P_e(\Delta D/\Delta I_s)) > 0 \quad \text{if} \quad P_e < 1/(\Delta D/\Delta I_s)$$

Then, $|A| > 0$ only if the salary paid to hired labor is less than the inverse of the slope of worker-owners labor force supply function. Therefore, it is impossible a priori to determine the sign of the determinant of matrix A.

Table 4-4. Complete matrix Z^* of policy elasticities for an associative enterprise with labor market

Endogenous variables (reactions)	Exogenous variables (policies): p	p_e	p_f
i_s	$\frac{c_2-a_2}{\lvert A\rvert^a}$	$\frac{a_2(1-c_2)-(1-a_2)c_2E_1}{\lvert A\rvert}$	$\frac{-a_3c_2(1-E_1)}{\lvert A\rvert}$
l_e	$\frac{a_1-c_1E_d}{\lvert A\rvert}$	$\frac{-a_1+(E_1+a_2(1-E_1))c_1E_d}{\lvert A\rvert}$	$\frac{a_3c_1E_d(1-E_1)}{\lvert A\rvert}$
l	$\frac{a_1c_2-a_2c_1E_d}{\lvert A\rvert}$	$\frac{-a_1c_2+a_2c_1E_d}{\lvert A\rvert}$	0
q	$\frac{(a_1c_2-a_2c_1E_d)E_1}{\lvert A\rvert}$	$\frac{(-a_1c_2+a_2c_1E_d)E_1}{\lvert A\rvert}$	0
d	$\frac{(c_2-a_2)E_d}{\lvert A\rvert}$	$\frac{(a_2(1-c_2)-(1-a_2)c_2E_1)E_d}{\lvert A\rvert}$	$\frac{-a_3c_2(1-E_1)E_d}{\lvert A\rvert}$
l_s	$\frac{(c_2-a_2)E_d}{\lvert A\rvert}$	$\frac{(a_2(1-c_2)-(1-a_2)c_2E_1)E_d}{\lvert A\rvert}$	$\frac{-a_3c_2(1-E_1)E_d}{\lvert A\rvert}$

[a] $|A| = (1-E_1)(a_1c_2-a_2c_1E_d)$.

Exogenous variables (policies)		
s	t	f
$\frac{(a_2c_1-a_1c_2)(1-E_1)}{\lvert A\rvert}$	$\frac{(c_2-a_2)E_t}{\lvert A\rvert}$	$\frac{(c_2-a_2)E_f-a_3c_2(1-E_1)}{\lvert A\rvert}$
$\frac{-a_1c_1(1-E_1)(1-E_d)}{\lvert A\rvert}$	$\frac{(a_1-c_1E_d)E_t}{\lvert A\rvert}$	$\frac{a_1E_f+(a_3-a_3E_1-E_f)c_1E_d}{\lvert A\rvert}$
0	$\frac{(a_1c_2-a_2c_1E_d)E_t}{\lvert A\rvert}$	$\frac{(a_1c_2-a_2c_1E_d)E_f}{\lvert A\rvert}$
0	$\frac{(a_1c_2-a_2c_1E_d)E_tE_1}{\lvert A\rvert}+E_t$	$\frac{(a_1c_2-a_2c_1E_d)E_fE_1}{\lvert A\rvert}+E_f$
$\frac{(a_2c_1-a_1c_2)(1-E_1)E_d}{\lvert A\rvert}$	$\frac{(c_2-a_2)E_tE_d}{\lvert A\rvert}$	$\frac{((c_2-a_2)E_f-a_3c_2(1-E_1))E_d}{\lvert A\rvert}$
$\frac{(a_2c_1-a_1c_2)(1-E_1)E_d}{\lvert A\rvert}+1$	$\frac{(c_2-a_2)E_tE_d}{\lvert A\rvert}$	$\frac{((c_2-a_2)E_f-a_3c_2(1-E_1))E_d}{\lvert A\rvert}$

$$|A| = (1 - E_1)(a_1c_2 - a_2c_1E_d) \gtrless 0$$

This situation makes it difficult to conduct a complete qualitative analysis. For purpose of comparison with Ward's Illyrian firm, the impact of different policies on production and general employment will be analyzed.

The increase of price of the product will have the following impact on production, q, and general employment, l.

$$q/p = (a_1c_2 - a_2c_1E_d)E_1/|A| = E_1/(1 - E_1) > 0$$

$$l/p = (a_1c_2 - a_2c_1E_d)/|A| = 1/(1 - E_1) > 0$$

The results of Ward's model are just the opposite. Therefore, as it stands, the model here presented does not give negative slope supply functions.

The impact of an increase in salary paid to hired labor, p_e, on production, q, and total employment, l, gives the following results.

$$l/p_e = -(a_1c_2 - a_2c_1E_d)/|A| = -1/(1 - E_1) < 0$$

$$q/p_e = -(a_1c_2 - a_2c_1E_d)E_1/|A| = -E_1/(1 - E_1) < 0$$

For both production and total employment, the reaction will be negative.

The impact of an exogenous change in availability of means of production, t and f, will also generate a change in the same direction in production and general employment.

$$q/t = ((a_1c_2 - a_2c_1E_d)E_tE_1/|A|) + E_t$$

$$= (E_tE_1/(1 - E_1) + E_t > 0$$

$$q/f = ((a_1c_2 - a_2c_1E_d)E_fE_1/|A|) + E_f$$

$$= (E_fE_1/(1 - E_1) + E_f > 0$$

$$1/t = (a_1c_2 - a_2c_1E_d)E_t/|A| = E_t/(1 - E_1) > 0$$

$$1/f = (a_1c_2 - a_2c_1E_d)E_f/|A| = E_f/(1 - E_1) > 0$$

Therefore, in general, the model as it is presented here does not show the perverse results obtained by Ward's Illyrian model.

Before the generalization of this model is presented, it is interesting to discuss the associative enterprises, that like family farms do not hire labor. It will be shown that they can be analyzed as special cases of the model already presented.

A model of economic behavior of associative enterprises without labor market

The main difference between this special case and the more general one already discussed is the absence of landless workers in the labor process of this type of enterprise. This means that assumptions 4, 5, and 7 should be adjusted accordingly.

If $L = L_s$ and there is no hired labor, the system of structural equations is reduced to one of four equations with four endogenous variables (Q, L_s, I_s, D).

$$Q = G(L, T, F) \tag{4-18}$$

$$I_s = (PQ - P_fF)/S \tag{4-19}$$

$$D = H(I_s) \tag{4-20}$$

$$L_s = S \cdot D = L \tag{4-21}$$

This system of nonlinear equations is transformed into one of linear equations in the same way as was done before.

$$q = E_1 \cdot 1 + E_t \cdot t + E_f \cdot f \tag{4-22}$$

$$ai_s + as + (1 - a)p_f + (1 - a)f = p + q \qquad (4\text{-}23)$$

$$d = E_d i_s \qquad (4\text{-}24)$$

$$l = d + s \qquad (4\text{-}25)$$

This system can also be reduced to one of two equations. Relations (4-22) and (4-23) can be combined into one equation.

$$ai_s - E_l l = p - (1 - a)p_f - as + E_t \cdot t + (E_f - (1 - a))f \qquad (4\text{-}26)$$

Relations (4-24) and (4-25) can also be combined into one equation.

$$l = E_d i_s + s \qquad (4\text{-}27)$$

These two new relations can be ordered as shown in Table 4-5.

Table 4-5. Reduced system of equations for an associative enterprise without hired labor

Equations	Endogenous variables		Exogenous variables				
	i_s	l	p	p_f	s	t	f
(4-26)	a	$-E_l$	1	$-(1-a)$	$-a$	E_t	$(E_f-(1-a))$
(4-27)	$-E_d$	1	0	0	1	0	0

This system can be expressed in matrix form as follows:

$$\begin{bmatrix} a & -E_l \\ -E_d & 1 \end{bmatrix} \begin{bmatrix} i_s \\ l \end{bmatrix} = \begin{bmatrix} 1 & -(1-a) & -a & E_t & (E_f-(1-a)) \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} p \\ p_f \\ s \\ t \\ f \end{bmatrix} \qquad (4\text{-}28)$$

The structure of (4-28) can be represented as

$$Ay = Bx$$

Its solution would look like

$$y = (A^{-1}B)x \qquad\qquad y = Zx$$

The table 4-6 shows matrix Z^* which corresponds to the complete system. In this case, the expression for the common denominator of all Z^*_{ij} is

$$|A| = a - E_d E_1 \tag{4-29}$$

It is also easy to realize that its sign is a priori, undetermined

$$|A| = a - E_d E_1 \gtrless 0 \tag{4-30}$$

It is important to notice the role of E_d in (4-29). It is not possible to conclude anything about the sign of the price policy elasticity of supply either.

$$q/p = (E_d E_1)/(a - E_d E_1) \gtrless 0$$

The condition for a positive price policy elasticity of supply will depend on condition

$$|A| > 0 \qquad\qquad a > E_d E_1 \tag{4-31}$$

Condition (4-31) will be fulfilled if E_d is negative or small and positive.

It can be seen from a comparison of Tables 4-4 and 4-6 that E_d has a higher weight in the policy elasticities of the latter.

<u>A model of economic behavior of family farms</u>

The case of family farms without labor market is still a simpler case than the ones presented above. This special case assumes absence of hired labor and the number of worker-owners is reduced to one. In this way, the limit of the simplest agricultural enterprise is captured.

Table 4-6. Complete matrix Z^* of policy elasticities for an associative enterprise without labor market

Endogenous variables (reactions)	Exogenous variables (policies)				
	p	p_f	s	t	f
i_s	$\frac{1}{\lvert A\rvert}$[a]	$\frac{-(1-a)}{\lvert A\rvert}$	$\frac{(E_1-a)}{\lvert A\rvert}$	$\frac{E_t}{\lvert A\rvert}$	$\frac{E_f-(1-a)}{\lvert A\rvert}$
l	$\frac{E_d}{\lvert A\rvert}$	$\frac{-(1-a)E_d}{\lvert A\rvert}$	$\frac{a(1-E_d)}{\lvert A\rvert}$	$\frac{E_tE_d}{\lvert A\rvert}$	$\frac{(E_f-(1-a))E_d}{\lvert A\rvert}$
q	$\frac{E_dE_1}{\lvert A\rvert}$	$\frac{-(1-a)E_dE_1}{\lvert A\rvert}$	$\frac{a(1-E_d)E_1}{\lvert A\rvert}$	$\frac{E_tE_dE_1}{\lvert A\rvert} + E_t$	$\frac{(E_f-(1-a))E_dE_1}{\lvert A\rvert} + E_f$
d	$\frac{E_d}{\lvert A\rvert}$	$\frac{-(1-a)E_d}{\lvert A\rvert}$	$\frac{(E_1-a)E_d}{\lvert A\rvert}$	$\frac{E_tE_d}{\lvert A\rvert}$	$\frac{(E_f-(1-a))E_d}{\lvert A\rvert}$

[a] $\lvert A\rvert = (a - E_dE_1)$.

The system of structural equations is reduced to three relations.

$$Q = G(L, T, F) \tag{4-32}$$

$$I_s = PQ - P_f F \tag{4-33}$$

$$D = H(I_s) = L \tag{4-34}$$

As is already known, the nonlinear system is transformed into the following linear one.

$$q = E_l \cdot l + E_t \cdot t + E_f \cdot f \tag{4-35}$$

$$ai_s + (1-a)p_f + (1-a)f = p + q \tag{4-36}$$

$$l = E_d i_s \tag{4-37}$$

Relations (4-35) and (4-36) can be combined as follows.

$$ai_s - E_l l = p - (1 - a)p_f + E_t t + (E_f - (1 - a))f \tag{4-38}$$

Then, relations (4-37) and (4-38) form the reduced system of structural equations. They can be ordered as shown in Table 4-7.

Table 4-7. Reduced system of structural equations for a family farm without hired labor

Equations	Endogenous variables i_s	Endogenous variables l	Exogenous variables p	Exogenous variables p_f	Exogenous variables t	Exogenous variables f
(4-38)	a	$-E_l$	1	$-(1-a)$	E_t	$E_f-(1-a)$
(4-37)	$-E_d$	1	0	0	0	0

The matrix form of the reduced system of equations is

$$\begin{bmatrix} a & -E_1 \\ -E_d & 1 \end{bmatrix} \begin{bmatrix} i_s \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & -(1-a) & E_t & E_f-(1-a) \\ 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} p \\ p_f \\ t \\ f \end{bmatrix} \qquad (4\text{-}39)$$

The structure and solution of (4-39) can be expressed as

$$Ay = Bx \qquad y = (A^{-1}B)x \qquad y = Zx$$

A comparison of (4-39) with (4-28) shows that matrix A in both cases is the same. The only difference between (4-39) and (4-28) is observed in the right-hand side of the system. The system in (4-39) does not have s as exogenous variable in the x vector nor the corresponding column of coefficients in the matrix B.

Therefore, the complete matrix of policy elasticities looks just like the one presented in Table 4-6 without the corresponding column for s. This implies that similar conclusions apply to this case.

In the same way, it could be concluded that the family farm with labor market would be another special case. It would generate a reduced system of equations similar to the one presented as (4-16). The difference will be again the absence of s in the vector x and the corresponding column of coefficients in matrix B. The complete matrix of policy elasticities would look like the one presented in Table 4-4 without the column for s. The same type of conclusion would apply.

A General Model of Economic Behavior of Agricultural Producers

The last section presented a simple model of an associative enterprise whose labor force was supplied by their own worker-owners complemented by hired landless workers. It was also shown that family farms with additional hired labor, as well as family farms and associative enterprises without outside labor, can be studied as special cases of the simple model. The focus in that section was on the specification of the social relations of production. The technical relations of production were kept to their minimum. This section builds the technical aspects of production on the last one with a more general view.

<u>The case of two products</u>

The assumptions used in the last section are maintained with the exception of the one related to the number of products. The system of structural relations looks at the "allocation problem" as well as the "distribution problem."

The "allocation problem" is represented by a sub-system of 11 equations. They will estimate the labor force for each product, the total requirements of labor force, the allocation of means of production between products, and the volume of production. They will also impose the full employment of the means of production.

The production functions have characteristics similar to the ones described in the last section. The only new aspect to mention is the subdivision of the means of production owned by the enterprise into "land," T, and "machinery," M. The first one includes land, buildings, etc., while the second includes machinery, hand tools, animals, etc.

$$Q_1 = G_1(L_1,T_1,M_1,F_1) \tag{4-40}$$

$$Q_2 = G_2(L_2,T_2,M_2,F_2) \tag{4-41}$$

The rules for hiring labor are those already discussed above. They allow one to obtain the total demand for labor force from an accounting relation.

$$P_1(\partial Q_1/\partial L_1) = P_e \tag{4-42}$$

$$P_2(\partial Q_2/\partial L_2) = P_e \tag{4-43}$$

$$L = L_1 + L_2 \tag{4-44}$$

The rules for allocation of means of production between the two products are obtained from the maximization of the residual income of worker-owners in such a way that the means of production are fully employed.

$$P_1(\partial Q_1/\partial T_1) = P_2(\partial Q_2/\partial T_2) \tag{4-45}$$

$$P_1(\partial Q_1/\partial M_1) = P_2(\partial Q_2/\partial M_2) \tag{4-46}$$

$$P_1(\partial Q_1/\partial F_1) = P_2(\partial Q_2/\partial F_2) \tag{4-47}$$

$$T = T_1 + T_2 \tag{4-48}$$

$$M = M_1 + M_2 \tag{4-49}$$

$$F = F_1 + F_2 \tag{4-50}$$

The "distribution problem" is represented by a sub-system of four equations. They will estimate the distribution of the value of production among the three types of owners: worker-owners, landless workers, and owners of means of production bought by the enterprise. The residual income of the worker-owner will permit the estimation of his labor supply. The assumption of homogeneity of worker-owners will allow one the estimation of the labor force that all worker-owners are willing to supply. The relation that links the two sub-systems will estimate the residual requirements of hired labor. These four equations are similar to the ones used in last section.

$$I_s = (P_1Q_1 + P_2Q_2 - P_eL_e - P_fF)/S \tag{4-51}$$

$$D = H(I_s) \tag{4-52}$$

$$L_s = S \cdot D \tag{4-53}$$

$$L = L_s + L_e \tag{4-54}$$

The system of structural relations is composed of 15 equations (4-40) to (4-51) which contain 15 endogenous variables (Q_1, Q_2, L_1, L_2, L, T_1, T_2, M_1, M_2, F_1, F_2, I_s, D, L_s, L_e) and 8 exogenous variables (P_1, P_2, P_e, P_f, S, T, M, F). These 15 equations form a nonlinear system which has to be transformed into a linear one. The procedure for the transformations is presented in Appendix A.

$$q_1 = E_{l1}l_1 + E_{t1}t_1 + E_{m1}m_1 + E_{f1}f_1 \tag{4-55}$$

$$q_2 = E_{l2}l_2 + E_{t2}t_2 + E_{m2}m_2 + E_{f2}f_2 \tag{4-56}$$

$$p_1 + q_1 - l_1 = p_e \tag{4-57}$$

$$p_2 + q_2 - l_2 = p_e \tag{4-58}$$

$$l = b_1l_1 + b_2l_2 \tag{4-59}$$

$$p_1 + q_1 - t_1 = p_2 + q_2 - t_2 \tag{4-60}$$

$$p_1 + q_1 - m_1 = p_2 + q_2 - m_2 \tag{4-61}$$

$$p_1 + q_1 - f_1 = p_2 + q_2 - f_2 \tag{4-62}$$

$$t = h_1t_1 + h_2t_2 \tag{4-63}$$

$$m = g_1m_1 + g_2m_2 \tag{4-64}$$

$$f = k_1f_1 + k_2f_2 \tag{4-65}$$

$$a_1i_s + a_1s + a_2p_e + a_2l_e + a_3p_f + a_3f = \pi_1q_1 + \pi_2q_2 + \pi_1p_1 + \pi_2p_2 \tag{4-66}$$

$$d = E_di_s \tag{4-67}$$

$$l_s = d + s \tag{4-68}$$

$$l = c_1l_s + c_2l_e \tag{4-69}$$

Relations (4-55) to (4-65) correspond to the "allocation problem." If relations (4-55) and (4-56) replace variables q_1 and q_2 in (4-57), (4-58), (4-60), (4-61), and (4-62), these seven relations can be replaced by five new relations.

$$(1 - E_{l1})l_1 - E_{t1}t_1 - E_{m1}m_1 - E_{f1}f_1 = p_1 - p_e \tag{4-70}$$

$$(1 - E_{l2})l_2 - E_{t2}t_2 - E_{m2}m_2 - E_{f2}f_2 = p_2 - p_e \tag{4-71}$$

$$-E_{l1}l_1 + E_{l2}l_2 + (1 - E_{t1})t_1 - (1 - E_{t2})t_2 - E_{m1}m_1 + E_{m2}m_2 - E_{f1}f_1 + E_{f2}f_2 = p_1 - p_2 \tag{4-72}$$

$$-E_{l1}l_1 + E_{l2}l_2 - E_{t1}t_1 + E_{t2}t_2 + (1 - E_{m1})m_1 - (1 - E_{m2})m_2 - E_{f1}f_1 + E_{f2}f_2 = p_1 - p_2 \tag{4-73}$$

$$-E_{l1}l_1 + E_{l2}l_2 - E_{t1}t_1 + E_{t2}t_2 - E_{m1}m_1 + E_{m2}m_2 + (1 - E_{f1})f_1 - (1 - E_{f2})f_2 = p_1 - p_2 \tag{4-74}$$

These five relations together with (4-63), (4-64), and (4-65) form a sub-system of eight equations with eight dependent variables (l_1, l_2, t_1, t_2, m_1, m_2, f_1, f_2). After this sub-system is solved, (4-55) and (4-56) can be used to obtain q_1 and q_2. Relation (4-59) will permit the estimation of l which will serve as a link with the sub-system that corresponds to the "distribution problem."

Relations (4-66) to (4-69) correspond to the "distribution problem." If (4-55) and (4-56) replace variables q_1 and q_2 in (4-66), relation (4-75) will be derived. Then, if (4-67) replaces variable d in (4-68) and this new relation replaces l_s in (4-68), the new expression for l can be equated to (4-59) and obtain (4-76).

$$a_1 i_s + a_2 l_e - \pi_1 E_{11} - \pi_2 E_{12} - \pi_1 E_{t1} - \pi_2 E_{t2} - \pi_1 E_{m1} - \pi_2 E_{m2}$$

$$- \pi_1 E_{f1} - \pi_2 E_{f2} = \pi_1 p_1 + \pi_2 p_2 - a_2 p_e - a_3 p_f - a_1 s - a_3 f \tag{4-75}$$

$$c_1 E_d i_s + c_2 l_e - b_1 l_1 - b_2 l_2 = -c_1 s \tag{4-76}$$

These two equations give the values for i_s and l_e after the allocation problem has been solved (l_1, l_2, t_1, t_2, m_1, m_2, f_1, and f_2 are known). Relations (4-67) and (4-68) allow one to obtain the values for d and l_s.

Then, the system of structural equations has been reduced to the relations (4-63) to (4-65), (4-70) to (4-76). This system can be expressed in matrix form as follows.

$$\begin{bmatrix} a_1 & a_2 & -\pi_1 E_{11} & -\pi_2 E_{12} & -\pi_1 E_{t1} & -\pi_2 E_{t2} & -\pi_1 E_{m1} & -\pi_2 E_{m2} & -\pi_1 E_{f1} & -\pi_2 E_{f2} \\ c_1 E_d & c_2 & -b_1 & -b_2 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & (1-E_{11}) & 0 & -E_{t1} & 0 & -E_{m1} & 0 & -E_{f1} & 0 \\ 0 & 0 & 0 & (1-E_{11}) & 0 & -E_{t2} & 0 & -E_{m2} & 0 & -E_{f2} \\ 0 & 0 & -E_{11} & E_{12} & (1-E_{t1}) & -(1-E_{t2}) & -E_{m1} & E_{m2} & -E_{f1} & E_{f2} \\ 0 & 0 & -E_{11} & E_{12} & -E_{t1} & E_{t2} & (1-E_{m1}) & -(1-E_{m2}) & -E_{f1} & E_{f2} \\ 0 & 0 & -E_{11} & E_{12} & -E_{t1} & E_{t2} & -E_{m1} & E_{m2} & (1-E_{f1}) & -(1-E_{f2}) \\ 0 & 0 & 0 & 0 & h_1 & h_2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & g_1 & g_2 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & k_1 & k_2 \end{bmatrix} \begin{bmatrix} i_s \\ l_e \\ l_1 \\ l_2 \\ t_1 \\ t_2 \\ m_1 \\ m_2 \\ f_1 \\ f_2 \end{bmatrix} =$$

$$
= \begin{bmatrix}
\pi_1 & \pi_2 & -a_2 & -a_3 & -a_1 & 0 & 0 & -a_3 \\
0 & 0 & 0 & 0 & -c_1 & 0 & 0 & 0 \\
1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1
\end{bmatrix}
\begin{bmatrix}
p_1 \\ p_2 \\ p_e \\ p_f \\ s \\ t \\ m \\ f
\end{bmatrix}
\qquad (4\text{-}77)
$$

The structure of (4-77) can be summarized as

$$Ay = Bx$$

where y is the vector of endogenous variables and x is the vector of exogenous variables. A and B are matrices of coefficients that correspond to the endogenous and exogenous variables, respectively. It is important to notice the pattern that both matrices follow. This is important for the generalization to n products and n means of production. It will facilitate its construction according to the variations of different regions. Its simplicity will allow a fast reproduction at different levels of the planning system for purposes of partial analysis.

The solution of the system is obtained by the well-known procedure of inverting matrix A and then pre-multiply B.

$$y = (A^{-1}B)x \qquad\qquad y = Zx$$

where Z is the reduced matrix of policy elasticities as was shown in the last section.

<u>The case of more than two products</u>

In the interest of showing the simplicity of the generalization of the model presented before, the case of three products will be presented here. This is done without going into many details made obvious by the simpler cases already presented.

The system of structural equations is increased to 20 relations as follows.

$$Q_1 = G_1(L_1, T_1, M_1, F_1) \tag{4-78}$$

$$Q_2 = G_2(L_2, T_2, M_2, F_2) \tag{4-79}$$

$$Q_3 = G_3(L_3, T_3, M_3, F_3) \tag{4-80}$$

$$P_1(\partial Q_1/\partial L_1) = P_e \tag{4-81}$$

$$P_2(\partial Q_2/\partial L_2) = P_e \tag{4-82}$$

$$P_3(\partial Q_3/\partial L_3) = P_e \tag{4-83}$$

$$L = L_1 + L_2 + L_3 \tag{4-84}$$

$$P_1(\partial Q_1/\partial T_1) = P_2(\partial Q_2/\partial T_2) \tag{4-85}$$

$$P_1(\partial Q_1/\partial T_1) = P_3(\partial Q_3/\partial T_3) \tag{4-86}$$

$$P_1(\partial Q_1/\partial M_1) = P_2(\partial Q_2/\partial M_2) \tag{4-87}$$

$$P_1(\partial Q_1/\partial M_1) = P_3(\partial Q_3/\partial M_3) \tag{4-88}$$

$$P_1(\partial Q_1/\partial F_1) = P_2(\partial Q_2/\partial F_2) \tag{4-89}$$

$$P_1(\partial Q_1/\partial F_1) = P_3(\partial Q_3/\partial F_3) \tag{4-90}$$

$$T = T_1 + T_2 + T_3 \tag{4-91}$$

$$M = M_1 + M_2 + M_3 \tag{4-92}$$

$$F = F_1 + F_2 + F_3 \tag{4-93}$$

$$I_s = (P_1Q_1 + P_2Q_2 + P_3Q_3 - P_eL_e - P_fF)/S \tag{4-94}$$

$$D = H(I_s) \tag{4-95}$$

$$L_s = S \cdot D \tag{4-96}$$

$$L = L_s + L_e \tag{4-97}$$

This system of 20 equations has 20 dependent variables (Q_i, L, L_s, L_e, I_s, L_i, T_i, M_i, F_i, and D, where $i = 1, 2, 3$). As has been explained before, this system is nonlinear; its linearization follows the same procedure already outlined.

Then, the system is reduced to one of 14 relations. The first three relations for q_1, q_2, and q_3 are replaced by their corresponding variables in the transformed relations that correspond to (4-81) to (4-83) and (4-85) to (4-90). Therefore, the sub-system that corresponds to the "allocation problem" is reduced from 16 relations to 12. The relations that correspond to the "distribution problem" together with the one that links both subsystems are reduced to two variables. The reduced system has only 14 relations. This reduced system is presented in matrix form as follows on the next two pages. It can be indicated that the structure is as before.

$$Ay = Bx$$

It is important to notice the pattern of matrices A and B. This simplicity of the pattern permits their duplication for any region with any number of products. Once the matrices have been constructed, the solution of the system is easily obtained.

$$y = (A^{-1}B)x \qquad\qquad y = Zx$$

$$
\begin{bmatrix}
a_1 & a_2 & -\pi_1E_{11} & -\pi_2E_{12} & -\pi_3E_{13} & -\pi_1E_{t1} & -\pi_2E_{t2} & -\pi_3E_{t3} & -\pi_1E_{m1} & -\pi_2E_{m2} & -\pi_3E_{m3} & -\pi_1E_{f1} & -\pi_2E_{f2} & -\pi_3E_{f3} \\
c_1E_d & c_2 & -b_1 & -b_2 & -b_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & (1-E_{11}) & 0 & 0 & -E_{t1} & 0 & 0 & -E_{m1} & 0 & 0 & -E_{f1} & 0 & 0 \\
0 & 0 & 0 & (1-E_{12}) & 0 & 0 & -E_{t2} & 0 & 0 & -E_{m2} & 0 & 0 & -E_{f2} & 0 \\
0 & 0 & 0 & 0 & (1-E_{13}) & 0 & 0 & -E_{t3} & 0 & 0 & -E_{m3} & 0 & 0 & -E_{f3} \\
0 & 0 & -E_{11} & E_{12} & 0 & (1-E_{t1}) & -(1-E_{t2}) & 0 & -E_{m1} & E_{m2} & 0 & -E_{f1} & E_{f2} & 0 \\
0 & 0 & -E_{11} & 0 & E_{13} & (1-E_{t1}) & 0 & -(1-E_{t3}) & -E_{m1} & 0 & E_{m3} & -E_{f1} & 0 & E_{f3} \\
0 & 0 & -E_{11} & E_{12} & 0 & -E_{t1} & E_{t2} & 0 & (1-E_{m1}) & -(1-E_{m2}) & 0 & -E_{f1} & E_{f2} & 0 \\
0 & 0 & -E_{11} & 0 & E_{13} & -E_{t1} & 0 & E_{t3} & (1-E_{m1}) & 0 & -(1-E_{m3}) & -E_{f1} & 0 & E_{f3} \\
0 & 0 & -E_{11} & E_{12} & 0 & -E_{t1} & E_{t2} & 0 & -E_{m1} & E_{m2} & 0 & (1-E_{f1}) & -(1-E_{f2}) & 0 \\
0 & 0 & -E_{11} & 0 & E_{13} & -E_{t1} & 0 & E_{t3} & -E_{m1} & 0 & E_{m3} & (1-E_{f1}) & 0 & -(1-E_{f3}) \\
0 & 0 & 0 & 0 & 0 & h_1 & h_2 & h_3 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & g_1 & g_2 & g_3 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & k_1 & k_2 & k_3
\end{bmatrix}
\begin{bmatrix}
i_s \\ l_e \\ l_1 \\ l_2 \\ l_3 \\ t_1 \\ t_2 \\ t_3 \\ m_1 \\ m_2 \\ m_3 \\ f_1 \\ f_2 \\ f_3
\end{bmatrix}
=
$$

$$
= \begin{bmatrix}
\pi_1 & \pi_2 & \pi_3 & -a_2 & -a_3 & -a_1 & 0 & 0 & -a_3 \\
0 & 0 & 0 & 0 & 0 & -c_1 & 0 & 0 & 0 \\
1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1
\end{bmatrix}
\begin{bmatrix}
P_1 \\ P_2 \\ P_3 \\ P_e \\ P_f \\ s \\ t \\ m \\ f
\end{bmatrix}
$$

As before, Z is the matrix of policy elasticities that will allow one to estimate the reaction of producers to the policies being analyzed.

CHAPTER 5. EMPIRICAL ESTIMATION OF PRODUCERS' REACTION FUNCTIONS

This chapter presents efforts made to estimate different parameters that enter in the derivation of the producers' reaction functions. Since there is not a single source of information, many different official statistics as well as individual studies and expert opinions are combined to form the basis for the estimation put forward here.

This chapter presents a characterization of the agricultural production process based on the requirements defined in the last chapter. In the first section the availability of land is shown together with its ownership and uses. The second section presents the potential labor force available for participation in the agricultural production process.

The next two sections focus on generation and distribution of the gross value of production. This is done by looking at some of the characteristics of agricultural technology and the ownership of the means of production and labor.

The fifth section looks at the producers' reaction functions constructed with the information generated by the first four sections. One of them is used for the purpose of illustrating the method of policy analysis.

Finally, some comments are made on the results, and suggestions for further work are presented.

Land Availability, Ownership, and Use

Table 5-1 combines information collected by the Water (DGA), Forestry (DGFF), Agrarian Reform (DGRA/AR), and "Catastro Rural" (OGCR) divisions of the Ministry of Agriculture, together with estimates of the Agrarian

Table 5-1. Distribution of national territory by natural regions and use of land (in hectares)[a]

Use of land	Natural regions Coast	Sierra	Jungle	Total	%
Irrigated	762,812	492,000	18,702	1,273,514	0.99
Nonirrigated	--	1,674,000	743,903	2,417,903	1.88
Cultivated	762,812	2,166,000	762,605	3,691,417	2.87
Natural pasture	496,000	26,781,000	333,000	27,610,000	21.48
Agricultural use	1,258,812	28,947,000	1,095,605	31,301,417	24.35
Woods and "montes"	1,000,000	5,500,000	65,500,000	72,000,000	56.02
"Eriazos"	12,898,588	1,085,900	11,235,655	25,220,143	19.63
Total	15,157,400	35,532,900	77,831,260	128,521,560	100.00
%	11.79	27.65	60.56	100.00	

[a]Author based on (34), (35), (42), and (45).

Planning Office (OSPA) and the 1972 Agricultural Census. Almost 61% of the Peruvian territory is in the Jungle region. Only 0.99% of the territory is irrigated land, most of it on the Coast. Cultivated land amounts to only 2.87% of the territorial area. If natural pasture is added to cultivated land, one obtains land in agricultural use. This equals 31 million hectares or 24% of territorial area.

Table 5-2 shows how the 31 million hectares of agricultural land were distributed by type of ownership as of July 1976. They include the land, 17.96% of the total, redistributed through the agrarian reform program as of that date. The 1,403 associative farm enterprises created under the agrarian reform program received 17.34% or almost all of the redistributed agricultural land. These 1,403 associative enterprises possess 945,792 hectares of cultivated land, while 1,154,374 farm units, not touched by the

Table 5-2. Distribution of agricultural land by use of land and types of ownership (July, 1976) (in hectares)[a]

Types of ownership	Use of land						Total	%
	Enter-prises	Families	Irrigated	Non-irrigated	Cultivated	Natural pastures		
CAPs	522	102,819	338,333	114,518	452,851	1,169,504	1,622,355	5.18
SAISs	58	57,385	34,139	220,780	254,919	1,858,287	2,113,206	6.75
Communities	244	66,939	42,602	25,796	68,398	460,321	528,719	1.69
Groups	579	32,906	30,498	139,126	169,624	995,387	1,165,011	3.72
Associative	1,403	260,049	445,572	500,220	945,792	4,483,499	5,429,291	17.34
Individuals ref.	34,557	34,557	9,730	44,206	53,936	54,646	108,582	0.35
Total reformed	35,960	294,606	455,302	544,426	999,728	4,538,145	5,537,873	17.69
Other[b]	1,154,374	--	818,212	1,873,477	2,691,689	23,071,855	25,763,544	82.31
Total	1,190,334	--	1,273,514	2,417,903	3,691,417	27,610,000	31,301,417	100.00
%			4.07	7.72	11.79	88.21	100.00	

[a]Author based on (34), (35), (42), and (45).

[b]Owners of small and medium sized farms not affected, those unaffected by law, "minifundistas," peasant communities not beneficiaries of agrarian reform.

agrarian reform process, possess the remaining 2,691,689 hectares. The Peruvian agrarian reform eliminated the "latifundio" ownership, but it has not yet dealt with the "minifundio" problem. Table 5-2 shows the unequal distribution of land. It does not make reference to the unequal distribution of the quality of land or the existence of approximately one million landless workers.

The Ministry of Agriculture divides the national territory in 12 agrarian zones so as to facilitate the administration of government activities. Table 5-3 shows the amount of agricultural land by agrarian zones in 1974. Each of these agrarian zones is subdivided by agrarian offices. In 1974 there were 49 agrarian offices as listed in Table B-1 of Appendix B. Producers' reaction functions were estimated at this level of disaggregation.

Table 5-3 indicates that at a given moment of time only 69% of the arable land is actually cultivated. The rest is allowed to rest for periods of less than a year ("barbecho") or up to five years on the Coast and seven years in the Sierra ("descanso"). The 1972 Agricultural Census indicated that the latter equaled 26% of arable land in the Sierra.

Table 5-4 shows the use of the 2,553,315 cultivated hectares by transitory crops. Twenty-two such crops accounted for 60% of the cultivated land in 1974. Potatoes and white corn ("maiz amilaceo") accounted for 33.31% or almost one-third of the area occupied by the 22 products considered in Table 5-4. Seven products (potatoes, white corn, barley, cotton, wheat, rice, and sugar cane) account for more than 75% of the area cultivated in the 22 products of Table 5-4. These seven products account for almost 45% of all arable land.

Table 5-3. Distribution of agricultural land by use and agrarian zones of Ministry of Agriculture (1974) (in hectares)[a]

Agrarian zones and their centers	Irrigated land	Non-irrigated land	Cultivated land	Actively cultivated land	"Descanso" "barbecho" land[b]
01 Piura	171,941	67,218	239,159	189,844	49,315
02 Lambayeque	292,270	547,413	839,683	714,986	124,697
03 Huaraz	208,600	218,820	427,420	350,865	76,555
04 Lima	176,890	17,651	194,541	125,340	69,201
05 Ica	146,325	23,695	170,020	107,080	62,940
06 Arequipa	86,343	7,979	94,322	82,634	11,688
07 Tacna	36,548	726	37,274	35,624	1,650
08 Iquitos	508	61,898	62,406	57,622	4,784
09 Tarapoto	1,909	151,119	153,028	105,363	47,665
10 Huancayo	83,923	706,511	790,434	496,454	293,980
11 Cuzco	62,146	255,089	317,235	102,575	214,660
12 Puno	6,111	359,784	365,895	184,928	180,967
Total	1,273,514	2,417,903	3,691,417	2,553,315	1,138,102
%	34.50	65.50	100.00	69.17	30.83

[a]Author based on (35) and (45).

[b]The 1972 Agricultural Census defines the terms as follows: "descanso" - land that is not cultivated for at least one year, maximum limit is five years on the Coast and seven years in the Sierra; "barbecho" - land that is not cultivated for a period of less than a year.

The methodology presented in the last chapter, therefore, restricted itself to principal crops only. The number of dominant crops at a lower level of geographical disaggregation are fewer yet. The two products that occupy the largest number of hectares in each agrarian office area were, therefore, selected for further study. This allows one to keep the presentation within manageable bounds without detracting from the existing heterogeneity between regions. Table 5-5 shows the products selected by agrarian offices. White corn, potatoes, and barley are analyzed for 12 to

Table 5-4. Use of the actively cultivated land by nonpermanent crops and agrarian zones (1974) (in hectares)[a]

Crops	Agrarian zones 01	02	03	04	05	06
01 Rice	17,894	69,645	1,649	--	--	5,539
03 White corn	13,857	51,715	48,226	28,886	11,739	8,673
04 Sweet corn	547	7,906	4,052	2,509	--	569
05 Yellow corn	3,438	14,381	22,192	21,626	8,069	333
06 Wheat	4,155	13,280	43,342	3,128	8,367	5,333
07 Barley	1,607	15,861	50,220	4,769	11,686	8,245
08 "Quinua"	--	191	491	9	243	403
09 Sorgum	--	--	4,305	--	1,344	--
11 Sweet potatoes	1,630	1,903	2,161	4,822	552	636
13 Potatoes	923	12,403	41,949	17,528	5,023	7,688
14 Manioc	2,719	5,550	4,021	1,623	235	213
16 "Oca"	903	5,186	11,192	2,184	1,480	1,066
17 Sugar cane	--	36,474	39,908	7,682	--	1,672
19 Peas	1,474	9,979	6,636	153	153	--
21 Beans	2,685	27,522	4,222	3,984	3,841	2,846
23 Lima beans	350	923	3,881	1,101	345	872
25 Broad beans	327	35	582	266	8,150	40
44 Tomatoes	--	--	3,670	1,179	--	--
47 Garlic	--	--	--	--	--	1,200
48 Onions	--	--	--	538	--	6,675
80 Cotton	68,609	7,329	3,454	19,107	45,057	906
83 Tobacco	1,220	466	--	47	12	--
Products considered	122,338	280,749	296,153	121,141	106,296	52,909
Other products	67,506	434,237	54,712	4,199	784	29,725
Actively cultivated	189,844	714,986	350,865	125,340	107,080	82,634

[a]Author based on (34), (35), and (37).

Agrarian zones							
07	08	09	10	11	12	Total	%
--	8,052	9,113	451	1,424	--	113,767	4.46
2,941	8,798	11,639	40,425	20,910	1,470	249,279	9.76
272	--	--	7,119	134	547	23,655	.93
105	2,360	11,279	4,912	1,163	374	90.232	3.53
490	--	2,019	27,448	8,951	175	116,688	4.57
734	--	1,834	49,713	18,830	11,232	174,731	6.84
77	--	8	1,499	871	18,726	22,518	.88
587	--	--	--	--	--	6,236	.24
10	11	46	250	234	48	12,303	.48
2,921	--	846	100,068	31,033	35,927	256,309	10.04
--	9,918	6,278	4,681	1,753	310	37,301	1.46
604	--	184	17,737	7,396	2,525	50,457	1.98
--	--	--	--	--	--	85,736	3.36
11	--	125	8,727	414	94	27,766	1.09
18	5,115	5,240	3,305	619	65	59,462	2.33
422	--	173	5,888	2,397	1,043	17,395	.68
--	--	--	19	--	--	9,419	.37
113	--	--	--	38	--	5,000	.20
--	--	--	--	--	--	1,200	.05
287	--	--	--	--	--	7,500	.29
53	--	1,257	--	--	--	145,772	5.71
--	114	2,994	40	4	4	4,901	.19
9,645	34,368	53,035	272,282	96,171	72,540	1,517,627	59.44
25,979	23,254	52,328	224,172	6,404	112,388	1,035,688	40.56
35,624	57,622	105,363	496,454	102,575	184,928	2,553,315	100.00

Table 5-5. Two products with largest area by agrarian offices

Agrarian offices	Rice 01	White corn 03	Yellow corn 05	Wheat 06	Barley 07	Quinua 08	Pota- toes 13	Manioc 14	Sugar cane 17	Beans 21	Garlic 47	Onion 48	Cotton 80
01-01		X											X
01-02		X											X
01-03	X												X
01-04	X	X											
01-05	X												X
02-01	X								X				
02-02	X	X											
02-03	X	X											
02-04		X								X			
02-05				X	X								
03-01				X	X								
03-02			X						X				
03-03		X	X										
03-04				X	X								
04-01		X											X
04-02		X	X										
04-03		X	X										
05-01			X										X
05-02		X											X
05-03					X								X
06-01					X							X	
06-02									X		X		
06-03		X			X								
06-04		X					X						

Table 5-5. (continued)

Agrarian offices	Rice 01	White corn 03	Yellow corn 05	Wheat 06	Barley 07	Quinua 08	Pota-toes 13	Manioc 14	Sugar cane 17	Beans 21	Garlic 47	Onion 48	Cotton 80
07-01		X					X						
07-02		X					X						
08-01	X							X					
08-02		X						X					
09-01	X		X										
09-02	X	X											
09-03		X	X										
09-04		X	X										
10-01				X			X						
10-02		X			X								
10-03					X		X						
10-04					X		X						
10-05		X	X										
10-06		X					X						
11-01		X					X						
11-02		X					X						
11-03					X		X						
11-04					X		X						
11-05		X					X						
11-06	X							X					
12-01						X	X						
12-02						X	X						
12-03					X	X							
12-04						X	X						
12-05		X					X						

26 of the 49 agrarian offices listed in Table 5-5. The hectares accounted for by each of the 13 crops for each agrarian office are shown in Appendix B, Table B-2.

Agricultural Labor Force

The quantification of the agricultural labor force is even more difficult than that of land. The availability of information is not the only problem. There are conceptual difficulties as well. These difficulties begin with the definition of the labor force. The National Census and Statistics Office (ONEC) (46) defines the labor force, in general, as the economically active population (PEA). They include in this definition all those persons from a given age (minimum age limit) that during a given period are working and those who are not working but are seeking a job. By definition they do not include the economically inactive population (PEI), those without a job who gave up their search but are able to work. In the same way, the minimum age limit is open for discussion. There are cases in which a six years of age minimum is used but 10, 15, and 17 years have been used as well. There are other definitions which are also in use. Some of them are: rural population of working age, rural economically active population, and economically active population by activity. The first one considers all the persons living in rural areas within a certain age range (6 to 64 years old or 15 to 64 years old, there is more agreement on the upper limit than on the lower). This definition includes PEA and PEI. The other two definitions consider the PEA in rural areas and the PEA in each economic activity or sector. The differentiation between rural and urban populations is another subject that is not clear cut. The problems confronting economic activity are subject to fewer difficulties. Few problems come from cases where agriculture, forestry, and fisheries are grouped as one economic activity or sector.

The only comprehensive study of the Peruvian agricultural labor force is CEEB (10). The Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA) is doing a new, in-depth study of the agricultural labor force. They are using the information from the last two population censuses as well as new surveys that the Ministry of Food is conducting. This will give more accurate results when completed.

In order to get an idea of the quality of the projections of the CEEB study, it can be said that ONEC (46) projected the 1974 and 1975 populations as 15,387.7 and 15,868.8 thousands of persons, respectively, while the CEEB study projected 15,687.8 thousand for the 1975 population. The CEEB study underestimated the 1975 population by a small margin.

As was pointed out in the last chapter, the requirements for information for this study were greater than those available in one single source. It was, therefore, necessary to combine several sources. The CEEB study was used to get the labor force in number of persons by provinces. These results were adjusted to satisfy the base year (1974) and regional requirements (agrarian zones and offices). A person was considered to be a member of the agricultural labor force if he or she fulfilled each of the following conditions: (1) the individual resided in a rural area as defined by the sixth population census; (2) the individual was six years old or older; (3) the individual was classified by the sixth population census as economically active; and (7) the individual's principal activity was agriculture, forestry, or fishing.

There are several reasons why CEEB overestimated the agricultural labor force. The rate of growth used for the projections was 2.5% annually. The estimated intercensal rate (1961-1972) of growth for rural population was approximately 0.50% annually (with 5% for urban and 2.9% for total population). On the other hand, it should be noted that the last two-year plan (1977-1978) for the agricultural sector (42) states that there were 2,100 thousand persons of working age for the agricultural sector. Besides the high rate of growth used, (1) there were no corrections made for forestry and fishing activities and (2) it was assumed that women, men, and children over 16 years of age were equivalent members of the agricultural labor force. All these factors indicated why there was a tendency to overestimate the available agricultural labor force. The only correction made at this point was the one for the base year at a rate of growth given by the intercensus period for rural population. This is shown in Table 5-6.

The available agricultural labor force in terms of persons has to be converted into days-labor for carrying out the farm practices. In doing this, rural traditions have to be taken into consideration. Locally observed holidays were calculated by another CEEB study (9). They conducted a survey with the 558 local police posts throughout the country. Their calculations revealed an average of 272 work days annually. These calculations have been adjusted to the regional division used in this study as shown in column 1 of Table 5-6. This allowed one to calculate the agricultural labor force by agrarian zones and offices as shown in Table 5-6 and B-3 in Appendix B. Calculations showed that 1,919 thousand persons were equivalent to 503.88 million days-labor available for farm practices.

Table 5-6. Availability of agricultural labor force by agrarian zones (1974)[a]

Agrarian zones	Working days per year	Agricultural labor force: Persons	Agricultural labor force: Days-labor (000)
01 Piura	259	162,403	42,063
02 Lambayeque	249	337,160	83,953
03 Huaraz	238	227,136	54,060
04 Lima	248	116,933	28,999
05 Ica	284	83,687	23,767
06 Arequipa	259	48,708	12,615
07 Tacna	283	24,472	6,926
08 Iquitos	287	75,287	21,608
09 Tarapoto	356	63,371	22,560
10 Huancayo	238	339,208	80,733
11 Cuzco	288	230,662	66,431
12 Puno	286	210,366	60,165
Total		1,919,393	503,880

[a]Author based on (9) and (10).

Tables 5-7 and 5-8 show that approximately 53% of these 500 million days-labor could be performed by worker-owners while only 26% corresponded to the beneficiaries of agrarian reform. Tables B-3 and B-4 in Appendix B present detailed information and the generation of calculations used to estimate the agricultural labor force by workers' class at the agrarian office level.

In the last chapter, it was shown that the elasticity of supply of labor differentiated by worker's classes is an important parameter. There are no studies or other information which focus on this aspect. The Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA) is conducting a study on rural employment. Its second stage is planned to give the above

Table 5-7. Percentage distribution of agricultural labor force of each worker class by agrarian zones (1974)

Agrarian zones	Associative owners labor force	Individual owners labor force	Worker-owners labor force	Landless labor force	Agricultural labor force
01 Piura	10.73	10.17	10.40	5.46	8.35
02 Lambayeque	13.40	21.25	17.89	15.92	16.66
03 Huaraz	20.24	12.87	16.03	7.05	10.73
04 Lima	5.87	9.98	8.22	2.46	5.76
05 Ica	4.82	11.19	8.46	1.53	4.72
06 Arequipa	0.74	5.82	3.64	1.06	2.50
07 Tacna	0.12	2.72	1.61	0.99	1.37
08 Iquitos	0.08	1.43	0.85	7.74	4.29
09 Tarapoto	0.76	2.36	1.67	7.21	4.48
10 Huancayo	20.00	10.63	15.51	17.23	16.02
11 Cuzco	12.35	9.74	10.86	14.57	13.18
12 Puno	8.89	1.84	4.86	18.77	111.94
Total	100.00	100.00	100.00	100.00	100.00

mentioned needed information. For the time being, this study assumes that the elasticity of labor supply for landless workers is equal to infinity. This implies that there is enough labor force supplied by landless workers at the given wage rate to fulfill the requirements of the enterprises. On the other hand, for the case of the labor supplied by worker-owners, elasticities of infinity or negative values are being ruled out. The former would imply that leisure is an inferior good; worker-owners will want to maximize net income per worker-owner without consideration of the number of hours spent. The latter case would imply that leisure is a superior good. The assumption that is made is that the elasticity of supply of labor by worker-owners is some value between zero and one. The decision was made to use E_d = 0.8 in this study.

Table 5-8. Percentage distribution of agricultural labor force by workers' classes and by agrarian reform status (1974)[a]

Worker's classes and agrarian reform status	Agricultural labor force %
Worker-owners	52.84
Associative owners	22.65
Individual	30.19
Landless workers	47.16
Total	100.00
Beneficiaries agrarian reform	26.47
Associative owners	22.65
Individual owners	3.82
Nonbeneficiaries agrarian reform	73.53
Individual owners	26.37
Landless workers	47.16

[a]Author based on (9), (10), and (38).

Generation of Gross Value of Production

This section focuses on the labor process, how labor is combined with different means of production to transform them into agricultural products. The information required refers primarily to agricultural technology. It is not easy to describe or measure a particular agricultural technology. This could be one of the reasons why there is no comprehensive record of the ways in which crops are grown. There are, nevertheless, some sources which can be used as starting points. The first relates to the "basic budgets" (2) prepared by field men of the Agricultural Development Bank. The second deals with the "costs of production" (40) data gathered by the Agricultural Statistics Office of the Ministry of Agriculture. The third refers to the "costs of production" (36) estimated by the Production Division of the Ministry of Agriculture.

The "basic budgets" are the field men's estimates as to the prevailing technique of production in a given area. They are available for all crops within each known area of commercial production. They concentrate on those inputs the farmer normally purchases, such as fertilizer, pesticides, and variable machinery costs as well as labor. They are used as a reference for extending agricultural credit.

The costs of production of the Statistical Office reflects the average of a small number of observations in a given area. They are not sample estimates. The observations are not updated.

The "costs of production" of the Production Division were based on the estimations of the production division of the agrarian zones. These estimates were contrasted with the averages of the Statistical Office and adjusted by crop specialists of the national production division.

Both the Statistical and Production Divisions' "cost of production" include, besides the cost of purchased inputs, an imputed opportunity cost for land and family labor. They have been used occasionally as references for setting agricultural price supports.

Although the available data have several deficiencies, they are the only sources available with a consistent and wide coverage. They are the basis for the agricultural technology matrix used in this study. They served as a basis for the calculation of Table B-5 presented in Appendix B. This table shows the generation of the gross value of production as a function of yields, based on a certain choice of technology, and prices.

The choice of technology in Peruvian agriculture could be based on criteria that varies according to the institutional structure through which property rights are held. Individual farmers, as a rule, do not consider a very large number of alternative technologies in trying to determine the most economical technique of production. A farmer's knowledge about the effect of alternative input combinations may be severely restricted. On the other hand, the biological nature of crop production is subject to obvious uncertainties that give the profitability calculations a certain air of unreality. The uncertainty is equally important for the case of a group of farmers since it affects all farmers equally. This reduces the choice of technology to average regional standards. These standards are the ones that the data described try to capture.

Table 5-9 shows the technological matrix of production for Agrarian Zone 01 Piura. The "Plan Nacional de Cultivos" (14) contains information that permits a differentiation between associative enterprises and individually owned farms. The associative enterprises use a technology that generates a higher gross value per hectare.

Tables 5-10 and 5-11 show the imputed cost share in absolute value and proportional terms of labor and each means of production for the products selected in each agrarian office of agrarian zone 01 (Piura).

It is assumed that, in equilibrium, the cost share of each means of production and labor, in terms of proportions, can be considered as the corresponding partial elasticity of production. The cost share of labor can be expressed as P_eL/PQ. In equilibrium, it is assumed that the value of the marginal product of labor should be equal to the wage rate

Table 5-9. Technological matrix per unit of land (hectare) for products in agrarian zone 01 differentiated by agrarian offices and between associative and individual enterprises

	Yield (metric tons)	Price (soles)	Gross value (soles)	Machinery (soles)
01-01 Alto Piura				
03 White corn				
Associative	--	--	--	--
Individuals	1.73	3,500	6,055	--
80 Cotton				
Associative	1.54	26,600	40,965	2,970
Individuals	1.10	26,600	29,262	1,350
01-02 Medio y Bajo Piura				
03 White corn				
Associative	--	--	--	--
Individuals	1.73	3,500	6,055	--
80 Cotton				
Associative	1.54	26,600	40,963	2,970
Individuals	1.10	26,600	29,260	1,350
01-03 Sullana				
01 Rice				
Associative	5.50	6,000	33,000	3,355
Individuals	4.52	6,000	27,125	1,880
80 Cotton				
Associative	1.45	26,600	38,571	2,970
Individuals	1.37	26,600	36,443	1,350
01-04 Tumbes				
01 Rice				
Associative	5.00	6,000	29,995	1,200
Individuals	3.96	6,000	23,760	1,200
03 White corn				
Associative	--	--	--	--
Individuals	1.73	3,500	6,055	--
01-05 San Lorenzo				
01 Rice				
Associative	5.85	6,000	35,100	3,356
Individuals	4.92	6,000	29,520	1,880
80 Cotton				
Associative	2.15	26,600	57,189	2,970
Individuals	1.30	26,600	34,580	1,350

Labor (soles)	Social benefits (soles)	Total labor (soles)	Land (soles)	Other means production (soles)	Labor (days-labor)	Wage rate (soles per day-labor)
--	--	--	--	--	--	--
2,720	823	3,543	452	2,060	34	80
8,080	2,445	10,525	13,410	14,060	101	80
8,400	2,542	10,942	5,968	11,002	105	80
--	--	--	--	--	--	--
2,720	823	3,543	452	2,060	34	80
8,080	2,445	10,525	13,410	14,058	101	80
8,400	2,542	10,942	5,968	11,000	105	80
10,000	3,026	13,026	5,675	10,944	125	80
11,040	3,340	14,380	3,253	7,612	138	80
8,080	2,445	10,525	11,016	14,060	101	80
8,400	2,542	10,942	13,150	11,001	105	80
13,280	4,017	17,297	5,000	6,498	166	80
11,040	3,340	14,380	2,680	5,500	138	80
--	--	--	--	--	--	--
2,720	823	3,543	452	2,060	34	80
10,000	3,027	13,027	7,775	10,942	125	80
11,040	3,340	14,380	5,654	7,606	138	80
8,080	2,445	10,525	29,636	14,058	101	80
8,400	2,542	10,942	11,288	11,000	105	80

Table 5-10. Gross value of production and cost shares of labor and means of production in absolute values (soles) for agrarian zone 01 Piura

	Area (has)	Machinery (000)	Labor (000)	Land (000)	Other means production (000)	Total gross value (000)
01-01 Alto Piura	9,392	12,181	67,378	56,904	73,074	209,537
03 White corn	4,585	--	16,245	2,072	9,445	27,762
Associative	--	--	--	--	--	--
Individuals	4,585	--	16,245	2,072	9,445	27,762
80 Cotton	4,807	12,181	51,133	54,832	63,629	181,775
Associative	3,513	10,434	36,974	47,109	49,393	143,910
Individuals	1,294	1,747	14,159	7,723	14,236	37,865
01-02 Medio y Bajo Piura	30,504	67,169	307,773	303,145	368,663	1,046,750
03 White corn	2,493	--	8,833	1,127	5,135	15,095
Associative	--	--	--	--	--	--
Individuals	2,493	--	8,833	1,127	5,135	15,095
80 Cotton	28,011	67,169	298,940	302,018	363,528	1,031,655
Associative	18,120	53,816	190,713	242,989	254,731	742,249
Individuals	9,891	13,353	108,227	59,029	108,797	289,406
01-03 Sullana	28,585	76,031	322,161	290,603	357,254	1,046,049
01 Rice	7,227	23,897	94,460	40,439	78,303	237,099
Associative	6,990	23,451	91,052	39,668	76,499	230,670
Individuals	237	446	3,408	771	1,804	6,429
80 Cotton	21,358	52,134	227,701	250,164	278,951	808,950
Associative	14,383	42,718	151,381	158,443	202,221	554,763
Individuals	6,975	9,416	76,320	91,721	76,730	254,187

Table 5-10. (continued)

	Area (has)	Machinery (000)	Labor (000)	Land (000)	Other means production (000)	Total gross value (000)
01-04 Tumbes	4,287	3,411	46,598	8,754	18,816	77,579
01 Rice	2,842	3,411	41,478	8,101	15,840	68,830
Associative	209	251	3,615	1,045	1,358	6,269
Individuals	2,633	3,160	37,863	7,056	14,482	62,561
03 White corn	1,445	--	5,120	653	2,976	8,749
Associative	--	--	--	--	--	--
Individuals	1,445	--	5,120	653	2,976	8,749
01-05 San Lorenzo	17,834	32,442	204,636	248,901	197,305	683,284
01 Rice	3,401	7,161	48,203	20,332	27,603	103,299
Associative	520	1,745	6,774	4,043	5,690	18,252
Individuals	2,881	5,416	41,429	16,289	21,913	85,047
80 Cotton	14,433	25,281	156,433	228,569	169,702	579,985
Associative	3,578	10,627	37,658	106,038	50,301	204,624
Individuals	10,855	14,654	118,775	122,531	119,401	375,361

Table 5-11. Partial elasticities of production for products agrarian zone 01 Piura

	Machinery E_m	Labor E_l	Land E_t	Other means production E_f
01-01 Alto Piura				
03 White corn	0	.5852	.0746	.3402
80 Cotton	.0670	.2813	.3016	.3501
01-02 Medio y Bajo Piura				
03 White corn	0	.5852	.0746	.3402
80 Cotton	.0651	.2898	.2927	.3524
01-03 Sullana				
01 Rice	.1008	.3984	.1706	.3302
80 Cotton	.0645	.2815	.3092	.3448
01-04 Tumbes				
01 Rice	.0496	.6026	.1177	.2301
03 White corn	0	.5852	.0746	.3402
01-05 San Lorenzo				
01 Rice	.0693	.4667	.1968	.2672
80 Cotton	.0436	.2697	.3941	.2926

$P_e = P(\partial Q/\partial L)$. This expression can be rewritten as follows $(\partial Q/\partial L) = P_e/P$. Then, the cost share can be written as

$$(P_e/P)(L/Q) = (\partial Q/\partial L)(L/Q)$$

This shows that the cost share of labor is equal to the partial elasticity of production for labor. Detailed information for these estimates is presented in Table B-5 in Appendix B.

Distribution of Gross Value of Production

Once the agricultural products have been produced, their value is distributed according to the property rights structure. The "distribution problem" is solved by assigning to each social class the inputed cost share corresponding to the inputs they contribute.

It was assumed that the worker-owners receive the value inputed to their labor contribution and that of land and machinery. The landless workers receive the value that corresponds to their labor contribution valued at the contractual wage rate. The residual cost share corresponds to the purchased means of production. Table 5-12 shows, by way of example, the calculations performed for agrarian zone 01 (Piura). The landless workers receive only 6.48% of the gross value of production generated in this agrarian zone. Table B-6 shows in detail the corresponding calculations for all of the 49 agrarian offices.

Producers' Reaction Functions

The preceding sections made an effort to use all of the available information to estimate the coefficients required for the formulation of producers' reaction functions. These coefficients were defined in the last chapter as: the proportion of the total labor force required by crops (b_i), the proportion of the labor force supplied by worker class (c_1 and c_2), the elasticity of labor supply of worker-owners (E_d), the proportion of each means of production required by crops (h_i, g_i, k_i), the partial elasticities of production (E_{li}, E_{ti}, E_{mi}, E_{fi}), the proportion of gross value of production generated by crops (π_i), the proportion of gross value of production distributed by class of labor and the means of production (a_1, a_2, and a_3). For the purpose of illustrating the methodology, two products per region have been selected. This implies that 24 coefficients per region are needed. These coefficients are used to construct the

Table 5-12. Distribution of gross value of production among workers' classes and owners of means of production bought by enterprises

	Gross value of production (000)	Income of worker-owners (000)	Income of landless workers (000)	Income of owners' other means of production (000)
01-01 Alto Piura	209,537	108,387	28,076	73,074
%	100.00	51.73	13.40	34.87
01-02 Medio y Bajo Piura	1,046,750	637,738	40,349	368,663
%	100.00	60.93	3.85	35.22
01-03 Sullana	1,046,049	688,795	--	357,254
%	100.00	65.85	--	34.15
01-04 Tumbes	77,579	35,674	23,089	18,816
%	100.00	45.98	29.76	24.26
01-05 San Lorenzo	683,284	379,057	106,922	197,305
%	100.00	55.48	15.64	28.88
01-Piura	3,063,199	1,849,651	198,436	1,015,112
%	100.00	60.38	6.48	33.14

matrices of coefficients of endogenous and exogenous variables as shown in the last chapter. The producers' reaction function is then obtained by first inverting the matrix of coefficients of the endogenous variables and then post-multiplying it by the matrix of coefficients of the appropriate exogenous variables.

Table 5-13 shows the producers' reaction function for the agrarian office 01-04. The 1st, 2nd, 11th, and 12th rows are written as follows:

$$i_s = 5.6159p_{01}-1.7435p_{03}-0.6414p_e-0.7212s-0.1647t+0.2786m+0.6096f$$

$$l_e = 2.1078p_{01}-1.0166p_{03}-3.7229p_e-0.4307s-0.1252t+0.1046m+1.4479f$$

$$q_{01} = 5.4619p_{01}-4.3567p_{03}-1.1053p_e-0.6009t+0.3205m+1.2804f$$

$$q_{03} = -22.3717p_{01}+23.477p_{03}-1.1053p_e+3.7242t-1.1096m-1.6145f$$

Table 5-13. Producers' reaction function for agrarian office 01-04 Tumbes

	p_{01}	p_{03}	p_e	s	t	m	f
i_s	5.6159	-1.7435	-0.6414	-0.7212	-0.1647	0.2786	0.6096
l_e	2.1078	-1.0166	-3.7229	-0.4307	-0.1252	0.1045	1.4479
l_{01}	6.4619	-4.3567	-2.1053	0	-0.6009	0.3205	1.2804
l_{03}	-22.3717	24.4770	-2.1053	0	3.7242	-1.1096	-1.6145
t_{01}	9.7198	-9.7198	0	0	-0.4580	0.4821	0.9759
t_{03}	-19.1138	19.1138	0	0	3.8671	-0.9480	-1.9190
m_{01}	0	0	0	0	0	1.0000	0
m_{03}	-28.8336	28.8336	0	0	4.3250	-0.4301	-2.8949
f_{01}	4.5615	-4.5615	0	0	-0.6842	0.2262	1.4580
f_{03}	-24.2722	24.2722	0	0	3.6408	-1.2039	-1.4369
q_{01}	5.4619	-4.3567	-1.1053	0	-0.6009	0.3205	1.2804
q_{03}	-22.3717	23.4770	-1.1053	0	3.7242	-1.1096	-1.6145
l	-15.9098	20.1203	-4.2105	0	3.1233	-0.7891	-0.3342
l_s	-18.0176	21.1369	-0.4876	0.4307	3.2485	-0.8937	-1.7821

Each variable in these relations is expressed in percentage changes. The variables p_{01} and p_{03} represent percentage changes in the prices of rice and white corn, respectively, at the farm level. The variables p_e, s, t, m, and f represent percentage changes in the wage rate, number of worker-owners, land, machinery, and means of production bought by the enterprises, respectively. A specific combination of them represents a package of price policy, wage policy, property redistribution policy, and resource expansion policy. The variables i_s, l_e, q_{01}, and q_{03} represent the reaction of producers in terms of percentage changes of worker-owners' incomes, employment of landless workers, and production of rice and white corn, respectively.

Suppose that the Ministry of Agriculture is interested in knowing the possible reaction of producers to the following policies: (1) a price policy represented by a 1.5% and 2% increase in the prices of rice and white corn, respectively; (2) a wage policy represented by a 1% increase in wages; and (3) a resource expansion policy that will increase available land by 5%.

$$i_s = 5.6159(1.5) - 1.7435(2) - 0.6414(1) - 0.1647(5) = 3.47195$$

$$1_e = 2.1078(1.5) - 1.0166(2) - 3.7229(1) - 0.1252(5) = -3.2204$$

$$q_{01} = 5.4619(1.5) - 4.3567(2) - 1.1053(1) - 0.6009(5) = -4.63035$$

$$q_{03} = -22.3717(1.5) + 23.477(2) - 1.1053(1) + 3.7242(5) = 30.91215$$

This package of policies would increase the income of worker-owners by 3.47%. The employment of landless workers would be reduced by 3.22%. The production of rice would decrease 4.6% while the production of white corn would increase by almost 31%.

Such results should then be compared with the objectives that motivated these policies. This assessment must then yield a judgment as to the acceptability of the proposed policy package.

The incorporation of consumers' reaction is reserved for Chapter 8. Tables B-7 to B-55 present the producers' reaction function for the 49 agrarian offices. When aggregated, they yield the national impact of the policies previously mentioned.

Further Research

In Tables 5-13 and B-7 to B-55, selected elasticities show proportionately large policy responses. For example, the set of policies proposed in the previous section predicted a 31% change in the production of white corn.

Several experiments were conducted to determine the controlling cause of these results. The initial investigation concentrated on the near singularity of the matrix of parameters associated with the endogenous variables. Selective changes in these parameters did not substantially increase the value of the determinant or decrease the policy response elasticities. Indiscriminate variations gave rise to negative supply elasticities, a phenomenon not encountered with the original data. Aggregation of the four original input classes into a lesser number similarly did not materially reduce the occurrence of proportionate large policy response elasticities. The latter proved to be sensitive with respect to the elasticity of the supply of labor worker-owners over the range -1 to 100. The former coefficient is indicative of a backward sloping owner-operator labor supply curve, whereas the latter coefficient is approximately equivalent to an infinitely elastic labor supply curve for owner-operators.

Finally, we performed calculations with different values for the elasticity of substitution. A zero value for the elasticity of substitution is implicit in single technique linear programming models. An infinite value for this parameter occurs when such models consider two technological alternatives. In this study, we assumed that the production functions were linear homogenous of the Cobb-Douglas type. This is equivalent to setting the elasticity of substitution a priori equal to unity. A simple model developed by Van de Wetering (65) was used to get an idea of the impact of the elasticity of substitution. This model assumed that there was not hired labor and that the members of the cooperative tried to maximize the return to the owned resources (land and labor force). The opportunity cost of these resources outside the cooperative was assumed to be zero. Values for the elasticity of substitution ranging from 0.05 to 2.50 for the two inputs considered were used in the experiments. Table 5-14 shows the results for the own price elasticities of supply for the two products considered. A wide range of variation from 0.069 to 3.463 for one product and from 0.448 to 22.422 for the second product can be seen. The combination of unity elasticity for both products gave a result of 1.385 for one product and 8.969 for the second product.

Such results are an indication of the need for further research into the estimation of the elasticity of substitution. It requires information not available for this study. Thirsk (58) estimated the partial elasticities of substitution in the case of three inputs. He used rather fragmentary cross-section data for the Colombian agricultural sector and reported values ranging from 0.02 to 2.22.

Table 5-14. Impact of different values for elasticity of substitution (S_1 and S_2) between means of production and labor force on direct price elasticity of supply for rice (1) and white corn (2) in agrarian office 01-04 (Tumbes)

S_2		S_1 0.05	0.10	0.15	0.20	0.25	0.50	1.00	1.50	2.00	2.50
0.05	e_{11}	0.069	0.119	0.156	0.185	0.209	0.281	0.341	0.368	0.383	0.393
	e_{22}	0.448	0.772	1.018	1.212	1.370	1.858	2.269	2.453	2.558	2.625
0.10	e_{11}	0.076	0.139	0.192	0.237	0.277	0.418	0.562	0.637	0.682	0.713
	e_{22}	0.488	0.897	1.244	1.544	1.806	2.740	3.715	4.224	4.538	4.752
0.15	e_{11}	0.078	0.147	0.208	0.262	0.312	0.499	0.718	0.843	0.924	0.981
	e_{22}	0.054	0.949	1.345	1.702	2.024	3.263	4.727	5.572	6.125	6.516
0.20	e_{11}	0.079	0.151	0.217	0.277	0.332	0.554	0.835	1.007	1.124	1.209
	e_{22}	0.511	0.977	1.403	1.794	2.155	3.612	5.480	6.637	7.430	8.008
0.25	e_{11}	0.080	0.154	0.223	0.287	0.346	0.594	0.926	1.141	1.293	1.405
	e_{22}	0.516	0.995	1.440	1.854	2.242	3.860	6.062	7.502	8.523	9.287
0.50	e_{11}	0.082	0.160	0.236	0.308	0.378	0.693	1.187	1.560	1.852	2.088
	e_{22}	0.526	1.033	1.520	1.990	2.442	4.485	7.721	10.182	12.124	13.699
1.00	e_{11}	0.083	0.163	0.243	0.320	0.397	0.757	1.385	1.917	2.374	2.771
	e_{22}	0.532	1.053	1.564	2.065	2.557	4.884	8.969	12.444	15.441	18.058
1.50	e_{11}	0.083	0.165	0.245	0.325	0.403	0.781	1.468	2.078	2.624	3.116
	e_{22}	0.533	1.060	1.579	2.092	2.598	5.035	9.486	13.453	17.016	20.236
2.00	e_{11}	0.083	0.165	0.246	0.327	0.407	0.793	1.513	2.169	2.771	3.324
	e_{22}	0.534	1.063	1.587	2.106	2.619	5.114	9.769	14.026	17.938	21.546
2.50	e_{11}	0.083	0.165	0.247	0.328	0.409	0.801	1.542	2.228	2.867	3.463
	e_{22}	0.535	1.065	1.592	2.114	2.632	5.163	9.947	14.395	18.543	22.422

CHAPTER 6. A THEORETICAL APPROACH TO CONSUMERS' REACTION FUNCTIONS

The objective of this chapter is to present the theoretical foundations that underline the consumers' reaction functions. As previously stated, the study of the consumption process is limited to its superficial relation without going into the deeper problems of its dependence on the relations of production. This is due to the fact that the "agricultural sector" is linked to consumption agents that do not participate directly in the production process of this sector. The study of the production process of the rest of the economy has not been incorporated. Therefore, the relations of production and distribution and the corresponding income distribution, although basic to understanding the structure of the demand, are not considered as endogenously determined.

In Chapter 3 we outlined the requirements that consumers' reaction functions should meet in order to be incorporated as elements of a system for policy analysis. The basic characteristic of the system is the simulation of consumer participation in the process of decision making. At this first approximation of the system for policy analysis, the consumers' reaction functions consider explicitly the impact of price policies as well as changes in their income on the demand for food. This is done by means of a complete set of price and income elasticities. This chapter starts with a brief presentation of the static theory of consumer preferences. It is used to derive the price elasticities of demand. Since the best information available in Peru is that which was collected from household budgets (ENCA, 1971-1972), the theoretical developments discussed are those which permit the utilization of this type of information for the generation of the above elasticities. The procedure selected requires in addition the definition and estimation of income elasticities, money flexibility, and want elasticities. The algebraic and statistical procedures for their estimation are outlined in detail.

The Static Theory of Consumer Preferences

The constrained utility maximization and the demand functions

The theory of consumer behavior is constructed under the assumption that a consumer attempts to allocate his fixed money income among available goods and services so as to maximize his satisfaction. It can be assumed that an individual consumer, with fixed money income m, purchases n, commodities represented by the vector q at the vector prices p. The theory of consumer behavior assumes that this consumer acts as if he maximizes the value of a utility function, which is dependent on the quantities of the commodities, subject to his budget constraint. This can be represented as follows:

$$\max u(q) \text{ subject to } p'q = m \text{ and } q \geq 0 \tag{6-1}$$

The associated Lagrangian function and the first order maximization conditions can be written:

$$L(q,\lambda) = u(q) + \lambda(m - p'q) \tag{6-2}$$

$$u_q - \lambda p = 0 \tag{6-3}$$

$$p'q = m \tag{6-4}$$

where u_q is the vector of the first partial derivatives of the utility function with respect to $q[u_q = \partial u(q)/\partial q]$ which are interpreted as the marginal utilities of q. The Lagrange multiplier, λ, can be interpreted as the marginal utility of money.

$$\lambda = \partial u(q)/\partial(p'q) \qquad \lambda = \partial u(q)/\partial m$$

This implies that λ measures the impact on the maximized value of utility of a change in income. Phlips (48) has indicated that λ can be interpreted as a coefficient that converts money into utility, $\lambda = (1/p)'(u_q)$ where $(1/p)$ is a vector whose elements indicate the number of units of each good that can be bought with one monetary unit.

The n equations in (6-3) can be interpreted as the equality of relative marginal utilities and relative prices. The equation (6-4) is the budget constraint. The sufficient conditions for a maximum require the Hessian U (n x n matrix of second order partial derivatives of the utility function, $U_{ij} = \partial u_i/\partial q_j$ $i,j = 1,\ldots,n$) to be a negative definite matrix, implying that the utility function is strictly concave. Then (6-3) and (6-4) represent a system of n + 1 equations with n + 1 unknowns whose unique solutions are:

$$q = q(m,p) \tag{6-6}$$

$$\lambda = \lambda(m,p) \tag{6-7}$$

The system of n equations represented by (6-6) can also be written as

$$q_i = q_i(m,p_1,\ldots,p_n) \qquad i = 1,\ldots,n$$

They form what is called a complete set of demand equations. They represent the quantities of the n commodities that the consumer purchases when he has a money income of m and the commodities are sold at prices p. The derivation of these demand functions is the main purpose of the theory of consumer behavior.

The fundamental matrix equation of consumer demand theory

Samuelson (51) has indicated that the utility analysis is meaningful because of the restrictions it places on these demand functions. A good summary of these restrictions has been presented by Phlips (48) and Goldberger (25) among others. The restrictions are known as: (1) "Engel Aggregation" or "Adding-up," according to which the marginal propensities to consume or the marginal budget share must add to one. In elasticity terms, this means that the sum of the income elasticities, weighted by the corresponding budget shares, must add to one; (2) "Homogeneity of Degree Zero" implying that the sum of all direct, cross-price, and income elasticities must add to zero; and (3) "The Fundamental Matrix Equation" permitting one to derive other restrictions that will be analyzed in detail in the next section. There are other types of restrictions that Phlips (48) calls "particular restrictions." They refer to specification of the utility function. Reference will be made to them later.

For the purpose of this chapter, it is important to concentrate on the "Fundamental Matrix Equation of Consumer Demand Theory." In order to derive it, the starting point is the total differentiation of the first order conditions (6-3) and (6-4)

$$Udq - pd\lambda - \lambda\, dp = 0$$

$$p'dq + q'dp = dm$$

which can also be written more compactly.

$$\begin{bmatrix} U & p \\ p' & 0 \end{bmatrix} \begin{bmatrix} dq \\ -d\lambda \end{bmatrix} = \begin{bmatrix} 0 & \lambda I \\ 1 & -q' \end{bmatrix} \begin{bmatrix} dm \\ dp \end{bmatrix} \tag{6-8}$$

Goldberger (25) has shown that this could be further transformed if the vector $[dq - d\lambda]'$ is replaced by the values obtained from the total differentiation of (6-6) and (6-7)

$$dq = q_m \, dm + Q_p \, dp$$

$$d\lambda = \lambda_m \, dm + \lambda_p' \, dp$$

or more compactly

$$\begin{bmatrix} dq \\ -d\lambda \end{bmatrix} = \begin{bmatrix} q_m & Q_p \\ -\lambda_m & -\lambda_p' \end{bmatrix} \begin{bmatrix} dm \\ dp \end{bmatrix} \qquad (6\text{-}9)$$

where q_m is a n x 1 income slope vector $(\partial q/\partial m)$, Q_p is a n x n price slope matrix $(\partial q/\partial p)$ for the demand functions (6-6), while λ_m is the scalar income slope $(\partial\lambda/\partial m)$, λ_p is a n x 1 price slope vector $(\partial\lambda/\partial p)$.

Then the "fundamental matrix equation of the theory of consumer demand," in terms of the slopes of the functions (6-6) and (6-7), would be

$$\begin{bmatrix} U & p \\ p' & 0 \end{bmatrix} \begin{bmatrix} q_m & Q_p \\ -\lambda_m & -\lambda_p' \end{bmatrix} = \begin{bmatrix} 0 & \lambda I \\ 1 & -q' \end{bmatrix} \qquad (6\text{-}10)$$

<u>The income and substitution effects of price changes</u>

Goldberger (25) has shown that the solution of (6-10) can be written as follows

$$\lambda_m = (p'U^{-1}p)^{-1} \qquad (6\text{-}11)$$

$$q_m = \lambda_m U^{-1} p \qquad (6\text{-}12)$$

$$\lambda_p = -(\lambda q_m + \lambda_m q) \qquad (6\text{-}13)$$

$$Q_p = \lambda U^{-1} - \lambda\lambda_m^{-1} q_m q_m' - q_m q' \qquad (6\text{-}14)$$

where (6-14) corresponds to Barten's (3) representation of the well-known "Slutsky equation." Slutsky (54) wrote his famous article in 1915. He showed that the reaction of the quantity demanded of a good, to a change in its price or of any other good, can be decomposed into an "income effect" and a "substitution effect." The first two terms in (6-14) represent the Slutsky substitution effect while the third term represents the income effect.

It can be seen that an increase in the price of the jth commodity, p_j, causes the original optimal basket to be more expensive by $q_j dp_j$. This could also be interpreted as a loss in the consumer's purchasing power, $dm = -q_j dp_j$. The impact of this reduction in purchasing power in the quantity demanded of the ith commodity that results from the price increase dp_j is

$$(\partial q_i/\partial m)dm = -(\partial q_i/\partial m)q_j dp_j \tag{6-15}$$

which is the same as the third term on the right-hand side of the relation (6-14). This has been identified as the "Income Effect."

If it is assumed that the consumer receives an income compensation which will allow him to buy his original optimal basket of goods at the new vector price, he will be confronted with a change in price and money income. Theil (57) has indicated that the consumer will retain the original level of utility, but he will buy a different basket of products. This is due to the fact that the price change, dp_j, will also affect the price ratios. This gives rise to the "Total Substitution Effect" of dp_j on the quantity demanded of the ith good which, with the help of (6-14), can be written as follows.

$$(\partial q_i/\partial p_j + (\partial q_i/\partial m)q_j)dp_j = (\lambda u^{ij} - (\lambda/(\partial\lambda/\partial m))(\partial q_i/\partial m)(\partial q_j/\partial m))dp_j \tag{6-16}$$

where u^{ij} is the ij element of U^{-1}, the inverse of the Hessian of the utility function.

Barten (3), using Houthakker (27) terminology, distinguishes two different types of interaction in the substitution effect: specific and general.

It has been shown by relation (6-7) that the marginal utility of income, λ, is a function of income and all prices. Then, a change in one price, dp_j, will change the value of λ. In order to restore the original value of λ, income would have to be changed so as to compensate the change in p_j. Theil (57) has shown that if p_j and m are changed to keep λ from changing, the required value of dm could be obtained as follows.

$$d\lambda = d\lambda(m,p) = (\partial\lambda/\partial m)dm + (\partial\lambda/\partial p_j)dp_j = 0$$

using (6-13) for $(\partial\lambda/\partial p_j)$

$$(\partial\lambda/\partial m)dm - (\lambda(dq_j/\partial m) + (\partial\lambda/\partial m)q_j)dp_j = 0$$

$$dm = (\lambda/(\partial\lambda/\partial m))(\partial q_j/\partial m)dp_j + q_j dp_j \tag{6-17}$$

Therefore, the impact on the quantity demanded for the ith commodity of a change in p_j, when the consumer is given an income compensation which will restore the original marginal utility of income, is equal to

$$(\partial q_i/\partial p_j + (\partial q_i/\partial m)q_j + (\lambda/(\partial\lambda/\partial m))(\partial q_i/\partial m)(\partial q_j/\partial m))dp_j \tag{6-18}$$

From (6-14) it can be seen that (6-18) is equal to λu^{ij}. This term is called the "Specific Substitution Effect" of dp_j in the quantity demanded, q_i. It indicates a specific kind of interaction between the two goods in terms of off-diagonal elements of Hessian U, which can represent a substitution or complementary type of relationship.

In order to restore the original value of the marginal utility of income, λ, changed by the change in price dp_j, it was necessary to compensate the consumer with a change in money income, dm. This implies a change in the real income or in the consumer's purchasing power. Theil (57) has shown that its impact on the quantity demanded of the ith good could be represented by the expression

$$(\partial q_i/\partial m)dm - (\partial q_i/\partial m)(q_j dp_j)$$

from relation (6-17)

$$dm - q_j dp_j = (\lambda/(\partial\lambda/\partial m))(\partial q_j/\partial m)dp_j$$

Then, the impact on the demand q_i of the change on consumer's purchasing power would be

$$(\lambda/(\partial\lambda/\partial m))(\partial q_j/\partial m)(\partial q_i/\partial m)dp_j \qquad (6\text{-}19)$$

which corresponds to the second term in the right-hand side of relation (6-14). This term is called the "General Substitution Effect." It indicates a general kind of interaction due to the fact that all goods are "competing" for the increments in the consumer's budget. It is important to point out now, as does Theil (57), that the second and third terms on the right-hand side of (6-14) indicate the effect of an income change on the quantity demanded q_i of the change in p_j. The income effect reflects the change in money income needed to maintain the level of utility, while the general substitution effect reflects the change in real income needed to maintain the level of marginal utility of income.

The relation (6-14) can be expressed in terms of elasticities if each term is pre-multiplied by $\bar{q}^{-1}$ and post-multiplied by $\bar{p}$, where both are diagonal matrices.

$$\bar{q}^{-1}Q_p\bar{p} = \bar{q}^{-1}(\lambda U^{-1})\bar{p} - \bar{q}^{-1}(\lambda\lambda_m^{-1}q_m q_m')\bar{p} - \bar{q}^{-1}(q_m q')\bar{p} \tag{6-20}$$

The left-hand side term corresponds to the total price elasticity of demand. If price of good j increases, it will cause a change in the demand for good i that will be measured by

$$e_{ij} = (\partial q_i/\partial p_j)(p_j/q_i) \tag{6-21}$$

Relation (6-21) corresponds to the definition of price elasticity of demand. The first term on the right-hand side of (6-20) is the specific substitution effect component of the price elasticity.

$$(e_1)_{ij} = (\partial q_i/\partial u_j)(\lambda p_j/q_i)$$

Relation (6-3) permits one to rewrite it as follows

$$(e_1)_{ij} = (\partial q_i/\partial u_j)(u_j/q_i) = (\partial q_i/\partial p_j)(p_j/q_i)\Big|_{\lambda\ =\ \text{constant}} \tag{6-22}$$

This is what Frisch (23) has called "Want Elasticity" under the condition that the marginal utility of money is kept constant. He identifies it as x_{ij}.

The second term on the right-hand side of (6-20) is the general substitution effect component of the price elasticity.

$$(e_2)_{ij} = -(\lambda/\lambda_m)(\partial q_i/\partial m)(\partial q_j/\partial m)(p_j/q_i)$$

This could also be written as

$$(e_2)_{ij} = -(\lambda/\lambda_m m)(\partial q_i/\partial m)(m/q_i)(\partial q_j/\partial m)(m/q_j)(p_j q_j/m) \tag{6-23}$$

Frisch (23) has also introduced another very important concept which will be discussed in some detail later. He called it the "Income Elasticity of the Marginal Utility of Money" or "Money Flexibility."

$$E_\lambda = (\partial\lambda/\partial m)(m/\lambda) = \lambda_m m/\lambda \tag{6-24}$$

Then the relation (6-23) could be rewritten as

$$(e_2)_{ij} = -(E_j/E_\lambda)E_i a_j \tag{6-25}$$

where E_i, E_j, and E_λ are the income elasticities of goods i, j, and marginal utility of income, respectively, while a_j is the budget proportion corresponding to the jth good.

The third term on the right-hand side of (6-20) is the income effect components of the price elasticity.

$$(e_3)_{ij} = -(\partial q_i/\partial m)(q_j p_j/q_i)$$

$$(e_3)_{ij} = -(\partial q_i/\partial m)(m/q_i)(p_j q_j/m) \tag{6-26}$$

which can also be written

$$(e_3)_{ij} = -E_i a_j \tag{6-27}$$

Therefore, the relations (6-21), (6-22), (6-25), and (6-27) allow one to rewrite (6-20) in the following way.

$$e_{ij} = x_{ij} - (E_j/E_\lambda)E_i a_j - E_i a_j \qquad i,j = 1(1)n \tag{6-28}$$

Relation (6-28) is the same as Frisch's relation 52 in (23). This is a very important relation in applied consumption analysis. It permits one to estimate a complete set of price elasticities from cross-section information.

As has been indicated before, the consumers' reaction functions are based on income elasticities and a complete set of price elasticities. They are going to be estimated from the Peruvian household survey. It is clear that equation (6-28) plays a key role for the derivation of these reaction functions. The next three sections explain how the three key elements of relation (6-28) are derived. They are the income elasticities, the money flexibility, and the want elasticities.

The Engel Curves and the Income Elasticities of Demand

The demand functions (6-6) relate the quantity demanded with consumer's money income and all market prices. If prices were held constant, a relation of quantity demanded for each good and money income could be derived from (6-6) such as

$$q_i = q_i(m) \tag{6-29}$$

This relation has been called the "Engel Curve" for the ith commodity.

The response of demand q_i to changes in m is measured by the income elasticity of demand for the ith commodity.

$$E_i = (dq_i/dm)(m/q_i) \tag{6-30}$$

Before this coefficient can be obtained, there are several aspects that should be discussed. These aspects are related to the specification and estimation of Engel curves.

<u>The Engel curves and their variables</u>

Before the specification given to the Engel curves is accepted, there are some questions that deserve a careful examination. This section concentrates on two of them. Are there other variables besides income that should be included as explanatory variables? How should consumption, income, and any other variable be defined?

It is recognized (47) that, besides income, other socio-economic aspects should be included as independent variables. This will permit one to obtain better estimates for income elasticities. In general, however, it is indicated (11) that household budget data available had precluded the consideration of other variables that would permit the testing of these hypotheses. It should be mentioned that the most reported effort along these lines is the explicit consideration of the size and composition of the family. Cramer (11) indicates that this reflects the concern of early budget surveys with the living conditions of the workers. Apart from this, there could be a strong correlation between income and size of the family, at least for some groups of the population. If this is the case, ignoring this variable will invalidate the estimation by least squares. This is due to the fact that the size of the family will be included in the disturbance term of the Engel curve. In other words, the independent variable, income, will not have zero covariance with the disturbance term.

There are two aspects to take into account if this variable is not relegated to the disturbance term. The first aspect relates to the composition of the family and the second to the form it takes in the function. The first problem originates in the observation that the needs of the members of the family are expected to vary with age, as well as with other characteristics that could include sex, status, etc. Therefore, the size of the family, if the information permits it, is not defined as the number of individuals in the household. In order to account for these differences, "equivalent adult scales" (11,68) have been developed. They permit one to attach different weights to individuals according to different sex and age groups. These scales are indices that express the consumption of each commodity by a person of a certain age and sex as a proportion of that consumed by the adult male who is assigned unity. The second problem relates to the inclusion of the variable in the function. If this is done as another independent variable, the nonzero covariance problem would be transformed to one of multicollinearity among the "independent" variables. This will give estimates with large variances. Cramer (11) has shown that the only way of improving the precision of the estimates is to impose a restriction on the joint variation of the estimates. If the sum of the two estimates is restricted to one, the original function could be transformed to one with consumption per capita as the dependent variable and income per capita as the independent variable. In this way, the procedure tries to treat families of different sizes and compositions as if they had similar needs.

In relation to the use of the variable income, it cannot be said that it is without its difficulties. The practice is to use current income, as it is reported in the survey or additional sources or total expenditure. Both practices have been criticized by Friedman (22) and Summers (56). Friedman's argument is known as the "Permanent Income Hypothesis." He argues that "permanent income," instead of current income, is the variable that influences expenditures. Paris (47) reviewed Friedman's approach in relation to the estimation of income elasticities. He concluded that the use of current values for consumption and income will produce downward biased estimates of the regression coefficients. Summer's argument is that the total expenditure and its components, the expenditure on each commodity, are endogenous to the consumer, and they are determined simultaneously. In this case, the method of least squares gives biased estimates of the parameters too.

Liviatan (28) presents a method to avoid the problems of nonobserved variables such as permanent income and consumption and the simultaneity of total expenditure and individual commodity expenditure. His method consists of using the income reported as an instrumental variable. This permits one to eliminate the bias created by the relation between total expenditure and its components. Liviatan supposes that reported income retains two important characteristics: (1) relative close correlation with permanent income and (2) no correlation with the random element. These characteristics imply that income recorded is an efficient instrumental variable.

Relation (6-29) could be represented as

$$q_i = \alpha_{0i} + \alpha_{1i}m_p + v_i \qquad i = 1(1)n \qquad (6\text{-}31)$$

where m_p is the "true" or "permanent" income and v_i is the stochastic element uncorrelated with m_p.

The relation between total expenditure and permanent income could be expressed as

$$c = \alpha_0 + \alpha_1 m_p + u \qquad (6\text{-}32)$$

where c is total expenditure and u is the corresponding stochastic element.

Relation (6-32) can be solved for m_p, and its value can be replaced in relation (6-31). This gives a new relation that involves the observed variables.

However, the objective is to estimate the relation between the "true" or "permanent" components of q_i, as q_{pi}, and that of c, as c_p. This relation can be derived from relations similar to (6-31) and (6-32).

$$q_{pi} = \alpha_{0i} + \alpha_{1i}(c_p/\alpha_1 - \alpha_0/\alpha_1)$$

$$q_{pi} = (\alpha_{0i} - \alpha_{1i}(\alpha_0/\alpha_1)) + (\alpha_{1i}/\alpha_1)c_p$$

$$q_{pi} = \beta_{0i} + \beta_{1i}c_p \qquad i = 1(1)n \qquad (6\text{-}33)$$

Since q_{pi} and c_p are not observable, the relation between the corresponding observable variables would be:

$$q_i = \beta_{0i} + \beta_{1i}c + w_i \qquad i = 1(1)n \tag{6-34}$$

where w_i is a linear combination of stochastic elements $w_i = v_i - (\alpha_{1i}/\alpha_1)u = v_i - \beta_{1i}u$. It should be expected that w_i and c would be correlated because they have common elements. Therefore, the least squares procedure for estimating β_{1i} is generally inappropriate. Liviatan shows that, due to the characteristics indicated for the reported income, it can be used as an instrumental variable. Therefore, it can be assumed that the following relation holds:

$$c = a_0 + a_1m + \varepsilon \tag{6-35}$$

where m is the observed income uncorrelated with the stochastic term.

The probability limit of the least squares estimator of a_1 is:

$$\begin{aligned} \text{plim}(a_1) &= \text{Cov}(c,m)/\text{Var}(m) \\ &= \text{Cov}(a_0 + a_1m + \varepsilon,m)/\text{Var}(m) \\ &= a_1 + \text{Cov}(\varepsilon,m)/\text{Var}(m) \end{aligned}$$

since $$\text{Cov}(\varepsilon,m) = 0$$

$$\text{plim}(a_1) = a_1 \tag{6-36}$$

Relation (6-36) implies that the least squares estimator, a_1, is consistent.

Relation (6-35) can be combined with relation (6-34). This will give:

$$q_i = (\beta_{0i} + \beta_{1i}a_0) + \beta_{1i}a_1m + (\beta_{1i}\varepsilon + w_i) \qquad i = 1(1)n \tag{6-37}$$

The probability limit of the least squares estimator of $\beta_{1i}a_1$ is:

$$\begin{aligned} \text{plim}(\beta_{1i}a_1) &= \text{Cov}(q_i,m)/\text{Var}(m) \\ &= \beta_{1i}a_1 + \text{Cov}(\beta_{1i}\varepsilon + w_i,m)/\text{Var}(m) \end{aligned}$$

Since $$\text{Cov}(\beta_{1i}\varepsilon + w_i,m) = 0$$

$$\text{plim}(\beta_{1i}a_1) = \beta_{1i}a_1 \tag{6-38}$$

Relation (6-38) implies that the least squares estimator, $\beta_{1i}a_1$, is consistent.

Therefore, β_{1i} can be estimated by the ratio of the two least squares estimators $\beta_{1i}a_1$ and a_1.

$$\text{plim}(\beta_{1i}a_1/a_1) = \beta_{1i} \tag{6-39}$$

Thus, the ratio $\beta_{1i}a_1/a_1$ is a consistent estimate of $\beta_{1i}(=\alpha_{1i}/\alpha_1)$.

Therefore, instead of using relation (6-34) to estimate $\beta_{1i}(=\alpha_{1i}/\alpha_1)$, relations (6-35) and (6-37) should be used. The ratio of their corresponding regression coefficient would give a consistent estimate of β_{1i}.

<u>The Engel curves and their functional form</u>

The functional form of the Engel curve is a key aspect in the process of estimation of the income elasticity of demand. FAO (21) has studied this aspect in great detail. They have studied nine forms for the Engel curves. Six of the forms are among the most commonly used:

Forms	Relationship	Income Elasticity
linear	$q = a + b\ m$	$b(m/q)$
double-log	$\ln q = a + b \ln m$	b
semi-log	$q = a + b \ln m$	b/q
inverse	$q = a - b/m$	b/qm
log-inverse	$\ln q = a - b/m$	b/m
log-log-inverse	$\ln q = a - b/m - c \ln m$	$b/m - c$

Zarembka (71) has shown that the above six functional forms of the Engel curve are special cases of the general transformation.

$$q^{(\lambda_0)} = a + b\ m^{(\lambda_1)} \qquad \text{where } x^{(\lambda)} = (x^{\lambda}-1)/\lambda \tag{6-40}$$

with $x^{(\lambda)}$ at $\lambda = 0$ defined as the logarithm of a variable x (ln x) by the used of L'Hospital's rule. The next table shows the specific values that λ_0 and λ_1 take in order to get the above functional forms.

Forms	λ_0	λ_1
linear	1	1
double-log	0	0
semi-log	1	0
inverse	1	-1
log-inverse	0	-1

The log-log-inverse requires an extra term

$$q^{(\lambda_0)} = a + b\, m^{(\lambda_1)} + c\, m^{(\lambda_2)} \tag{6-41}$$

where $\lambda_0 = 0$, $\lambda_1 = -1$, and $\lambda_2 = 0$.

Zarembka draws on the work of Box and Cox (4) who define their transformation as

$$m^{(\lambda)} = \begin{cases} (m^{\lambda} - 1)/\lambda & \lambda \neq 0 \\ \ln m & \lambda = 0 \end{cases} \tag{6-42}$$

Box and Cox altered the "simple family" transformation of Tukey (59) to avoid the discontinuity at $\lambda = 0$. The fundamental assumption made by Box and Cox was that for some unknown λ the transformed observations $m^{(\lambda)}$ can be treated as independently normally distributed with constant variance σ^2 and with expectations defined by a linear model.

$$E(m^{(\lambda)}) = X\beta \tag{6-43}$$

They formulate the likelihood in relation to the original observations m as

$$(2\,\pi\,\sigma^2)^{-n/2} \exp(-(m^{(\lambda)} - X\beta)'(m^{(\lambda)} - X\beta)/2\,\sigma^2)J \tag{6-44}$$

where n is the number of observations and J the Jacobian of the inverse transformation from the dependent variable $m^{(\lambda)}$ to the actually observed m.

$$J = \prod_{i=1}^{n} \left| dm_i^{(\lambda)} / dm_i \right| = \prod_{i=1}^{n} m_i^{\lambda - 1} \tag{6-45}$$

Except for a constant, the maximized log function is

$$L_{max}(\lambda) = -(n/2)\ln \hat{\sigma}^2(\lambda) + (\lambda - 1)\sum_{i=1}^{n} \ln m_i \tag{6-46}$$

In order to maximize over parameter space, one has to follow the following procedure: (1) choose alternative values for λ over a reasonable range; (2) regress $m^{(\lambda)}$ on X; (3) find the $\hat{\lambda}$ which maximizes $L_{max}(\lambda)$; and (4) pick from the regression results β and σ^2 for $\hat{\lambda}$.

It should be mentioned that Schlesselman (52) has pointed out that Box and Cox fail to mention that in models which do not allow for the removal of an additive constant, their transformation leads to procedures which are not scale invariant for $\lambda \neq 0$. He also presented a general transformation of which Box and Cox's transformation is a special case.

$$m^{(\lambda)} = \begin{cases} (m^{\lambda} - c^{\lambda})/\lambda & , \lambda \neq 0 \\ \ln(m/c) & , \lambda = 0 \end{cases} \tag{6-47}$$

where c is an arbitrary positive constant in the measurement units of the variable m. This constant c could be replaced by the sample average, sample geometric mean, or the sample median.

Zarembka has used the Box and Cox transformation to study the demand for money (69) and the demand for food (70). In this last case, he works with a linear relation between a power transformation λ of food consumption as dependent variable and the same power transformation of income as the independent variable

$$q^{(\lambda)} = a + b\, m^{(\lambda)} \tag{6-48}$$

The income elasticity is $b(m/q)^{\lambda}$. Then if $\lambda < 0$, the income elasticity declines as income m rises because (m/q) rises. In this way, Zarembka introduces an additional parameter into the Engel curve which allows the data to generate the shape of the curve instead of force the data into a pre-defined shape. This has interesting implications for the estimation of the income elasticities since the data are allowed to discriminate the behavior of the income elasticity as income levels change.

The Money Flexibility

Fisher-Frisch on the measure of cardinal utility

It is well-known that Vilfredo Pareto laid the foundations for the reformulation of the theory of consumer behavior in terms of the indifference-curve approach. He thought that, from an operational point of view, the assumption of cardinally measurable utility could be removed. It was not until the 1930s that Hicks and Allen worked out this systematic reformulation in terms of an assumption of ordinal or nonmeasurable utility. This is the reasoning behind the interpretation of relation (6-3) as the equality of relative marginal utilities and relative prices. The values assigned to ratios of marginal utilities are testable. They do not involve measurement in units of utility which was implied by the marginal utility concept.

This interpretation of the first order condition (6-3) cancels out λ, the marginal utility of money. The ratio of marginal utilities of two commodities is their marginal rate of substitution. This is an operationally defined magnitude. It is conceived as a function of all commodity quantities consumed.

Fellner (17) points out that in the early part of the 1940s cardinal utility was going out of fashion. This was due to the lack of an operational equivalent concept as the one used by ordinal utility. He also indicated that there are two technical methods by which the operational concepts are to be identified and their propositions tested. They are those which involve a generation of human behavior under laboratory-type circumstances and the others which involve the processing of data generated without the intervention of the observer.

The search for an operational utility concept possessing the properties of measurability up to linear transformations rather than monotone goes back to the work of Irving Fisher. Fellner (17) reports that Fisher's doctoral dissertation, written in 1891 and reprinted as (20), expressed the general idea that the measurability of cardinal utility would require a kind of choice-theoretical independence of goods. Fisher believed this to be an acceptable assumption if the analysis is conducted in terms of food and nonfood. Fisher (19) indicates that in his dissertation he endeavored to show that the marginal utility or as he preferred to say the "want-for-one-more-unit" of anything is measurable, at least in theory. In his article (19), he goes one step further to outline his method. The information needed for the application of his method is retail prices and family budgets. He showed that the family budgets should be for two different places (or times). The families would have to be of identical tastes. The relative price levels would have to correspond to the places or times and diverge sufficiently from each other. They would have to be for budget groups such as food, clothing, etc. Then he compared the "wants" of two "typical" families of different incomes, in the same community, by using as a yardstick a third typical family having identical taste but differing in the amount of income and living under a different set of prices for the main budget groups.

Frisch (24) was the first who reported his empirical attempt to solve the problem of utility measurement. He used time series of sales and prices collected by the Union of Cooperatives of Paris. He constructed the marginal utility curve of money for the "average" member of the union of cooperatives. The special feature he reported was that the "flexibility" of the curve was negative in conformity with the hypothesis of decreasing marginal utility. He defined the flexibility of the marginal utility curve of money as the ratio between a small percentage change in marginal utility and the corresponding percentage change in income. This is what he later (23) called "Money Flexibility" or "Income Elasticity of the Marginal Utility of Money."

Frisch called his approach "method of isoquants." He started by postulating the marginal utility as a function of money income and the "price of living." Then he transformed this function into one that expresses how the marginal utility of money varies with income when the price of living was equal to unity. Then instead of studying the function of two variables $\lambda = \lambda(m,P)$ where P is the price of living, he studied the function of one variable $\lambda = \lambda(m)$. This last function was represented by a one-dimensional curve in (λ,m) coordinates holding all individual prices $(p_1,\ldots,p_n)$ constant. This was the fundamental fact on which the isoquant method of utility measurement was based. On the other hand, Fisher considered the marginal utility of money as dependent on money income and the whole set of prices $\lambda = \lambda(m,p_1,\ldots,p_n)$. Firsch indicated that, although this was a more general method, Fisher's marginal utility of money curve was good for a given price situation. The isoquant approach permits one to utilize observations relating to different price situations to determine points on the same utility curve. The data at his disposal forced him to use the sugar consumed by the members of the Union as choice-theoretically independent of all other commodities in their budget. Later, Frisch and Fisher working together try to apply their methods to data from the United States. They did not succeed because they lacked adequate price data. Then Frisch (24) worked out another method that he called the "translation method." He used household bugets for the United States in 1918-1919. In this case, he substituted food for sugar. He was forced to estimate relative prices by exploring the price assumptions that could explain the different food expenditure between cities. He had to assume identical tastes for the different cities considered as had Fisher before him.

It is interesting to point out that even in his famous paper (23) written almost 30 years later, Frisch does not make reference to new estimates of his money flexibility. He assumes that the values could vary from -0.1 for the rich part of the population to -10 for the extremely poor.

<u>Fellner's operational method</u>

Fellner (17) has presented a new method for the estimation of money flexibility. He assumes that if the general price level changes, the first-order maximization condition presented as relation (6-3) above could be rewritten as

$$(\partial u/\partial q_f)/(p_f/p_g) = \lambda(m/p_g) = \lambda(r) \qquad (6\text{-}49)$$

where $u = u(q_f, q_n) = u_f(q_f) + u_n(q_n)$, with q_f corresponding to food and q_n to nonfood, $\partial^2 u/\partial q_f \partial q_n = 0$. Then if the consumer is confronted with two values of (p_f/p_g), a "low" value $(p_f/p_g)_1$ and a higher value $(p_f/p_g)_2$, Fellner explores how much money is needed to keep the consumer buying the same quantity q_f that he bought at the lower price for a relatively higher price.

$$\partial u/dg_f = \lambda(r_1)(p_f/p_g)_1 = \lambda(r_2)(p_f/p_g)_2 \tag{6-50}$$

He is trying to measure utility up to linear transformation. This implies an arbitrary zero point and an arbitrary unit of measurement. Therefore, he can set $\lambda(r_1) = 1$, then

$$\lambda(r_2) = (p_f/p_g)_1/(p_f/p_g)_2 \tag{6-51}$$

This is the operational equivalent concept that Fisher and Frisch could not develop earlier. Total utility is obtained by integration. This brings in an arbitrary constant which determines the zero point.

Fellner recognizes the imperfection of his method when he says that no statistical manipulation can make measured real income serve as an impeccable representative of any given level of utility. This is more so when he treats consumers with the same real income at different relative prices. These consumers are not at the same utility level as they would have to be for a precise operational theory.

The empirically (operational) concept that Fellner uses to obtain the money flexibility is another elasticity. He constructs a function that describes the dependence of the real income at which a specific quantity of food is consumed on the relative price of food.

$$r_c = f(p_f/p_g) \tag{6-52}$$

where r_c is the real income leading to constancy of food consumption at some level c. The elasticity concept that Fellner uses refers to this function. It can be expressed as

$$e_{pr} = d \ln r_c / d \ln (p_f/p_g) \tag{6-53}$$

Then the basic conception of the method is the inverse relation between this elasticity (e_{pr}) and the income elasticity of the marginal utility of money (E_λ) for the small income range at which food consumption is at level c. In Fellner's words, this is so because if along a locus involving a specific range of relative food prices income is adjusted to keep food consumption constant, then along the constant food locus the marginal utility of income is changing in the same proportion as that in which (p_f/p_g) is changing. Then the corresponding change in income tells us in what proportion income must change to lead to that change in the marginal utility of income.

Then, the method would consist of (1) selection of the cities with household budget information and corresponding relative prices for food; (2) construction of Engel curves that regress food consumption on real income for each city, as it was discussed in previous section; (3) computation of real incomes which in each city correspond to the food consumption levels selection; (4) construction of functions that relate the real income for each food consumption level and the relative price of food; (5) estimation of the elasticity of this last function; and (6) estimation of money flexibility as an inverse relation of elasticity estimated in (5).

The Want Elasticities

This is a concept defined by Frisch (23). It was derived before as relation (6-22)

$$x_{ij} = (\partial q_i/\partial u_j)(u_j/q_i) = (\partial q_i/\partial p_j)(p_j/q_i)$$

under the condition that all other prices and the marginal utility of money are kept constant. This is also the elasticity associated with the specific substitution effect. It is important because of its direct association with the concept of want-dependency. Deaton (13) has shown that the assumption of want-independent goods is very popular and abused in applied demand analysis. It implies a diagonal Hessian U matrix or additive utility function. This assumption has been used before for the derivation of money flexibility. It was acceptable in that case because the household budget was divided between food and nonfood, two aggregated commodities. It is not acceptable among the components of food.

Frisch (23) has also defined his "utility acceleration" as the elasticity of the marginal utility of one good with respect to the consumption of another good.

$$u'_{ij} = (\partial u_i/\partial q_j)(q_j/u_i) = (\partial^2 u/\partial q_j \partial q_i)(q_j/u_i) \qquad (6\text{-}54)$$

Relation (6-3) and the variable m_j, which indicates the amount spent on commodity j ($m_j = p_j q_j$) permit one to rewrite the last equation as follows

$$u'_{ij} = (\partial^2 u/\partial m_j \partial m_i)(m_j/\lambda) = u_{ij}(m_j/\lambda) \qquad (6\text{-}55)$$

Frisch has shown that there is a unique relation between the want elasticity and the utility acceleration. In order to do this, he starts from the function of marginal utility

$$u_i = u_i(q_1,\ldots,q_n) \qquad (6\text{-}56)$$

Its inverse function is denoted as

$$q_i = q_i(u_1,\ldots,u_n) \qquad (6\text{-}57)$$

Then he proceeds to differentiate u_i with respect to u_j on the assumption that each of the arguments of u_i is an inverse function

$$\partial u_i/\partial u_j = (\partial u_i/\partial q_1)(\partial q_1/\partial u_j) + \ldots + (\partial u_i/\partial q_n)(\partial q_n/\partial u_j)$$

$$(\partial u_i/\partial u_j)(u_j/u_i) = (\partial u_i/\partial q_1)(q_1/u_i)(\partial q_1/\partial u_j)(u_j/q_1) + \ldots$$

$$(\partial u_i/\partial u_j)(u_j/u_i) = u'_{i1} \cdot x_{1j} + u'_{i2} \cdot x_{2j} + \ldots + u'_{in} \cdot x_{nj}$$

$$\delta_{ij} = \sum_{k=1}^{n} u'_{ik}x_{kj} = \begin{matrix} 1 \text{ if } i = j \\ 0 \text{ if } i \neq j \end{matrix} \tag{6-58}$$

This relation shows that u'_{ik} is the inverse of the matrix x_{ki}. Therefore, the effort will be concentrated on the generation of matrix u'_{ik}. Once this is done, its inversion will allow one to obtain matrix x_{ki}.

In order to generate the matrix u'_{ij}, it is necessary to use Frisch's relation 42 in (23) between u'_{ij} and two elasticities already discussed in this chapter, income elasticities and money flexibility. The differentiation of relation (6-3), the first-order conditions of constrained utility maximization, is the starting point. If (6-56) is kept in mind

$$\partial u_i/\partial m = \sum_j (\partial u_i/\partial q_j)(\partial q_j/\partial m)$$

Then from relation (6-3) one gets

$$\sum_j (\partial u_i/\partial q_j)(\partial q_j/\partial m) = (\partial\lambda/\partial m)p_i$$

$$\sum_j (\partial u_i/\partial q_j)(q_j/u_i)(\partial q_j/\partial m)(m/q_j) = (\partial\lambda/\partial m)(m/u_i)p_i$$

Relation (6-54) together with (6-30) and (6-24) transform the last expression into Frisch's relation 42 in (23).

$$\sum_{j=1}^{n} u'_{ij}E_j = E_\lambda \qquad i = 1(1)n \tag{6-59}$$

In matrix notation, relation (6-59) looks like

$$\begin{bmatrix} u'_{11} & u'_{12} & \cdots & u'_{1n} \\ u'_{21} & u'_{22} & \cdots & u'_{2n} \\ \vdots & \vdots & & \vdots \\ u'_{n1} & u'_{n2} & \cdots & u'_{nn} \end{bmatrix} \begin{bmatrix} E_1 \\ E_2 \\ \vdots \\ E_n \end{bmatrix} = \begin{bmatrix} E_\lambda \\ E_\lambda \\ \vdots \\ E_\lambda \end{bmatrix} \tag{6-60}$$

Bussink (6) has suggested that this system of n relations is solved if all u'_{ij} could be expressed in the n diagonal elements u'_{ii}. Barten's (3) approach to conditions of almost additive preferences inspired Bussink's substitutability factor. Instead of establishing Barten's semi-bilinear relation between elasticities, Bussink establishes the link between changes in marginal utility u_{ij}

$$u_{ij} = s_{ij}\sqrt{u_{ii} + u_{jj}} \approx \tfrac{1}{2}s_{ij}(u_{ii} + u_{jj}) \tag{6-61}$$

where s_{ij} is Bussink's substitutability factor $(-1 \leq s_{ij} \leq 1)$. If two goods are perfect substitutes, u_{ij} will be equal to u_{ii} and $s_{ij} = 1$. If two goods are not related, u_{ij} will be zero and $s_{ij} = 0$.

Relation (6-61) is replaced in (6-55) in order to get u'_{ij} expressed in terms of the diagonal elements of the matrix

$$u'_{ij} = (s_{ij}u'_{ii}a_j + s_{ij}u'_{jj}a_i)/2a_i \tag{6-62}$$

Then (6-62) can be replaced in (6-60) and solved for the diagonal values.

$$\begin{bmatrix} u'_{11} & (s_{12}u'_{11}a_2+s_{12}u'_{22}a_1)/2a_1 & \cdots \\ (s_{21}u'_{22}a_1+s_{21}u'_{11}a_2)/2a_2 & u'_{22} & \cdots \\ \vdots & \vdots & \vdots \\ (s_{n1}u'_{nn}a_1+s_{n1}u'_{11}a_n)/2a_n & (s_{n2}u'_{nn}a_2+s_{n2}u'_{22}a_n)/2a_n & \cdots \end{bmatrix} \begin{bmatrix} E_1 \\ E_2 \\ \vdots \\ E_n \end{bmatrix} = \begin{bmatrix} E_\lambda \\ E_\lambda \\ \vdots \\ E_\lambda \end{bmatrix} \tag{6-63}$$

This system of equations can be reordered as follows

$$\begin{bmatrix} E_1+\sum_{j\neq 1} E_j(s_{1j}a_j)/2a_1 & E_2(s_{12}/2) & \cdots & E_n(s_{1n}/2) \\ E_1(s_{21}/2) & E_2+\sum_{j\neq 2} E_j(s_{2j}a_j)/2a_2 & \cdots & E_n(s_{2n}/2) \\ \vdots & \vdots & & \vdots \\ E_1(s_{n1}/2) & E_2(s_{n2}/2) & \cdots & E_n+\sum_{j\neq n} E_j(s_{nj}a_j)/2a_n \end{bmatrix} \begin{bmatrix} u'_{11} \\ u'_{22} \\ \vdots \\ u'_{nn} \end{bmatrix} = \begin{bmatrix} E_\lambda \\ E_\lambda \\ \vdots \\ E_\lambda \end{bmatrix} \qquad (6\text{-}64)$$

Relation (6-64) allows one to get the values for u_{ii} in terms of budget shares, income elasticities, money flexibility, and substitutability factors. Finally, the matrix u'_{ij} can be expressed in terms of these elements. This will permit the estimation of the matrix of want elasticities.

$$\begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nn} \end{bmatrix} = \begin{bmatrix} u'_{11} & (s_{12}u'_{11}a_2+s_{12}u'_{22}a_1)/2a_1 & \cdots \\ (s_{21}u'_{22}a_1+s_{21}u'_{11}a_2)/2a_2 & u'_{22} & \cdots \\ \vdots & \vdots & \\ (s_{n1}u'_{nn}a_1+s_{n1}u'_{11}a_n)/2a_n & (s_{n2}u'_{nn}a_2+s_{n2}u'_{22}a_n)/2a_n & \cdots \end{bmatrix}^{-1} \qquad (6\text{-}65)$$

The Price Elasticities of Demand

The three preceding sections have discussed the basic elements of relation (6-28)

$$e_{ij} = x_{ij} - (E_j/E_\lambda)E_i a_j - E_i a_j \qquad i,j = 1(1)n \qquad (6\text{-}28)$$

As was said before, this relation is used to estimate the price elasticities of demand from household surveys. In order to facilitate the calculations, relation (6-28) will be rewritten in a slightly different form.

Relation (6-58) can be used in order to present relation (6-59) as follows.

$$E_i = E_\lambda \sum_j x_{ij} = E_\lambda x_{i.} \qquad i = 1(1)n \qquad (6\text{-}66)$$

Frisch (23) has shown that

$$a_i x_{ij} = a_j x_{ji} \qquad (6\text{-}67)$$

He has also defined the "horizontal want aggregation" and the "vertical want aggregation" as

$$x_{i.} = \sum_{j=1}^{n} x_{ij} \qquad i = 1(1)n \qquad (6\text{-}68)$$

$$x_{.j} = \sum_{i=1}^{n} a_i x_{ij} \qquad j = 1(1)n \qquad (6\text{-}69)$$

respectively. Relation (6-67), (6-68), (6-69) can be combined as follows

$$x_{.j} = a_j x_{j.} \qquad j = 1(1)n \qquad (6\text{-}70)$$

Relations (6-66) and (6-70) can be used in order to get

$$E_j a_j = E_\lambda x_{.j} \qquad (6\text{-}71)$$

Then, relation (6-69) helps to rewrite (6-71) as

$$(E_j/E_\lambda)a_j = \sum_i a_i x_{ij} \qquad (6\text{-}72)$$

Relation (6-72) allows one to rewrite relation (6-28)

$$e_{ij} = x_{ij} - (\sum_i a_i x_{ij})E_i - a_j E_i \qquad i,j = 1(1)n \qquad (6\text{-}73)$$

The matrix representation of relation (6-73) would be

$$\begin{bmatrix} e_{11} \cdots e_{1n} \\ \vdots \quad\quad \vdots \\ e_{n1} \cdots e_{nn} \end{bmatrix} = \begin{bmatrix} x_{11} \cdots x_{1n} \\ \vdots \quad\quad \vdots \\ x_{n1} \cdots x_{nn} \end{bmatrix} - \begin{bmatrix} E_1 \cdots 0 \\ \ddots \quad \vdots \\ 0 \cdots E_n \end{bmatrix} \left(\begin{bmatrix} a_1 \cdots a_n \\ \vdots \quad\quad \vdots \\ a_1 \cdots a_n \end{bmatrix} \begin{bmatrix} x_{11} \cdots x_{1n} \\ \vdots \quad\quad \vdots \\ x_{n1} \cdots x_{nn} \end{bmatrix} + \begin{bmatrix} a_1 \cdots a_n \\ \vdots \quad\quad \vdots \\ a_1 \cdots a_n \end{bmatrix} \right) \qquad (6\text{-}74)$$

which will help the empirical estimation of the matrix of a complete set of price elasticities of demand. Relations (6-64) and (6-65) outline the operational procedure for the estimation of the matrix (x_{ij}).

CHAPTER 7. EMPIRICAL ESTIMATION OF CONSUMERS' REACTION FUNCTIONS

This chapter presents estimates of the different components of the consumers' reaction functions. This is done with the help of the information collected by the Peruvian national consumption survey (ENCA). Some of the characteristics of this survey are discussed as well as the procedure followed to organize the information for this research.

A few summary tables are presented to show the composition of the food basket and the proportion of the household budget spent on food. Engel curves are estimated and compared to similar estimates made by the Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA). The estimates of money flexibility are presented in some detail; their shortcomings and possibilities for improvement are also discussed. Then a complete set of price elasticities for selected agricultural products is estimated. Some experiments showing the impact of the want-dependence assumption and different values of money flexibility are presented.

Finally the construction and use of the consumers' reaction functions at the regional level are presented. Complete numerical results are included in Appendix C.

National Food Consumption Survey

The Peruvian national food consumption survey (ENCA) was a national household and consumption survey. Perú was divided in nine regions, termed ENCA sectors. First, the country was divided in relatively homogeneous areas, North, Central, South, and East (Jungle). Then each area was divided in ecological sub-areas. North, Central, and South were divided in

Coast and Sierra. The Jungle was divided in High Jungle and Low Jungle. Because of the importance of the capital, Metropolitan Lima was considered a separate sector. Therefore, the ENCA sectors are: North Coast, North Sierra, Central Coast, Central Sierra, South Coast, South Sierra, High Jungle, and Low Jungle.

The size of the total sample was estimated at a sample ratio of 3/1000. Peru's population in 1970 was estimated to be 13,613,510 inhabitants. A family size of 5.6 members was assumed. Then a 3/1000 ratio gave 7,293 sample families. A total sample of 8,000 households was selected. The distribution among ENCA sectors was proportionally to population. It was recommended that the minimum sample size for each sector should be 600 households. A readjustment was made to satisfy this restriction. This is shown in Table 7-1.

Table 7-1. Distribution of households of the sample by ENCA sectors[a]

ENCA sectors	Population 1970	Families 1970	% families 1970	Proportional distribution	Adjusted distribution
11 North Coast	1,889,030	337,330	13.5	1,080	889
12 North Sierra	2,147,770	383,530	15.4	1,232	1,010
21 Central Coast	599,000	106,980	4.3	344	607
22 Central Sierra	2,144,760	382,990	15.4	1,232	1,009
31 South Coast	565,090	100,910	4.1	328	700
32 South Sierra	2,316,290	413,620	16.6	1,328	1,089
41 High Jungle	675,760	120,670	4.8	384	650
42 Low Jungle	528,900	94,450	3.8	304	600
50 Metropolitan Lima	2,746,820	549,360	22.1	1,768	1,446
Total	13,613,510	2,489,840	100.0	8,000	8,000

[a]ENCA (16).

Each ENCA sector was divided in three strata. The first was composed of large cities with the following characteristics: (1) for Central Coast and High Jungle, those cities with a 1970 population of 25,000 inhabitants and over; (2) for South Coast and Low Jungle, those cities with a 1970 population of 19,000 inhabitants and over; and (3) for all other sectors, those cities with a 1970 population of 50,000 inhabitants and over. The second was formed by those towns with a lower limit of over 2,000 inhabitants and an upper limit set by that indicated for large cities in each sector. The third stratum corresponded to rural areas with 2,000 inhabitants and under.

The technical aspects of the sample design are presented in ENCA (16). In short, it can be said that the sample had a multistage probabilistic design. The selection of the primary sampling units (UPM's) as well as the secondary sampling units (USMs) was made with probabilities proportional to their size. The size for the first stage was given by the 1970 population. The sample ratio for each stratum was the same as the sector shown in Table 7-1. All the UPMs of the first stratum (large cities) entered the sample. The UPMs of the other two stratum were selected systematically. The USMs were selected within each UPM chosen. These USMs were blocks of urban houses with at least four houses in the first two strata and groups of houses of at least 80 rural houses in the last stratum. The terciary sampling units (UTMs) were chosen from each USM selected. These UTMs were houses where the survey was conducted.

Table 7-2 shows the number of families actually surveyed by ENCA sector-stratum combination. Each of these families was interviewed during a week. Every day of the week the food that each family consumed, whether

Table 7-2. Number of families with ENCA information by sector-stratum combination

Sectors	Strata: Large cities 1	Towns 2	Rural areas 3	Total sector
11 North Coast	276	260	299	835
12 North Sierra	0	70	854	924
21 Central Coast	32	286	219	537
22 Central Sierra	31	178	700	909
31 South Coast	261	147	287	695
32 South Sierra	217	115	776	1,108
41 High Jungle	0	130	502	632
42 Low Jungle	132	22	405	559
50 Metropolitan Lima	1,488	0	0	1,488
Total	2,437	1,208	4,042	7,687

purchased or produced at home, was weighed and recorded. Money spent for food and nonfood items, as well as service expenses, was registered. There were other data collected that referred the last month's expenses (housing, fuel, different types of services). There also was information collected on expenses during the previous year (clothes, furniture, education, medical bills, etc.). All this was complemented by general information about each family.

The present study used this data on a yearly per capita basis. Since the consumption was in terms of final products, it was transformed into primary products. This was done with the help of a study conducted by the Policy Analysis Office of the Agricultural Planning Office (OAPA-OSPA). This study focuses on main agricultural products. Their transformation was analyzed first qualitatively and then their proportion in final products was quantified. Therefore, the ENCA information was put in terms that allowed us to conduct the type of analysis described in the last chapter.

Consumers' Food Baskets and Budget Shares

The definition of consumers' baskets has been based on budget shares and amount consumed of each product. All products with budget shares of 2% and over or a consumption of 10 kilograms per year and over were selected. Later, all strata in each sector were homogenized.

Tables 7-3 to 7-5 show the variety of products that enter the food basket for each region (ENCA sector-stratum combinations). There are 29 products that satisfied the restriction. It is also interesting to observe that each of the 23 regions considered has a different food basket composition.

Metropolitan Lima (ENCA sector 50), together with the towns that are relatively close to it (ENCA sector 21 Central Coast), consumes the largest variety of products. On the other hand, the towns in the South Sierra (ENCA sector 32, stratum 2), together with the rural areas in the Low Jungle (ENCA sector 42, stratum 3), consume the smallest variety of products. Less than 30% (eight products) of all the products considered enter the food basket of those regions.

These tables also show that wheat, sugar, and pork are the only products that enter the food baskets of all regions. Milk does not appear in the food baskets of two regions, towns of the South Sierra (ENCA sector 32, stratum 2) and rural areas of Low Jungle (ENCA sector 42, stratum 3). Rice and potatoes are lacking in food baskets of three regions, while beef is lacking in four. Rice is not commonly consumed in the rural areas of

Table 7-3. Consumers' food basket in large cities (ENCA stratum 1)

Products	North Coast 11-1	Central Coast 21-1	Central Sierra 22-1	South Coast 31-1	South Sierra 32-1	Low Jungle 42-1	Metro-politan Lima 50
01 Rice	X	X	X	X	X	X	X
03 White corn							
04 Sweet corn			X				
06 Wheat	X	X	X	X	X	X	X
07 Barley							
08 Quinua							
11 Sweet potatoes		X					
13 Potatoes	X	X	X	X	X		X
14 Manioc						X	
16 Oca							
17 Sugar	X	X	X	X	X	X	X
19 Dried peas							
21 Beans							
23 Lima beans							
25 Broad beans							
27 Soy beans	X	X	X	X	X		X
31 Oranges							X
33 Bananas	X		X			X	X
44 Tomatoes		X	X				X
48 Onions		X	X	X			X
49 Carrots			X				X
58 Lamb		X			X		
59 Pork	X	X	X	X	X	X	X
60 Beef	X	X	X	X	X	X	X
62 Chicken	X	X		X		X	X
66 Game							
70 Milk	X	X	X	X	X	X	X
76 Cotton seed	X	X	X	X		X	X
90 Fish	X	X		X			X

Central Sierra (ENCA sector 22, stratum 3), towns, and rural areas of South Sierra (ENCA sector 32, strata 2 and 3). Potatoes do not enter the food basket of the three strata (large cities, towns, and rural areas) of the Low Jungle (ENCA sector 42, strata 1, 2, and 3). Beef does not enter the

Table 7-4. Consumers' food basket in towns (ENCA stratum 2)

Products	North Coast 11-2	North Sierra 12-2	Central Coast 21-2	Central Sierra 22-2	South Coast 31-2	South Sierra 32-2	High Jungle 41-2	Low Jungle 42-2
01 Rice	X	X	X	X	X		X	X
03 White corn			X	X		X		
04 Sweet corn								
06 Wheat	X	X	X	X	X	X	X	X
07 Barley						X		
08 Quinua								
11 Sweet potatoes								
13 Potatoes	X	X	X	X	X	X	X	
14 Manioc	X						X	X
16 Oca								
17 Sugar	X	X	X	X	X	X	X	X
19 Dried peas								
21 Beans							X	
23 Lima beans						X		
25 Broad beans								
27 Soy beans	X		X	X	X			
31 Oranges								X
33 Bananas	X		X				X	X
44 Tomatoes			X					
48 Onions			X					
49 Carrots								
58 Lamb		X		X		X		
59 Pork	X	X	X	X	X	X	X	X
60 Beef	X	X	X		X		X	X
62 Chicken			X				X	X
66 Game								
70 Milk	X	X	X	X	X		X	X
76 Cotton seed	X	X	X		X			
90 Fish	X		X					

food basket of rural areas of North and Central Sierra (ENCA 12-3 and 22-3), towns of Central and South Sierra (ENCA 22-2 and 32-3). Therefore, there are seven products (wheat, pork, sugar, milk, rice, potatoes, and beef) which play a major role in the diet of Peruvian people.

Table 7-5. Consumer's food basket in rural areas (ENCA stratum 3)

Products	North Coast 11-3	North Sierra 12-3	Central Coast 21-3	Central Sierra 22-3	South Coast 31-3	South Sierra 32-3	High Jungle 41-3	Low Jungle 42-3
01 Rice	X	X	X		X		X	X
03 White corn		X	X	X		X		
04 Sweet corn		X		X				
06 Wheat	X	X	X	X	X	X	X	X
07 Barley		X				X		
08 Quinua						X		
11 Sweet potatoes			X					
13 Potatoes	X	X	X	X	X	X	X	
14 Manioc	X	X					X	X
16 Oca						X		
17 Sugar	X	X	X	X	X	X	X	X
19 Dried peas		X						
21 Beans							X	
23 Lima beans						X		
25 Broad beans					X			
27 Soy beans	X		X		X		X	
31 Oranges								
33 Bananas	X	X					X	X
44 Tomatoes								
48 Onions					X			
49 Carrots								
58 Lamb				X		X		
59 Pork	X	X	X	X	X	X	X	X
60 Beef	X		X		X	X	X	
62 Chicken			X				X	X
66 Game								X
70 Milk	X	X	X	X	X	X	X	
76 Cotton seed	X		X		X			
90 Fish	X		X		X			

Tables C-1 to C-32 permit one to give a quantitative view of the relative importance of the products in the food basket of each region. It can be seen that in the food basket for Metropolitan Lima milk, potatoes, and wheat enter in larger quantities than the rest. Milk enters with 175 kgs/per capita/year, potatoes enter with 44 kgs/per capita/year, and wheat enters with 41 kgs/per capita/year. For the rest of the Coast, large quantities of milk, wheat, and rice are consumed. For the Sierra, potatoes, wheat, and white corn enter the food basket in large quantities. Two hundred twenty-nine kilograms of potatoes are consumed per capita per year in rural areas of the South Sierra. For the Jungle, bananas and manioc are the most important food stuffs.

A more concise picture can be obtained from Table 7-6. The summary presented in this table is an average over the three strata of most of the sectors other than Metropolitan Lima which is an average over the ten income strata. This table is helpful in the sense that it also presents the consumption of those products that are important for other regions. This serves as a comparison. It also has the percentage of population that lives in each of these regions.

It can be seen that seven products are the ones that are consumed in larger quantities. Rice, wheat, potatoes, and milk are the only ones that were indicated before as the seven most common products in the diet of the Peruvians. Sugar, pork, and beef are not consumed in relatively large quantities, although they, as was shown before, are present in almost all food baskets. They are dominated by white corn, manioc, and bananas. The last two are extremely important in the diet of the Peruvians that live in the jungle area.

It is important to indicate that the South Sierra is the region with the highest population outside Lima. The only product which they consumed in quantities above the national average is potatoes. Consumption of other products is below the national average with the exception of white corn. If this region is compared with other Sierra regions, it can be said that

Table 7-6. Average per capita consumption in kgs/year of the three products with higher consumption in each ENCA sector and national average together with percentage of population for each sector

Products	North Coast 11	North Sierra 12	Central Coast 21	Central Sierra 22	South Coast 31	South Sierra 32	High Jungle 41	Low Jungle 42	Metro-politan Lima 50	National average
01 Rice	46	(16)[a]	(38)	(9)	(29)	(5)	(25)	20	(33)	23
03 White corn	(4)	32	(7)	(27)	(2)	(23)	(5)	(1)	(2)	14
06 Wheat	32	40	53	39	51	24	(26)	(17)	45	36
13 Potatoes	(25)	103	42	147	41	179	31	(5)	47	85
14 Manioc	(11)	(17)	(4)	(2)	(5)	(1)	71	65	(4)	12
33 Bananas	(14)	(12)	(8)	(4)	(7)	(2)	127	89	(14)	19
70 Milk	42	(28)	60	32	76	27	(30)	(13)	96	50
Population %	14.48	13.64	2.55	14.56	4.25	16.28	6.02	3.83	24.39	100.00

[a] Numbers in parentheses mean consumption of products that are important for other regions.

its consumption is below all of theirs for all products with the exception of potatoes.

Tables 7-7 and 7-8 show how food budget shares and total expenditure move in opposite directions. Families with higher incomes (higher total expenditure) have lower food budget shares. Rural areas, in general, have the lowest incomes and the highest food budget shares within each ENCA sector.

Income Elasticities of Demand

As was shown in the last chapter, there are several decisions to be made before income elasticities can be estimated. Two major problems have been discussed. The first one refers to the variables to be considered. The availability of information restricted these estimations to consideration of only total expenditures (Y) and consumption (Q) in per capita terms. The former is expressed in "soles" per year ("sol" is the Peruvian monetary unit) and the latter in kilograms. The second major problem concerns the functional form. The power transformation approach discussed in the last chapter was used in this study.

$$(Q^{\lambda} - 1)/\lambda = a + b((Y^{\lambda} - 1)/\lambda)$$

A detailed study of income elasticities was also conducted by the Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA). They have experimented with five different functional forms: linear, double-log, semi-log, log-inverse, and inverse. This study chose those functions which presented the highest R^2 of the five. Table 7-9 compares some of the OAPA-OSPA preliminary results with some of the author's for one of the ENCA sector-stratum combinations.

Table 7-7. Food budget shares and total expenditures for ten income strata for Metropolitan Lima (ENCA 50)

	50-1	50-2	50-3	50-4	50-5	50-6	50-7	50-8	50-9	50-10
Food budget share	.6438	.6278	.5515	.5775	.5169	.4574	.4544	.3475	.2696	.2037
Total expenditure	6,629	8,582	10,402	11,622	12,876	16,813	18,780	22,607	28,074	50,532

Table 7-8. Food budget shares and total expenditures for all ENCA sector-stratum combination other than Metropolitan Lima

	Food budget share			Total expenditure		
				Large cities	Towns	Rural areas
Sectors	1	2	3	1	2	3
11 North Coast	.5279	.5511	.6301	9,976	8,712	5,818
12 North Sierra	--	.5972	.6844	--	6,797	4,286
21 Central Coast	.5634	.5569	.6360	11,378	12,728	8,325
22 Central Sierra	.5373	.5588	.5860	11,591	8,852	4,974
31 South Coast	.5123	.4953	.6164	11,283	13,136	7,440
32 South Sierra	.4461	.6882	.6844	8,924	4,037	4,423
41 High Jungle	--	.4819	.5132	--	8,314	7,672
42 Low Jungle	.4604	.4420	.5146	10,100	6,959	3,811

As was explained in the last chapter, the power transformation with $\hat{\lambda} = 0$ is equivalent to the double-log function while $\hat{\lambda} = 1$ is equivalent to the linear function. Table 7-9 shows that the OAPA-OSPA study used a double-log function for the estimation of income elasticities for potatoes, bananas, pork, and milk. The author's results show that the maximum likelihood for the functions for these products does not correspond to $\hat{\lambda} = 0$. The OAPA-OSPA study used linear functions for the estimation of income elasticities for manioc, beef, and fish. The author's results show that the maximum likelihood for the functions of these products does not correspond to $\hat{\lambda} = 1$ either. It should be noted that there are some significant differences in the estimates of some of the income elasticities.

The power transformation approach is a more general procedure. It allows "the data to determine the shape of the function," so to speak. It does not force the data into a predetermined function. On the other hand, the statistical criteria for judging the comparative analysis of

Table 7-9. A comparison of income elasticities for ENCA 11-3 with different functional forms for Engel curves

	QAPA-QSPA estimates				Author estimates				
Products	Income elasticity	Functional form	R^2	MSE	Income elasticity	$\hat{\lambda}$	R^2	$t_{\hat{b}}$	MSE
06 Wheat	.2070	Log.-Inv.	.4675	5.3870 E+03	.6784	-0.01	.9384	11.04	1.7635 E-02
13 Potatoes	2.2158	D.-Log.	.1493	9.4750 E-02	.8212	0.10	.8205	6.05	1.6777 E-01
14 Manioc	.6318	Linear	.0515	1.3600 E-07	.4207	0.10	.3242	1.96	3.6754 E-01
17 Sugar	.2404	Log.-Inv.	.3990	9.6080 E+03	.4051	-1.71	.9851	23.01	8.8364 E-08
33 Bananas	1.4902	D.-Log.	.0564	1.2580 E-01	.8220	-1.03	.8082	5.81	1.0067 E-03
59 Pork	1.6236	D.-Log.	.3019	2.6040 E-02	.8920	0.65	.8987	8.42	2.2460 E+00
60 Beef	.9778	Linear	.2278	1.5880 E-08	1.1389	0.40	.8181	6.00	7.5626 E-01
70 Milk	2.3131	D.-Log.	.1175	1.3610 E-01	1.4231	-0.44	.8923	8.23	1.5854 E-02
76 Cotton seed	.1828	Log.-Inv.	.0768	4.4380 E+04	.7617	1.66	.9753	17.75	2.1309 E+02
90 Fish	.6668	Linear	.0625	1.2060 E-07	.8500	-0.02	.8606	7.03	6.6040 E-02

predetermined curves could be misleading. The coefficient of correlation, R^2, is a measure of the degree of association between variables. Its value does not indicate the pattern of deviations from the fitted regression.

In this type of study, the variance of the estimate of the regression coefficient is more important. The criterion for judging the analysis should be the accuracy of its measurement. It is closer to the purpose of the analysis. In the power transformation approach adopted in this case, it is the data which give the value of $\hat{\lambda}$ that corresponds to the maximum likelihood of the function. Then, R^2 and the t value for $\hat{b}$ are estimated for the function generated by the maximum likelihood procedure. These results are presented in Tables C-33 to C-64 in Appendix C.

Money Flexibility

As was indicated in the last chapter, the first step relates to the estimation of the Engel curves for food for different cities. Table 7-10 shows the characteristics of food Engel curves for ENCA large cities. The power transformation used in the last section for the estimation of income elasticities was used for the generation of the food Engel curves. Then the real total expenditures were computed which, in each city, corresponded to the food consumption levels of \$3,981, \$4,707, \$5,432, \$6,158, and \$6,883 (in "soles").

The relation used to obtain the Engel curves is transformed in order to get the values of total expenditure for each predetermined value of consumption as follows

$$Y = ((\hat{\lambda}/\hat{b})(((Q^{\hat{\lambda}} - 1)/\hat{\lambda}) - \hat{a}) + 1)^{1/\hat{\lambda}}$$

Table 7-10. Food Engel curves for some ENCA large cities

ENCA sectors	$\hat{\lambda}$	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$	R^2	MSE
11 North Coast	-.19	.8648	.7761	28.95	.753	.0031
22 Central Sierra	-.07	1.5783	.7238	11.36	.816	.0137
31 South Coast	-.56	.3469	.8023	20.69	.623	5.E-06
32 South Sierra	.13	5.5660	.5370	14.96	.510	1.86
42 Low Jungle	-.33	1.0417	.6261	12.14	.531	4.E-04
50 Metropolitan Lima	.13	9.6154	.3540	24.90	.294	1.9003

These levels of total expenditure (Y) were regressed on the relative prices of food. This gave us five regressions. The observations were first plotted, then the linear and double-log relations were fitted,

$$Y^* = a + b\ P_f^* \qquad \ln Y^* = a + b\ \ln P_f^*$$

where Y^* and P_f^* correspond to real total expenditure and relative prices of food. The results are presented in Table 7-11. It is interesting to notice that the value of the money flexibility (E_λ) increases (decreases in absolute value) as the predetermined levels of consumption increase. Before more can be said, different levels of predetermined values of consumption should be tried. They should correspond to each regional average. It is necessary to use better information for general price levels. This could increase the number of observations. These extensions are not difficult to carry over. The most difficult information to obtain, accurate information on food prices, is presented in Tables C-1 to C-32.

Table 7-11. Values of regression used for estimation of money flexibility (E_λ)

	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$	R^2	E_λ
Linear 1	3,904	2,343	2.65	.778	-3.12
Double-log 1	8.733	.3157	2.66	.780	-3.17
Linear 2	4,327	4,036	4.54	.912	-2.37
Double-log 2	9.026	.4229	4.75	.919	-2.36
Linear 3	4,650	6,176	1.62	.566	-1.96
Double-log 3	9.283	.5096	1.68	.588	-1.96
Linear 4	4,862	8,810	1.07	.366	-1.70
Double-log 4	9.513	.5799	1.11	.382	-1.72
Linear 5	4,956	11,992	.83	.258	-1.53
Double-log 5	9.721	.6365	.85	.267	-1.57

For the purpose of this work, a figure close to the average level of consumption would be an income elasticity of the marginal utility of money or money flexibility of minus two ($E_\lambda = -2$). This value will be used for all regions.

Price Elasticities of Demand

It was shown in the last chapter that in order to estimate the complete set of price elasticicies, all that were needed were budget shares (Tables C-1 to C-32), income elasticities (Tables C-33 to C-64), money flexibility ($E_\lambda = -2$), and the substitutability matrices.

The substitutability matrices have been constructed based on a study of different patterns of consumption both in terms of different food baskets and typical regional menus. The products were grouped by common uses. Each group shows strong substitutability and/or complementarity. The values assigned range from -.4 for highly substitutable products to .2 for strong complements, with zero for those with no relation. This gives one block diagonal matrices. Then the off-diagonal combinations were studied, and some of them were given a value different from zero. Tables C-65 to C-73 show these matrices. They can be improved with the monthly information that the Food Ministry is collecting in selected cities based on a sub-sample of ENCA's sample.

All of this information is used according to the procedure described in the last chapter to obtain the complete set of price elasticities shown in Tables C-74 to C-105.

Experiments were conducted to show the impact of different values of money flexibility and different coefficients of substitutability. Tables 7-12 and 7-13 show the effect of changing the matrix of substitutability. Table 7-13 uses an identity matrix which is equivalent to the assumption of "want-independence." A comparison of price elasticities in these two tables shows: (1) the assumption of want-dependence increases the absolute value of cross-price elasticities; (2) there is not a definite pattern in terms of own price elasticities. Tables 7-14 and 7-15 show the effect of money flexibility. It can be said that the higher its absolute value, the lower the absolute value of the elasticities.

Consumers' Reaction Functions

The consumers' reaction functions are built with the price and income elasticities presented in previous sections as shown in Table 7-16. The first row of the matrix can be written as follows

$$q_{01} = -.192p_{01} + .031p_{06} - .002p_{11} + .001p_{13} - .014p_{17} + .455y$$

Table 7-12. Reduced matrix of price elasticities for sixth income stratum Metropolitan Lima ($E_\lambda = -2$, $S \neq I$)

Products	01	06	11	13	17
01 Rice	-.097	.020	-.007	-.014	-.014
06 Wheat	.017	-.052	-.001	.001	-.002
11 Sweet potatoes	-.084	-.014	1.116	-.193	.006
13 Potatoes	-.009	-.001	-.015	.027	-.005
17 Sugar	-.004	-.012	.000	-.005	-.141

Table 7-13. Reduced matrix of price elasticities for sixth income stratum Metropolitan Lima ($E_\lambda = -2$, $S = I$)

Products	01	06	11	13	17
01 Rice	-.233	-.015	-.001	-.007	-.004
06 Wheat	-.001	-.039	.000	-.001	-.002
11 Sweet potatoes	.003	.007	.102	.003	.006
13 Potatoes	-.002	-.005	.000	-.079	-.005
17 Sugar	-.004	-.012	.000	-.005	-.181

where each variable is expressed in percentage changes. The variables p_{01}, p_{06}, p_{11}, p_{13}, and p_{17} represent percentage changes in the prices of the corresponding products at the retail level. A specific combination of them represents a specific price policy. The variable y represents percentage change in "income." It could be interpreted as the expression of an income or wage policy. The variable q_{01} represents the percentage change in the

Table 7-14. Reduced matrix of price elasticities for sixth income stratum of Metropolitan Lima (E_λ = -1.5, S ≠ I)

Products	01	06	11	13	17
01 Rice	-.127	.032	-.009	-.017	-.013
06 Wheat	.023	-.068	-.001	.002	-.002
11 Sweet potatoes	-.114	-.021	1.488	-.258	.006
13 Potatoes	-.012	.000	-.021	.037	-.004
17 Sugar	-.004	-.011	-.001	-.005	-.184

Table 7-15. Reduced matrix of price elasticities for sixth income stratum of Metropolitan Lima (E_λ = -2.5, S ≠ I)

Products	01	06	11	13	17
01 Rice	-.079	.013	-.006	-.013	-.015
06 Wheat	.013	-.042	.000	.001	-.002
11 Sweet potatoes	-.067	-.010	.893	-.154	.007
13 Potatoes	-.008	-.002	-.012	.021	-.005
17 Sugar	-.005	-.012	.000	-.005	-.116

quantity demanded of product 01 (rice) as a reaction to the changes in the independent or policy variables.

It might be imagined that the government could decide to increase the official price of rice and potatoes at the retail level. The price of rice is increased by 1.5% while the price of potatoes is increased by 2%. At the same time, the government decreed an increase in wages of 1%.

Table 7-16 can help to estimate the possible reaction of consumers in the sixth income stratum in Metropolitan Lima.

$$\text{Rice: } q_{01} = -.192(1.5) + .001(2) + .455(1) = .169$$

$$\text{Wheat: } q_{06} = .021(1.5) - .003(2) + .072(1) = .098$$

$$\text{Sweet potatoes: } q_{11} = -.014(1.5) - .186(2) - .204(1) = -.597$$

$$\text{Potatoes: } q_{13} = .006(1.5) + .024(2) + .152(1) = .209$$

$$\text{Sugar: } q_{17} = -.004(1.5) - .005(2) + .340(1) = .324$$

Table 7-16. Reduced consumers' reaction function for sixth income stratum of Metropolitan Lima (from Tables C-60 and C-101)

Products		p_{01}	p_{06}	p_{11}	p_{13}	p_{17}	y
Rice	q_{01}	-.192	.031	-.002	.001	-.014	.455
Wheat	q_{06}	.021	-.033	-.002	-.003	-.002	.072
Sweet potatoes	q_{11}	-.014	-.053	1.121	-.186	.006	-.204
Potatoes	q_{13}	.006	-.010	-.015	.024	-.005	.152
Sugar	q_{17}	-.004	-.012	.000	-.005	-.141	.340

Therefore, the policies described could increase the consumption of rice, wheat, potatoes, and sugar and decrease the consumption of sweet potatoes in the amount indicated above.

The same exercise could be done with each of the income strata for Metropolitan Lima as well as the other regions. Thus, the national impact of these policies could be estimated. In the next chapter, a procedure for estimating the national impact of policies will be discussed in a complete framework utilizing both consumers' and producers' reaction functions.

CHAPTER 8. AN EXERCISE IN POLICY ANALYSIS

The goal of this chapter is to show, by means of an exercise, how the proposed system for policy analysis can be used by the agricultural planning system.

The first section shows how the national producers' reaction function is derived from the regional producers' reaction functions. In the second section, the national consumers' reaction function is obtained in the same way. The third section discusses the construction of the national food material balances. The role of these balances in the system for policy analysis is also presented.

The last section demonstrates how the basic components of the system are joined. A demonstration exercise is performed with six policy runs, and some conclusions are drawn from it.

National Producers' Reaction Function

Chapters 4 and 5 have explained, in detail, the specification and estimation of the producers' reaction function. An illustration of its use at the regional level has also been presented in Chapter 5. A matrix structure of the producers' reaction function for the kth region appears as follows

$$[y_i^k] = [z_{ij}^k][x_j^k] \tag{8-1}$$

y_i^k corresponds to the ith policy performance indicator (ith endogenous variable) in kth region expressed in terms of percentage rate of change. x_j^k is the jth policy instrument (jth exogenous variable) in the kth region expressed in terms of percentage rate of change. z_{ij}^k represents the policy elasticity that measures the reaction of producers in terms of the ith policy performance indicator to a change in jth policy instrument in the kth region.

One might assume k = 2. If one wishes to obtain the national response function, the prices would have to be referred to some national prices. These national prices would be the weighted average of the regional prices. Thus, the national price for product 01 would be

$$P_{01}^{N} = ((P_{01}^{1})(Q_{01}^{1}) + (P_{01}^{2})(Q_{01}^{2}))/(Q_{01}^{1} + Q_{01}^{2})$$

$$P_{01}^{N} = \alpha_{01}^{1}P_{01}^{1} + \alpha_{01}^{2}P_{01}^{2} \tag{8-2}$$

where $\alpha_{01}^{k} = Q_{01}^{k}/(Q_{01}^{1} + Q_{01}^{2})$ and $\sum_{k}\alpha_{01}^{k} = 1$. Then, the national price of product 01 could be expressed in terms of differences as follows

$$\Delta P_{01}^{N} = \alpha_{01}^{1}\Delta P_{01}^{1} + \alpha_{01}^{2}\Delta P_{01}^{2} \tag{8-3}$$

It has been indicated that (8-1) and all the producers' regional reaction functions presented in Appendix B are expressed in terms of percentage rates of change. In order to express them in terms of absolute changes, a set of weights have to be derived. Then, expression (8-1) would appear as shown in (8-4).

$$[\Delta Y_{i}^{k}] = ([Z_{ij}^{k}] \otimes [Y_{i}^{k}/X_{j}^{k}])[\Delta X_{j}^{k}] \tag{8-4}$$

The term in parentheses, on the right-hand side of (8-4), is the inner product of two matrices. $[Z_{ij}^{k}]$ is the policy elasticity matrix for the kth region, while $[Y_{i}^{k}/X_{j}^{k}]$ is the matrix that results from dividing the value of the endogenous variables by the value of the exogenous variables, both in absolute terms, in the same order as they appear in the policy elasticity matrix. The matrix $[Y_{i}^{k}/X_{j}^{k}]$ can be looked at as a complete set of weights for the policy elasticities. In terms of the notation used in Chapter 3, (8-1) and (8-4) can be written

$$Y^r_{rp} = Z_{rp}X_{rp} \qquad (8\text{-}5)$$

After the inner multiplication is performed and the weighted policy elasticity matrices for each region are formed, the national producers' reaction function is obtained by the aggregation of regional producers' weighted reaction functions. This national matrix is shown in Table 8-1. The vertical entries for this matrix are:

DIS: change in income per worker-owner in "soles"

DLE: change in labor of landless-workers used in days-labor

DL#: change in labor for crop # in days-labor

DT#: change in land for crop # in hectares

DM#: change in "machinery" for crop # in "soles"

DF#: change in "other means of production" for crop # bought by enterprises in "soles"

DQ#: change in production for crop # in metric tons

DL: change in total labor used in days-labor

DLS: change in labor of worker-owners used in days-labor

The horizontal entries of the matrix are:

DP#: change in price at farm level of product # in "soles" per metric ton

DP_e: change in wage rate in "soles" per day-labor

DS: change in number of worker-owners

DT: change in the total amount of land in hectares

DM: changes in the total amount of "machinery" in "soles"

DF: change in the total amount of "other means of production" bought by enterprises in "soles"

The products' code numbers (#) are:

01: Rice ("Arroz"); 03: White corn ("Maiz amilaceo"); 05: Yellow corn ("Maiz amarillo"); 06: Wheat ("Trigo"); 07: Barley ("Cebada"); 08: "Quinua"; 13: Potatoes ("Papa"); 14: Manioc ("Yuca"); 17: Sugar cane ("Caña de azucar"); 21: Beans ("Frijol"); 47: Garlic ("Ajo"); 48: Onion ("Cebolla"); 80: Cotton ("Algodón").

The national matrix can be expressed as

$$[\Delta Y_i^N] = [Z_{ij}^N][\Delta X_j^N] \tag{8-6}$$

In terms of the notation used in Chapter 3, (8-6) can be written as

$$Y_{np}^r = Z_{np} X_{np} \tag{8-7}$$

X_{np} represents the vector of policies for production at the national level. in terms of changes. Z_{np} corresponds to the matrix of national policy elasticities. Y_{np}^r represents the vector of national policy performance indicators or national production reaction indicators in terms of change.

National Consumers' Reaction Function

The specification, estimation, and use of consumers' reaction functions have been explained in detail in Chapters 6 and 7. A complete set of estimates is presented in Appendix C. In this case, a matrix of these reaction functions for the kth region looks similar to (8-1). The matrix of policy elasticities would be integrated by a complete set of price and income elasticities. In terms of the notation used in Chapter 3, the regional reaction function would have the following structure

Table 8-1. National producers' reaction function

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DIS	4.3246E+00 6.9988E+00 2.7681E+00 -1.1065E-01	-1.4287E+02 1.0490E+02 2.9941E+01 2.8135E-03	-2.0523E-01 1.2199E+02 2.4681E+01 2.3103E-02	4.1348E+00 1.6293E+03 6.2853E+02	-3.5418E+01 8.0897E-01 -6.9518E+01
DLE	-1.5271E+03 -3.3395E+02 0.0000E+00 9.3077E+02	1.3018E+04 -5.7183E+03 4.7291E+01 -3.1517E-01	-4.1215E+02 6.7293E+03 -8.1063E+02 1.9189E-01	-1.8554E+03 0.0000E+00 -1.0941E+06	7.5235E+03 -1.6254E+02 -3.6829E+02
DL01	3.1906E+04 0.0000E+00 0.0000E+00 1.0939E+03	-3.7552E+03 0.0000E+00 0.0000E+00 1.3723E-01	-4.6790E+02 -2.5086E+03 -2.0106E+03 1.4918E-01	0.0000E+00 -3.2104E+05 -4.8256E+05	0.0000E+00 0.0000E+00 0.0000E+00
DL03	-2.2722E+03 0.0000E+00 0.0000E+00 1.7760E+03	3.4734E+04 -8.7476E+03 0.0000E+00 1.0400E-01	-6.1059E+03 -1.9249E+03 -2.7118E+02 -5.9383E-01	0.0000E+00 0.0000E+00 -6.2160E+05	4.5958E+02 -3.5937E+02 0.0000E+00
DL05	-3.3596E+02 0.0000E+00 0.0000E+00 4.8654E+01	-5.8063E+03 0.0000E+00 0.0000E+00 9.3577E-02	1.3650E+04 0.0000E+00 -6.1314E+02 3.8469E-01	0.0000E+00 -5.4645E+04 -9.3891E+04	0.0000E+00 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DL06	0.0000E+00 0.0000E+00 0.0000E+00 3.3097E+00	0.0000E+00 -5.6692E+02 0.0000E+00 -8.0670E-02	0.0000E+00 0.0000E+00 0.0000E+00 3.1956E-02	1.5754E+03 0.0000E+00 -2.6552E+04	-1.4287E+03 0.0000E+00 0.0000E+00
DL07	0.0000E+00 0.0000E+00 0.0000E+00 4.0573E+02	8.6335E+01 -5.1003E+03 -3.7844E+02 2.6754E-01	0.0000E+00 0.0000E+00 -4.5799E+01 -5.9269E-02	-1.5830E+03 0.0000E+00 -3.2781E+05	1.2931E+04 0.0000E+00 0.0000E+00
DL08	0.0000E+00 1.8548E+03 0.0000E+00 1.7622E+02	0.0000E+00 -2.9539E+03 0.0000E+00 1.8645E-02	0.0000E+00 0.0000E+00 0.0000E+00 -2.0196E-02	0.0000E+00 0.0000E+00 -1.7754E+04	0.0000E+00 0.0000E+00 0.0000E+00
DL13	0.0000E+00 -1.7960E+03 0.0000E+00 -3.9292E+02	-2.5843E+03 1.5913E+04 0.0000E+00 2.6789E-01	0.0000E+00 0.0000E+00 0.0000E+00 1.9537E-01	-7.2185E+02 0.0000E+00 -3.1571E+05	-4.5041E+03 0.0000E+00 0.0000E+00
DL14	-3.3743E+03 0.0000E+00 0.0000E+00 -4.4330E+02	-2.8627E+02 0.0000E+00 0.0000E+00 -1.5691E-02	0.0000E+00 1.1686E+04 0.0000E+00 2.6853E-01	0.0000E+00 0.0000E+00 1.8419E+04	0.0000E+00 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DL17	-3.7154E+03 0.0000E+00 -3.7598E+01 -2.1478E+01	0.0000E+00 0.0000E+00 0.0000E+00 1.5151E-02	-1.1684E+03 0.0000E+00 0.0000E+00 9.6657E-03	0.0000E+00 1.1716E+05 3.2519E+04	0.0000E+00 0.0000E+00 0.0000E+00
DL21	0.0000E+00 0.0000E+00 0.0000E+00 -3.0823E+00	-5.8538E+02 0.0000E+00 0.0000E+00 2.9189E-02	0.0000E+00 0.0000E+00 0.0000E+00 1.5409E-03	0.0000E+00 0.0000E+00 -1.3403E+04	0.0000E+00 2.8034E+02 0.0000E+00
DL47	0.0000E+00 0.0000E+00 4.5230E+01 -3.0038E+01	0.0000E+00 0.0000E+00 0.0000E+00 -5.9332E-03	0.0000E+00 0.0000E+00 0.0000E+00 4.7189E-03	0.0000E+00 -2.1267E+03 -7.1406E+02	0.0000E+00 0.0000E+00 0.0000E+00
DL48	0.0000E+00 0.0000E+00 0.0000E+00 -3.1004E+01	0.0000E+00 0.0000E+00 2.0075E+03 1.0467E-02	0.0000E+00 0.0000E+00 0.0000E+00 1.7119E-02	0.0000E+00 0.0000E+00 -1.2859E+04	-6.4980E+02 0.0000E+00 0.0000E+00
DL80	-8.1686E+03 0.0000E+00 0.0000E+00 -6.2888E+02	-1.4091E+03 0.0000E+00 0.0000E+00 -1.8098E-02	-2.8248E+03 0.0000E+00 2.6479E+03 1.2192E-01	0.0000E+00 0.0000E+00 3.0121E+04	-3.2185E+02 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DT01	2.7576E+02 0.0000E+00 0.0000E+00 1.1912E+01	-1.0652E+02 0.0000E+00 0.0000E+00 1.1916E-03	-8.8222E+00 -7.1792E+01 -1.5609E+01 1.1191E-03	0.0000E+00 -2.4662E+03 -1.3199E+03	0.0000E+00 0.0000E+00 0.0000E+00
DT03	-3.8356E+01 0.0000E+00 0.0000E+00 3.1734E+01	4.1903E+02 -7.0721E+01 0.0000E+00 2.6132E-03	-1.0972E+02 -2.7913E+01 -6.9970E+00 -1.1157E-02	0.0000E+00 0.0000E+00 -4.7658E+03	6.4044E+00 -6.4866E+00 0.0000E+00
DT05	-5.0511E+00 0.0000E+00 0.0000E+00 2.0135E+00	-1.4262E+02 0.0000E+00 0.0000E+00 1.3455E-03	2.4625E+02 0.0000E+00 -1.1285E+01 5.9000E-03	0.0000E+00 -9.8376E+02 -9.0722E+01	0.0000E+00 0.0000E+00 0.0000E+00
DT06	0.0000E+00 0.0000E+00 0.0000E+00 7.0278E-01	0.0000E+00 -1.9906E+01 0.0000E+00 -3.0937E-03	0.0000E+00 0.0000E+00 0.0000E+00 9.4829E-04	5.5909E+01 0.0000E+00 9.2110E+02	-8.0084E+01 0.0000E+00 0.0000E+00
DT07	0.0000E+00 0.0000E+00 0.0000E+00 1.2365E+01	-7.1701E+00 -9.9190E+01 -1.2999E+01 -2.7034E-03	0.0000E+00 0.0000E+00 -2.0060E+00 -2.2513E-03	-4.0074E+01 0.0000E+00 -3.2810E+03	2.3487E+02 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DT08	0.0000E+00 3.2083E+01 0.0000E+00 4.1388E+00	0.0000E+00 -5.6455E+01 0.0000E+00 2.5492E-04	0.0000E+00 0.0000E+00 0.0000E+00 -4.4944E-04	0.0000E+00 0.0000E+00 1.1447E+02	0.0000E+00 0.0000E+00 0.0000E+00
DT13	0.0000E+00 -3.2086E+01 0.0000E+00 -1.9234E+00	-6.0888E+01 2.2116E+02 0.0000E+00 1.5186E-03	0.0000E+00 0.0000E+00 0.0000E+00 1.6134E-03	-1.5834E+01 0.0000E+00 2.9310E+03	-1.2862E+02 0.0000E+00 0.0000E+00
DT14	-2.8166E+01 0.0000E+00 0.0000E+00 -3.4757E+00	-6.2513E+00 0.0000E+00 0.0000E+00 -1.0618E-04	0.0000E+00 9.9714E+01 0.0000E+00 2.3049E-03	0.0000E+00 0.0000E+00 3.6582E+02	0.0000E+00 0.0000E+00 0.0000E+00
DT17	-1.1381E+02 0.0000E+00 -2.8407E-01 -1.8892E+00	0.0000E+00 0.0000E+00 0.0000E+00 2.9428E-05	-6.3008E+01 0.0000E+00 0.0000E+00 3.1168E-04	0.0000E+00 3.4661E+03 1.7907E+03	0.0000E+00 0.0000E+00 0.0000E+00
DT21	0.0000E+00 0.0000E+00 0.0000E+00 1.8555E-01	-1.8530E+01 0.0000E+00 0.0000E+00 6.7526E-04	0.0000E+00 0.0000E+00 0.0000E+00 -9.2759E-05	0.0000E+00 0.0000E+00 -4.7347E-14	0.0000E+00 6.4854E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DT47	0.0000E+00 0.0000E+00 2.8399E-01 -1.3734E-01	0.0000E+00 0.0000E+00 0.0000E+00 -5.9464E-05	0.0000E+00 0.0000E+00 0.0000E+00 2.6704E-05	0.0000E+00 -1.6661E+01 2.0600E+00	0.0000E+00 0.0000E+00 0.0000E+00
DT48	0.0000E+00 0.0000E+00 0.0000E+00 -7.5522E-02	0.0000E+00 0.0000E+00 1.3001E+01 -3.0236E-05	0.0000E+00 0.0000E+00 0.0000E+00 8.8157E-05	0.0000E+00 0.0000E+00 3.7145E+01	-7.0752E+00 0.0000E+00 0.0000E+00
DT80	-9.0354E+01 0.0000E+00 0.0000E+00 -6.7114E+00	-4.2791E+01 0.0000E+00 0.0000E+00 -3.8056E-04	-6.4676E+01 0.0000E+00 3.5894E+01 1.6392E-03	0.0000E+00 0.0000E+00 2.2734E+03	-1.2266E+01 0.0000E+00 0.0000E+00
DM01	6.5118E+05 0.0000E+00 0.0000E+00 2.4228E+04	-3.6173E+04 0.0000E+00 0.0000E+00 6.4880E+00	0.0000E+00 0.0000E+00 -4.3000E+04 -2.2661E+00	0.0000E+00 -8.4655E+06 -7.7109E+06	0.0000E+00 0.0000E+00 0.0000E+00
DM03	-1.0150E+04 0.0000E+00 0.0000E+00 1.2432E+04	2.9791E+05 -9.8673E+04 0.0000E+00 3.2713E+00	-6.0256E+04 0.0000E+00 -5.9326E+03 -1.7332E+00	0.0000E+00 0.0000E+00 -2.2559E+06	-1.0344E+04 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DM05	0.0000E+00 0.0000E+00 0.0000E+00 8.6840E+03	-9.2287E+04 0.0000E+00 0.0000E+00 3.6349E+00	3.3224E+05 0.0000E+00 -3.0458E+04 -1.0906E+00	0.0000E+00 -1.5207E+06 -2.2341E+06	0.0000E+00 0.0000E+00 0.0000E+00
DM06	0.0000E+00 0.0000E+00 0.0000E+00 -7.7837E+02	0.0000E+00 0.0000E+00 0.0000E+00 8.7595E-01	0.0000E+00 0.0000E+00 0.0000E+00 5.4357E-01	1.9148E+04 0.0000E+00 6.2405E+05	-3.5290E+04 0.0000E+00 0.0000E+00
DM07	0.0000E+00 0.0000E+00 0.0000E+00 3.5804E+03	-2.1137E+03 -9.2295E+03 -1.3278E+04 2.8141E+00	0.0000E+00 0.0000E+00 -2.7702E+03 -1.3595E+00	-1.9150E+04 0.0000E+00 -9.4628E+05	7.2051E+04 0.0000E+00 0.0000E+00
DM08	0.0000E+00 2.0220E+04 0.0000E+00 1.8572E+03	0.0000E+00 -3.5478E+04 0.0000E+00 8.8139E-01	0.0000E+00 0.0000E+00 0.0000E+00 -2.7763E-01	0.0000E+00 0.0000E+00 6.4110E+04	0.0000E+00 0.0000E+00 0.0000E+00
DM13	0.0000E+00 -2.0221E+04 0.0000E+00 -4.4122E+03	-1.2291E+04 5.4022E+04 0.0000E+00 7.3247E+00	0.0000E+00 0.0000E+00 0.0000E+00 5.8926E-01	0.0000E+00 0.0000E+00 1.0893E+05	-8.6331E+03 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP90 DF	DP06 DP17 DPE	DP07 DP21 DS
DM14	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00		
DM17	-3.9078E+05	0.0000E+00	-9.7388E+04	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	1.0017E+07	0.0000E+00
	-5.0254E+02	0.0000E+00	0.0000E+00	5.6299E+06	0.0000E+00
	-1.1681E+04	2.0966E+00	9.3098E-01		
DM21	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	1.0000E+00	0.0000E+00		
DM47	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	-2.9483E+04	0.0000E+00
	5.0254E+02	0.0000E+00	0.0000E+00	3.6452E+03	0.0000E+00
	-6.1102E+02	1.8674E-01	4.7255E-02		
DM48	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-7.2273E+03
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	1.3280E+04	0.0000E+00	3.7943E+04	0.0000E+00
	-6.4768E+02	5.3965E-01	9.0052E-02		

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DM60	-2.5031E+05	-2.4768E+04	-1.6944E+05	0.0000E+00	-1.6940E+04
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	8.1260E+04	5.7755E+06	0.0000E+00
	-2.7293E+04	5.5382E+00	3.5529E+00		
DF01	2.5275E+06	-2.2587E+05	-8.3209E+03	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	-2.1647E+05	-3.0414E+07	0.0000E+00
	0.0000E+00	0.0000E+00	-1.6504E+05	-2.8552E+07	0.0000E+00
	9.5846E+04	7.8805E+00	-3.8887E+00		
DF03	-7.6710E+04	1.7436E+06	-2.3453E+05	0.0000E+00	9.8069E+02
	0.0000E+00	-7.0585E+05	-2.3978E+04	0.0000E+00	-1.3497E+04
	0.0000E+00	0.0000E+00	-2.3669E+04	-1.7903E+07	0.0000E+00
	7.6404E+04	-6.4435E+00	-8.9834E+00		
DF05	-4.3735E+03	-3.1976E+05	1.0087E+06	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	-7.2507E+06	0.0000E+00
	0.0000E+00	0.0000E+00	-5.4115E+04	-3.5079E+06	0.0000E+00
	1.6575E+04	2.3704E+00	6.4348E+00		
DF06	0.0000E+00	0.0000E+00	0.0000E+00	9.2740E+04	-9.1455E+04
	0.0000E+00	-5.7984E+04	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	2.3100E+05	0.0000E+00
	1.3620E+02	-8.3469E+00	3.2607E+00		

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DF07	0.0000E+00	-4.1985E+03	0.0000E+00	-4.6618E+04	4.5752E+05
	0.0000E+00	-2.5460E+05	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	-2.5969E+04	-3.5489E+03	-6.5409E+06	0.0000E+00
	1.5335E+04	5.5728E-01	-1.9616E+00		
DF08	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	1.0796E+05	-1.8941E+05	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	2.6193E+05	0.0000E+00
	1.2124E+04	8.8803E-01	-1.2945E+00		
DF13	0.0000E+00	-1.2468E+05	0.0000E+00	-4.6171E+04	-3.2533E+05
	-1.0797E+05	6.0865E+05	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	7.5011E+06	0.0000E+00
	-3.6416E+04	-2.2493E+00	1.7782E+01		
DF14	-8.3109E+04	-5.3698E+03	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	2.4049E+05	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	1.1084E+06	0.0000E+00
	-1.1524E+04	-5.3772E-01	6.9103E+00		
DF17	-1.4035E+06	0.0000E+00	-4.6427E+05	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	0.0000E+00	3.8044E+07	0.0000E+00
	-6.6032E+03	0.0000E+00	0.0000E+00	2.0688E+07	0.0000E+00
	-3.8812E+04	6.8583E-01	5.0219E+00		

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DF21	0.0000E+00 0.0000E+00 0.0000E+00 -4.5380E+02	-3.8570E+04 0.0000E+00 0.0000E+00 1.4056E+00	0.0000E+00 0.0000E+00 0.0000E+00 2.2686E-01	0.0000E+00 0.0000E+00 0.0000E+00	0.0000E+00 1.3500E+04 0.0000E+00
DF47	0.0000E+00 0.0000E+00 6.6031E+03 -8.0284E+03	0.0000E+00 0.0000E+00 0.0000E+00 -1.3830E+00	0.0000E+00 0.0000E+00 0.0000E+00 1.2291E+00	0.0000E+00 -3.8738E+05 4.7896E+04	0.0000E+00 0.0000E+00 0.0000E+00
DF48	0.0000E+00 0.0000E+00 0.0000E+00 -1.2663E+03	0.0000E+00 0.0000E+00 2.5964E+04 -6.0384E-02	0.0000E+00 0.0000E+00 0.0000E+00 1.1058E+00	0.0000E+00 0.0000E+00 7.4182E+04	-1.4130E+04 0.0000E+00 0.0000E+00
DF80	-9.5920E+05 0.0000E+00 0.0000E+00 -8.5268E+04	-1.3131E+05 0.0000E+00 0.0000E+00 -4.4993E+00	-3.1018E+05 0.0000E+00 2.4638E+05 1.7055E+01	0.0000E+00 0.0000E+00 1.7521E+07	-2.1698E+04 0.0000E+00 0.0000E+00
DQ01	1.2948E+03 0.0000E+00 0.0000E+00 5.2723E+01	-1.4120E+02 0.0000E+00 0.0000E+00 5.3657E-03	-9.2113E+00 -1.4315E+02 -8.3861E+01 -3.3117E-04	0.0000E+00 -1.4192E+04 -1.6186E+04	0.0000E+00 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DPRC DF	DP06 DP17 DPE	DP07 DP21 DS
DQ03	-7.9781E+01 0.0000E+00 0.0000E+00 7.7125E+01	1.4585E+03 -4.9212E+02 0.0000E+00 -3.4187E-03	-2.3024E+02 -4.3749E+01 -1.4053E+01 -1.9789E-02	0.0000E+00 0.0000E+00 -1.9019E+04	5.8737E+00 -1.1313E+01 0.0000E+00
DQ05	-1.1370E+01 0.0000E+00 0.0000E+00 1.0376E+01	-2.9134E+02 0.0000E+00 0.0000E+00 3.7368E-03	7.8028E+02 0.0000E+00 -4.6252E+01 1.3134E-02	0.0000E+00 -3.7831E+03 -4.1388E+03	0.0000E+00 0.0000E+00 0.0000E+00
DQ06	0.0000E+00 0.0000E+00 0.0000E+00 1.1196E-01	0.0000E+00 -2.2677E+01 0.0000E+00 -3.1127E-03	0.0000E+00 0.0000E+00 0.0000E+00 1.3987E-03	5.4555E+01 0.0000E+00 1.2978E+02	-6.1990E+01 0.0000E+00 0.0000E+00
DQ07	0.0000E+00 0.0000E+00 0.0000E+00 1.6486E+01	-3.4706E+00 -1.8954E+02 -2.7249E+01 3.3474E-03	0.0000E+00 0.0000E+00 -4.1220E+00 -2.8694E-03	-5.5358E+01 0.0000E+00 -8.3995E+03	4.4416E+02 0.0000E+00 0.0000E+00
DQ08	0.0000E+00 4.9068E+01 0.0000E+00 5.6658E+00	0.0000E+00 -8.3134E+01 0.0000E+00 5.6924E-04	0.0000E+00 0.0000E+00 0.0000E+00 -6.2797E-04	0.0000E+00 0.0000E+00 -7.7258E+01	0.0000E+00 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DQ13	0.0000E+00 -6.9032E+01 0.0000E+00 -1.9319E+01	-1.1073E+02 5.8566E+02 0.0000E+00 1.4939E-02	0.0000E+00 0.0000E+00 0.0000E+00 9.6882E-03	-4.2745E+01 0.0000E+00 7.4325E+02	-2.9451E+02 0.0000E+00 0.0000E+00
DQ14	-3.4624E+02 0.0000E+00 0.0000E+00 -4.5589E+01	-4.4985E+01 0.0000E+00 0.0000E+00 -1.8770E-03	0.0000E+00 1.2072E+03 0.0000E+00 3.1297E-02	0.0000E+00 0.0000E+00 2.9162E+03	0.0000E+00 0.0000E+00 0.0000E+00
DQ17	-1.7551E+04 0.0000E+00 -7.6423E+01 -3.7380E+02	0.0000E+00 0.0000E+00 0.0000E+00 3.4003E-02	-6.4261E+03 0.0000E+00 0.0000E+00 5.5189E-02	0.0000E+00 4.9662E+05 2.4722E+05	0.0000E+00 0.0000E+00 0.0000E+00
DQ21	0.0000E+00 0.0000E+00 0.0000E+00 -5.6042E-02	-1.0643E+01 0.0000E+00 0.0000E+00 5.3072E-04	0.0000E+00 0.0000E+00 0.0000E+00 2.8017E-05	0.0000E+00 0.0000E+00 -7.3108E+01	0.0000E+00 4.1367E+00 0.0000E+00
DQ47	0.0000E+00 0.0000E+00 1.9023E+00 -1.5019E+00	0.0000E+00 0.0000E+00 0.0000E+00 -2.9666E-04	0.0000E+00 0.0000E+00 0.0000E+00 2.3594E-04	0.0000E+00 -1.0633E+02 3.3772E+00	0.0000E+00 0.0000E+00 0.0000E+00

Table 8-1. (continued)

	DP01 DP08 DP47 DT	DP03 DP13 DP48 DM	DP05 DP14 DP80 DF	DP06 DP17 DPE	DP07 DP21 DS
DQ49	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	-1.1646E+02
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	2.4316E+02	0.0000E+00	2.8205E+01	0.0000E+00
	-5.5568E+00	1.8760E-03	3.0682E-03		
DQ80	-1.1490E+02	-2.9259E+01	-1.0397E+02	0.0000E+00	-1.2967E+01
	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
	0.0000E+00	0.0000E+00	4.7464E+01	2.5441E+03	0.0000E+00
	-1.3098E+01	-1.4953E-04	2.8103E-03		
DL	3.2361E+04	9.0758E+04	1.7870E+04	8.8599E+03	4.4426E+04
	9.5651E+03	-5.0784E+04	1.4420E+03	-3.2073E+05	2.3136E+02
	7.6365E+01	-1.9021E+03	-8.4425E+03	-5.4316E+06	0.0000E+00
	1.0720E+04	3.8532E-01	-4.6861E-01		
DLS	-7.4708E+04	-4.9350E+03	-2.0597E+04	1.0224E+04	1.4371E+04
	2.5182E+03	-1.6283E+04	-7.9839E+02	2.5893E+06	1.0938E+02
	1.4801E+02	-1.9672E+03	1.1432E+03	2.4767E+06	1.8975E+03
	-3.5722E+02	-2.9087E-01	-1.4728E-01		

$$Y^r_{rc} = Z_{rc} X_{rc} \tag{8-8}$$

As was explained in the last section, the relation between national and regional price can be expressed as (8-2) and (8-3). In the same way, relation (8-4) will also be applied to the consumers' regional reaction functions. The difference corresponds to each component of the Z_{rc}. This is due to the units in which each variable used to estimate the elasticities was expressed. From Chapter 7 one can get the following expression

$$q^k_{01} = e^k_{11} p^k_{01} + e^k_{12} p^k_{02} + \ldots + e^k_{1n} p^k_n + E^k_{01} y^k \tag{8-9}$$

The q, p's and y are expressed in percentage rates of change of quantities consumed in kilograms per capita, "soles" per kilogram, and "soles" of income per capita, respectively. In order to express exogenous and endogenous variables in terms similar to those of the production variables, q would have to be divided by 10^3 and multiplied by the population of the region, and prices would have to be multiplied by 10^3. These would transform the variables to consumption of the region (ENCA sector-stratum) in metric tons and prices in "soles" per metric ton. Then (8-9) would look like (8-10)

$$\begin{aligned} \Delta Q^k_{01} = {} & ((e^k_{11} \cdot Q^k_{01} \cdot POP^k/P^k_{01} \cdot 10^6)\Delta P^k_{01}) + \ldots + \\ & ((e^k_{1n} \cdot Q^k_{01} \cdot POP^k/P^k_n \cdot 10^6)\Delta P^k_n) + ((E^k_{01} Q^k_{01} POP^k/Y^k \cdot 10^3)\Delta Y^k) \end{aligned} \tag{8-10}$$

In a more compact form, (8-10) would look like

$$[\Delta Q^k_i] = ([Z^k_{ij}] \otimes [Q^k_i POP^k/Y_j X^k_j])[X^k_j] \tag{8-11}$$

The term in parenthesis, on the right-hand side of (8-11), is the inner product of two matrices. $[Z^k_{ij}]$ is the complete set of price and income elasticities for the kth region while $[Q_i^k POP^k/\gamma_j X_j^k]$ is the matrix that results from dividing the values of the endogenous variables (regional consumption in metric tons) by the value of the exogenous variables (prices in "soles" per metric ton and "income" per capita) in absolute terms. The latter matrix can be looked at as a complete set of weights for the regional policy elasticities.

After these operations are performed, the aggregation of the consumers' regional weighted reaction functions will allow one to obtain the consumers' national reaction function. This matrix is shown in Table 8-2. The vertical entries of this matrix are:

#: change in the quantity demanded of product # in metric tons

The horizontal entries of the matrix are:

#: change in price at consumer level of product # in "soles" per metric ton.

Y: change in income in "soles" per capita

The products' code numbers (#) are:

01: Rice ("Arroz"); 03: White corn ("Maiz amilaceo"); 04: Sweet corn ("Choclo"); 06: Wheat ("Trigo"); 07: Barley ("Cebada"); 08: "Quinua"; 11: Sweet potato ("Camote"); 13: Potatoes ("Papas"); 14: Manioc ("Yuca"); 16: "Oca"; 17: Sugar ("Azucar"); 19: Peas ("Arveja"); 21: Beans ("Frijol"); 23: Lima beans ("Habas"); 25: Broad beans ("Pallar"); 27: Soy beans ("Soya"); 31: Oranges ("Naranjas"); 33: Bananas ("Plátano"); 44: Tomatoes ("Tomate"); 46: Squash ("Zapallo"); 48: Onions ("Cebolla"); 49: Carrots ("Zanahoria"); 58: Lamb ("Carne de ovino"); 59: Pork ("Carne de cerdo"); 60: Beef ("Carne de vacuno"); 62: Chicken ("Carne de pollo"); 66: Game ("Carne de monte"); 69: Eggs ("Huevos de gallina"); 70: Milk ("Leche de vaca"); 76: Cotton seed ("Pepa de algodón"); 90: Fish ("Pescado").

The national consumers' reaction function can be represented as

$$[\Delta Q_i^N] = [Z_{ij}^N][\Delta X_j^N] \tag{8-12}$$

In terms of the notation used in Chapter 3, (8-12) can be written as

$$Y_{nc}^r = Z_{nc} X_{nc} \tag{8-13}$$

National Food Material Balances

As indicated in Chapter 3, the national food material balances refer to the equality that has to be maintained between the sources or total availability of a product and the uses to which that product is destined. In more conventional language, this implies an equality between supply and demand.

The sources or supplies have several components. The origin of the products could be internal or external. The internal sources could be production and change in inventories. The external source is imports.

$$\text{Sources} = \text{Production} + \text{Change Inventories} + \text{Imports} \tag{8-14}$$

On the other hand, the destiny of the products could also be internal or external. The internal destination refers to human consumption, industrial consumption, animal consumption, and consumption for reproduction. The external use is exports.

$$\begin{aligned} \text{Uses} = {} & \text{Human consumption} + \text{Industrial consumption} + \\ & \text{Animal consumption} + \text{Reproduction consumption} + \\ & \text{Exports} \end{aligned} \tag{8-15}$$

Table 8-2. National consumers' reaction function

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60 Y	7 19 44 62	8 21 46 66	11 23 48 69
1	-0.151E 02	0.248E 01	0.313E 01	0.394E 01	-0.153E 01	0.233E 00	0.224E 00
	0.115E 01	-0.197E 00	0.298E 00	-0.323E 00	-0.160E-01	-0.381E-01	0.129E 00
	-0.188E-01	-0.267E-01	-0.862E-02	0.554E 00	-0.383E 00	-0.116E-01	-0.675E 00
	-0.315E-01	-0.175E 00	-0.308E 00	-0.466E 00	-0.169E 00	-0.719E-02	-0.640E-03
	-0.983E-01	-0.100E 00	-0.887E-01	0.208E 02			
3	0.503E 01	-0.173E 02	-0.311E 01	-0.356E 01	0.727E 01	0.124E 00	-0.486E-01
	0.345E 01	0.325E 01	0.699E-01	-0.590E-01	-0.904E-02	0.000E 00	0.119E-01
	0.000E 00	0.120E 00	0.000E 00	-0.489E 00	0.164E-01	0.000E 00	0.221E-01
	0.965E-03	0.581E 00	0.110E 01	0.102E 01	-0.336E-02	0.000E 00	0.000E 00
	-0.137E-01	0.347E 00	0.470E-02	0.708E 01			
4	0.346E 01	-0.388E 00	-0.189E 02	-0.113E 01	0.399E 01	0.000E 00	0.000E 00
	0.256E 01	0.196E 01	0.000E 00	-0.541E-01	-0.603E-02	0.000E 00	0.000E 00
	0.000E 00	0.559E-01	0.000E 00	-0.900E 00	0.371E-01	0.000E 00	0.502E-01
	0.692E-03	0.297E 00	0.580E 00	0.507E 00	0.000E 00	0.000E 00	0.000E 00
	-0.131E-01	0.179E 00	0.000E 00	0.457E 01			
6	0.489E 01	-0.227E 01	-0.166E 01	-0.148E 02	0.388E 01	0.214E 00	0.332E 00
	0.359E 00	0.193E 01	-0.297E-02	-0.372E 00	-0.380E-01	-0.495E-01	-0.141E-01
	-0.113E-01	0.276E-01	0.330E-01	-0.113E 01	0.885E-01	-0.952E-02	0.748E-01
	-0.556E-02	0.246E 00	0.186E 00	0.333E 00	-0.127E 00	-0.570E-02	-0.221E-02
	-0.104E 00	0.141E 00	-0.149E-01	0.281E 02			
7	-0.144E 01	0.395E 01	0.399E 01	0.336E 01	-0.801E 01	0.293E 00	0.000E 00
	0.877E 00	-0.122E 01	-0.175E-01	-0.342E-01	-0.111E-01	0.000E 00	-0.382E-02
	0.000E 00	-0.402E-01	0.000E 00	0.559E 00	0.141E-01	0.000E 00	0.244E-01
	0.313E-02	-0.364E 00	-0.653E 00	-0.523E 00	0.000E 00	0.000E 00	0.000E 00
	-0.688E-02	-0.167E 00	0.000E 00	0.394E 01			
8	0.257E 00	0.643E-01	0.000E 00	0.223E 00	0.265E 00	-0.147E 01	0.000E 00
	-0.172E 00	0.000E 00	-0.116E-01	-0.295E-01	0.000E 00	0.000E 00	-0.215E-01
	0.000E 00	-0.304E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.271E-01	-0.358E-01	-0.166E-01	0.000E 00	0.000E 00	0.000E 00
	-0.625E-02	0.000E 00	0.000E 00	0.306E 01			
11	0.262E 00	-0.114E-01	0.000E 00	0.293E 00	0.000E 00	0.000E 00	-0.262E 01
	0.427E-03	0.000E 00	0.000E 00	-0.360E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.820E-01	-0.496E-01	0.448E 00	0.157E-01	-0.491E-02	0.746E-01
	-0.330E-02	-0.559E-03	-0.160E 00	0.903E-01	0.643E-01	0.000E 00	-0.311E-03
	-0.177E-01	-0.811E-01	-0.223E 00	0.144E 01			

Table 8-2. (continued)

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60 Y	7 19 44 62	8 21 46 66	11 23 48 69
13	0.189E 01	0.103E 01	0.236E 01	-0.102E 01	-0.314E 00	-0.551E 00	0.176E-01
	-0.774E 02	0.295E 01	0.271E 01	-0.171E 01	-0.795E-01	-0.453E-01	0.717E 00
	-0.233E-02	-0.109E 01	-0.106E-01	0.158E 01	-0.162E-01	-0.147E-01	-0.434E-01
	-0.550E-01	-0.769E 00	-0.202E 01	-0.125E 01	-0.369E 00	-0.372E-02	-0.321E-02
	-0.471E 00	-0.727E 00	0.233E 00	0.152E 03			
14	-0.744E-02	0.198E 01	0.215E 01	0.211E 01	-0.161E 01	0.000E 00	0.000E 00
	0.321E 01	-0.760E 01	0.000E 00	-0.198E-01	-0.135E-01	0.786E-01	0.000E 00
	0.000E 00	-0.626E-01	0.329E-01	0.222E 01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.194E 00	-0.855E 00	-0.490E 00	-0.307E-03	0.231E-01	0.000E 00
	-0.828E-02	-0.138E 00	0.560E-01	0.547E-01			
16	0.335E 00	0.492E-01	0.000E 00	-0.472E-02	-0.565E-01	0.277E-02	0.000E 00
	0.158E 01	0.000E 00	-0.771E 01	-0.235E-01	0.000E 00	0.000E 00	0.287E 00
	0.000E 00	-0.849E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.537E-01	-0.297E-01	-0.330E-01	0.000E 00	0.000E 00	0.000E 00
	-0.783E-02	0.000E 00	0.000E 00	0.254E 01			
17	-0.402E 00	-0.538E 00	-0.150E 00	-0.675E 00	-0.142E 00	-0.288E-01	-0.115E-01
	-0.155E 01	-0.328E 00	-0.302E-01	-0.543E 01	-0.518E-01	-0.909E-02	-0.276E-01
	-0.255E-02	-0.551E-01	-0.816E-02	-0.287E 00	-0.142E-01	-0.971E-02	-0.243E-01
	-0.110E-01	-0.172E-01	-0.285E 00	-0.576E-01	-0.228E-01	-0.296E-02	-0.142E-03
	-0.734E 00	-0.663E-01	-0.408E-01	0.792E 02			
19	-0.212E-01	-0.714E-01	-0.245E-01	-0.545E-01	-0.976E-02	0.000E 00	0.000E 00
	-0.175E 00	-0.323E-01	0.000E 00	-0.204E-01	-0.431E 00	0.000E 00	0.000E 00
	0.000E 00	0.155E-03	0.000E 00	-0.171E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	0.702E-04	-0.180E-01	0.802E-04	0.000E 00	0.000E 00	0.000E 00
	-0.520E-02	-0.163E-02	0.000E 00	0.270E 01			
21	-0.272E-01	0.000E 00	0.000E 00	-0.335E-01	0.000E 00	0.000E 00	0.000E 00
	-0.148E-01	0.679E-01	0.000E 00	-0.224E-03	0.000E 00	0.700E-01	0.000E 00
	0.000E 00	-0.259E-03	0.000E 00	-0.189E-02	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	0.000E 00	-0.376E-02	-0.274E-02	-0.170E-02	0.000E 00	0.000E 00
	-0.600E-04	0.000E 00	0.000E 00	0.341E-01			
23	0.198E 00	0.105E-01	0.000E 00	-0.228E-01	-0.322E-01	-0.146E-01	0.000E 00
	0.712E 00	0.000E 00	0.384E 00	-0.303E-01	0.000E 00	0.000E 00	-0.181E 01
	0.000E 00	0.176E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.577E-01	-0.419E-01	-0.209E-01	0.000E 00	0.000E 00	0.000E 00
	-0.555E-02	0.000E 00	0.000E 00	0.301E 01			

Table 8-2. (continued)

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60 Y	7 19 44 62	8 21 46 66	11 23 48 69
25	-0.203E-01	0.000E 00	0.000E 00	-0.171E-01	0.000E 00	0.000E 00	0.000E 00
	0.362E-02	0.000E 00	0.000E 00	-0.404E-02	0.000E 00	0.000E 00	0.000E 00
	-0.122E-01	-0.549E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	-0.216E-02
	0.000E 00	0.000E 00	-0.341E-02	-0.109E-02	-0.923E-03	0.000E 00	0.000E 00
	-0.880E-03	-0.531E-03	-0.128E-02	0.125E 00			
27	-0.204E 00	0.346E-01	0.111E 00	-0.280E 00	-0.160E 00	-0.161E-01	-0.181E 00
	-0.319E 01	-0.259E 00	-0.373E-01	-0.344E 00	-0.131E-01	-0.113E-01	0.397E-01
	-0.666E-02	-0.141E 01	-0.229E-01	-0.312E 00	-0.159E-01	-0.176E-01	-0.151E-01
	-0.114E-01	-0.146E 00	-0.604E 00	-0.320E 00	-0.783E-01	0.000E 00	-0.481E-03
	-0.143E 00	0.236E 00	-0.195E 00	0.193E 02			
31	-0.592E-01	0.000E 00	0.000E 00	-0.985E-02	0.000E 00	0.000E 00	-0.308E-01
	-0.470E-01	-0.292E-01	0.000E 00	-0.536E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.147E-01	-0.538E 01	0.280E 00	-0.980E-02	-0.475E-02	-0.974E-02
	-0.388E-02	0.000E 00	-0.418E-01	-0.224E-01	-0.148E-01	-0.283E-03	-0.624E-02
	-0.604E-01	-0.152E-01	-0.127E-01	0.294E 01			
33	0.775E 00	-0.253E-01	-0.901E 00	-0.843E 00	0.497E 00	0.000E 00	0.276E 00
	0.218E 01	0.225E 01	0.000E 00	-0.116E 00	-0.115E-01	0.309E-01	0.000E 00
	0.000E 00	-0.693E-01	0.345E 00	-0.105E 02	0.368E-01	-0.626E-02	0.233E-01
	-0.182E-02	-0.410E-01	0.959E-01	0.139E 00	0.113E-01	-0.122E-01	0.134E-02
	-0.492E-01	-0.522E-01	-0.334E-01	0.166E 02			
44	-0.542E 00	-0.591E-02	0.392E-01	0.659E-01	0.976E-02	0.000E 00	0.152E-01
	-0.623E-01	0.000E 00	0.000E 00	-0.510E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.893E-02	-0.345E-02	0.396E-01	-0.720E 00	-0.481E-02	-0.143E 00
	-0.329E-01	0.446E-02	-0.224E-01	-0.229E-02	-0.589E-02	0.000E 00	-0.161E-03
	-0.242E-01	-0.963E-02	-0.799E-02	0.233E 01			
46	-0.162E-01	0.000E 00	0.000E 00	-0.178E-01	0.000E 00	0.000E 00	-0.166E-02
	-0.199E-01	0.000E 00	0.000E 00	-0.175E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.426E-02	-0.267E-02	-0.468E-02	-0.248E-02	-0.601E 00	-0.314E-02
	-0.174E-02	0.000E 00	-0.101E-01	-0.335E-02	-0.302E-02	0.000E 00	0.000E 00
	-0.115E-01	-0.402E-02	-0.326E-02	0.654E 00			
48	-0.104E 01	-0.637E-02	0.705E-01	0.484E-01	0.203E-01	0.000E 00	0.744E-01
	-0.648E-01	0.000E 00	0.000E 00	-0.822E-01	0.000E 00	0.000E 00	0.000E 00
	-0.339E-02	-0.735E-02	-0.472E-02	0.578E-01	-0.165E 00	-0.699E-02	-0.151E 01
	-0.144E-01	0.846E-02	-0.150E-01	0.151E-01	-0.608E-02	0.000E 00	-0.181E-03
	-0.387E-01	-0.806E-02	-0.270E-01	0.380E 01			

Table 8-2. (continued)

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60 Y	7 19 44 62	8 21 46 66	11 23 48 69
49	-0.616E-01	-0.238E-01	0.238E-02	-0.407E-01	-0.600E-02	0.000E 00	-0.237E-02
	-0.915E-01	0.000E 00	0.000E 00	-0.336E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.652E-02	-0.330E-02	0.180E-02	-0.441E-01	-0.251E-02	-0.158E-01
	-0.926E 00	-0.543E-03	-0.182E-01	-0.456E-02	-0.483E-02	0.000E 00	-0.757E-04
	-0.181E-01	-0.719E-02	-0.455E-02	0.188E 01			
58	-0.194E 00	0.149E 00	0.243E 00	0.167E-01	-0.449E 00	-0.503E-01	0.105E-03
	-0.103E 01	-0.174E 00	-0.835E-01	-0.115E 00	-0.475E-02	0.000E 00	-0.774E-01
	0.000E 00	-0.453E-01	0.000E 00	-0.466E-01	0.339E-02	0.000E 00	0.186E-02
	-0.273E-02	-0.852E 00	0.668E-01	0.111E 00	0.457E-02	0.000E 00	0.000E 00
	-0.190E-01	-0.382E-01	0.386E-02	0.894E 01			
59	-0.355E 00	0.367E 00	0.533E 00	-0.654E-01	-0.712E 00	-0.313E-01	-0.885E-01
	-0.190E 01	-0.965E 00	-0.333E-01	-0.256E 00	-0.217E-01	-0.173E-01	-0.287E-01
	-0.137E-02	-0.154E 00	-0.575E-02	-0.734E-01	-0.547E-02	-0.598E-02	0.308E-02
	-0.783E-02	0.953E-01	-0.563E 01	0.119E 01	0.576E 00	0.352E-02	0.614E-03
	-0.690E-01	-0.189E 00	-0.327E 00	0.187E 02			
60	-0.664E 00	0.440E 00	0.478E 00	0.493E-01	-0.604E 00	-0.292E-01	0.667E-01
	-0.138E 01	-0.530E 00	-0.549E-01	-0.226E 00	-0.438E-02	-0.114E-01	-0.306E-01
	-0.320E-02	-0.128E 00	-0.186E-02	-0.478E-01	-0.801E-02	-0.686E-02	0.140E-02
	-0.654E-02	0.939E-01	0.115E 01	-0.216E 01	0.446E-01	0.424E-02	-0.387E-02
	-0.813E-01	-0.114E 00	0.330E 00	0.123E 02			
62	-0.246E 00	-0.782E-02	0.000E 00	-0.185E 00	0.000E 00	0.000E 00	0.420E-01
	-0.367E 00	-0.511E-01	0.000E 00	-0.871E-01	0.000E 00	-0.517E-02	0.000E 00
	-0.220E-02	-0.376E-01	-0.451E-02	-0.648E-01	-0.762E-02	-0.536E-02	-0.847E-02
	-0.352E-02	0.413E-02	0.539E 00	0.185E-01	-0.761E 00	-0.667E-03	0.447E-03
	-0.420E-01	-0.737E-02	0.150E 00	0.394E 01			
66	-0.491E-02	0.000E 00	0.000E 00	-0.259E-02	0.000E 00	0.000E 00	0.000E 00
	-0.360E-02	-0.247E-01	0.000E 00	-0.250E-02	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	0.000E 00	0.902E-03	-0.234E-01	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	0.000E 00	0.683E-02	0.570E-02	0.106E-03	-0.375E-01	0.000E 00
	-0.216E-03	-0.117E-02	0.000E 00	0.346E 00			
69	-0.819E-03	0.000E 00	0.000E 00	-0.126E-02	0.000E 00	0.000E 00	-0.654E-03
	0.000E 00	0.000E 00	0.000E 00	-0.240E-03	0.000E 00	0.000E 00	0.000E 00
	0.000E 00	-0.983E-04	0.416E-03	0.742E-03	-0.884E-04	0.000E 00	-0.103E-03
	0.000E 00	0.000E 00	0.521E-03	-0.309E-02	0.440E-03	0.000E 00	-0.198E-02
	-0.469E-03	-0.982E-04	0.365E-03	0.123E-01			

Table 8-2. (continued)

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60 Y	7 19 44 62	8 21 46 66	11 23 48 69
70	-0.124E 01	-0.768E 00	-0.191E 00	-0.177E 01	-0.245E 00	-0.413E-01	-0.653E-01
	-0.292E 01	-0.514E 00	-0.584E-01	-0.425E 01	-0.497E-01	-0.244E-01	-0.372E-01
	-0.164E-01	-0.265E 00	-0.451E-01	-0.636E 00	-0.823E-01	-0.548E-01	-0.125E 00
	-0.472E-01	-0.558E-01	-0.858E 00	-0.225E 00	-0.112E 00	-0.468E-02	0.000E 00
	-0.101E 02	-0.256E 00	-0.177E 00	0.725E 02			
76	-0.449E 00	0.552E 00	0.600E 00	0.308E 00	-0.617E 00	0.000E 00	-0.701E-01
	-0.108E 01	-0.352E 00	0.000E 00	-0.126E 00	-0.545E-02	0.000E 00	0.000E 00
	-0.260E-02	0.101E 00	-0.761E-02	-0.188E-01	-0.628E-02	-0.676E-02	-0.641E-02
	-0.457E-02	-0.845E-01	-0.360E 00	-0.181E 00	0.577E-02	-0.387E-02	-0.185E-03
	-0.465E-01	-0.708E 00	-0.147E 00	0.717E 01			
90	-0.209E 00	0.581E-02	0.000E 00	-0.136E 00	0.000E 00	0.000E 00	-0.335E 00
	0.334E 00	0.609E-01	0.000E 00	-0.115E 00	0.000E 00	0.000E 00	0.000E 00
	-0.349E-02	-0.113E 00	-0.124E-01	0.875E-02	-0.118E-01	-0.816E-02	-0.390E-01
	-0.562E-02	0.812E-02	-0.644E 00	0.630E 00	0.277E 00	0.000E 00	0.722E-03
	-0.475E-01	-0.199E 00	-0.234E 01	0.366E 01			

It should be added that, from the time a product is made until it arrives to its final destination, there is another form of consumption present called "waste." Even in the case that all components indicated have been estimated, there will be discrepancies between sources and uses. This could be due to round off errors, different procedures of estimation, or different procedures of data collection.

The Policy Analysis Office of the Agrarian Planning Office (OAPA-OSPA) of the Peruvian Agricultural Ministry is conducting a detailed study of the different components of sources and uses for the balance of several agricultural products. Their study includes close to 90 agricultural products. Figure 8-1 can give a clear idea of all the components that are being taken into consideration for the definition of the balances. Each component is a separate study in itself. National agricultural production is expressed in terms of primary products (without or with almost no transformation). Waste refers to the amount of the product wasted by imperfect conservation or marketing. Change in inventories considers final existence of primary products, between two periods, in all forms of transformation. Imports consider all forms of products that enter the country expressed in terms of their agricultural primary product components. Human consumption has been discussed in great detail in Chapter 7. As in all other cases, it is expressed in terms of primary products. It takes into consideration all forms of consumption by populations of different regions of the country. Industrial consumption expresses the quantity of primary products used by industry to produce all those products not considered in human consumption nor in animal consumption. Animal consumption takes into account all forms of feeding products in terms of primary products. Reproduction consumption

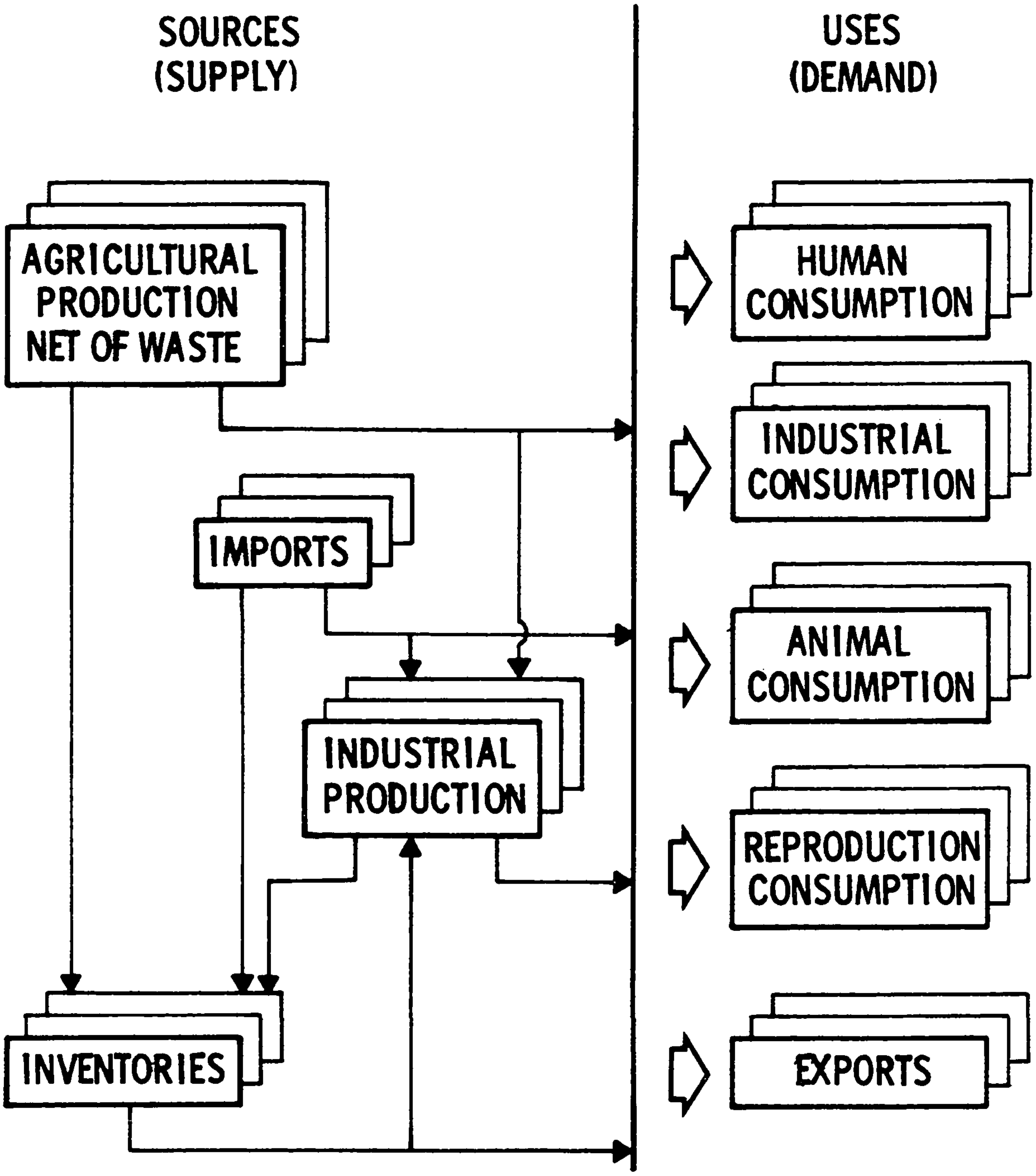


Figure 8-1. National Food Material Balances (study being conducted by OAPA-OSPA Peruvian Ministry of Agriculture)

considers the total quantity of primary products used as genetic material for purposes of agricultural production. Exports consider all forms of products that leave the country expressed in terms of their primary products.

In this study, the information of production presented in Chapter 5 and Appendix B has been used. The production for each product has been divided in production considered (PC) and production not considered (PN). The former refers to that selected in Chapter 5 for the purpose of estimation of producers' reaction function. The latter takes into consideration all the rest. In the same way, human consumption (CN) has been divided into considered (CC) and not considered (CN). The former refers to products which entered the food baskets for each ENCA region as discussed in Chapter 7. The latter refers to all that did not enter those food baskets. Then, exports (EX) and imports (IM) are differentiated as they were in the OAPA-OSPA study. All other types of use (CO) are not being differentiated. The information is taken from some preliminary results of the OAPA-OSPA study. Table 8-3 shows estimates for the balances used in the present study. The structure of the balances here considered is

$$PC_i + PN_i + IM_i = S_i = U_i = CC_i + CN_i + CO_i + EX_i \qquad (8\text{-}16)$$

As was done in the two preceding sections, (8-16) can be expressed in terms of changes as

$$\Delta PC_i + \Delta PN_i + \Delta IM_i = \Delta CC_i + \Delta CN_i + \Delta CO_i + \Delta EX_i \qquad (8\text{-}17)$$

Demonstration Exercise in Policy Analysis

Once a set of policies has been presented or suggested, the Agrarian Planning Office (OSPA) is expected to advise on its relation to the

Table 8-3. National food material balances (1972 in metric tons)

Products	Human consumption enter food baskets (CC)	Rest of human consumption (CN)	Other types of consumption (CO)	Exports (EX)	Total uses (demand)= total sources (supply) (U=S)	National production selected (PC)	Rest of national production (PN)	Imports (IM)
01 Rice	299,546	--	6,069	17,828	323,443	275,377	48,063	3
03 White corn	162,014	19,992	2,601	733	185,340	120,947	64,242	151
04 Sweet corn	40,517	38,996	3,180	--	82,693	--	82,693	--
05 Yellow corn[a]	--	4,725	300,848	20	305,593	206,315	98,299	979
06 Wheat	463,024	--	195,647	892	659,563	38,371	53,470	567,722
07 Barley	71,981	5,922	128,512	--	206,415	117,048	48,461	40,906
08 "Quinua"	24,009	2,826	803	--	27,638	20,408	7,230	--
11 Sweet potatoes	24,937	29,193	49,318	25	103,473	--	103,473	--
13 Potatoes	1,110,210	2,456	209,327	534	1,322,527	732,032	574,002	16,493
14 Manioc	140,856	19,001	321,836	14	481,707	128,274	353,415	18
16 "Oca"	24,077	15,683	146,033	--	185,793	--	185,793	--
17 Sugar	295,718	--	20,141	438,141	754,000	644,379	109,528	93
19 Peas	12,800	12,013	1,468	--	26,281	--	25,410	871
21 Beans	8,518	36,236	1,964	1,790	48,508	9,349	39,144	15
23 Lima beans	28,856	15,611	-6,198	--	38,269	--	38,269	--
25 Broad beans	3,867	4,763	318	--	8,948	--	8,948	--
27 Soy beans	218,903	1,927	--[b]	609	--[b]	--	--[b]	168,408
31 Oranges	29,302	26,871	183,005	288	239,466	--	239,411	55
33 Bananas	244,448	7,199	328,073	2	579,722	--	579,518	204
44 Tomatoes	38,575	28,614	-1,211	158	66,136	--	66,123	13
46 Squash	18,143	20,810	--	36	38,989	--	38,989	--

[a]Did not enter food basket of any region.

[b]Not available.

Table 8-3. (continued)

Products	Human consumption enter food baskets (CC)	Rest of human consump-tion (CN)	Other types of consump-tion (CO)	Exports (EX)	Total uses (demand)= total sources (supply) (U=S)	National produc-tion selected (PC)	Rest of national produc-tion (PN)	Imports (IM)
47 Garlic[a]	--	6,132	1,697	2,[illegible]58	10,800	3,951	6,849	--
48 Onions	62,151	35,909	59,334	469	157,863	140,386	17,351	126
49 Carrots	28,313	18,082	-3	--	46,392	--	46,392	--
58 Lamb	37,089	15,671	--	--	52,760	--	46,812	5,948
59 Pork	208,153	--	23,933	--	--[b]	--	--[b]	--[b]
60 Beef	109,052	--	-162	--	108,890	--	90,686	18,204
62 Chicken	48,221	5,275	16,515	--	70,011	--	70,000	11
66 Game	3,503	2,009	--	--	5,512	--	5,512	--
69 Eggs	1,813	28,955	5,420	1	36,189	--	36,000	189
70 Milk	762,111	--	-14,703	27	747,435	--	524,375	223,060
76 Cotton seed	97,996	--	-5,105	237	105,561	--	92,393	13,168
80 Cotton[c]	--	--[b]	24,843	--[b]	238,061	199,214	38,847	--
90 Fish	86,912	18,150	--	--	105,062	--	105,062	--

[c]Not considered in consumption study.

objectives and goals of the sector. Relation (8-6) would allow OSPA to estimate (ΔY^N) which corresponds to all the set of national policy performance indicators related to the agricultural production process. Similarly, relation (8-12) would permit OSPA to estimate (ΔQ^N), which corresponds to all the set of national policy performance indicators related to the consumption process. The specific details would also allow OSPA and OZPAs (regional offices) to use relations (8-4) and (8-11) to perform similar estimations at the regional levels. The aggregation of these regional policy performance indicators would be compared with the national responses to check for consistency. Although it will not be done in this chapter, it should be noted that, on an operational basis, the system for policy analysis presents an additive scheme between the regional and national reactions.

Then OSPA would be able to use relation (8-17) for the next consistency check. This last estimation would permit agricultural planners to establish the impact of the policies on foreign exchange requirements. In order to perform the last operation, additional relations are required. The use of relation (8-6) would give information for ΔPC_i in (8-17). The use of relation (8-12) would give information with respect to ΔCC_i in (8-17). If there is not more information available, the following can be assumed: (1) production considered (PC_i) is related to production not considered (PN_i) in a proportional way, measured by $\alpha_i = PN_i/PC_i$; (2) consumption considered (CC_i) is proportional to consumption not considered; the factor of proportionality is $\beta_i = CN_i/CC_i$; (3) consumption in other forms (CO_i) is also proportional to consumption considered; $\delta_i = CO_i/CC_i$. Then, the following relations can be used

$$\Delta PN_i = \alpha_i(\Delta PC_i) \tag{8-18}$$

$$\Delta CN_i = \beta_i(\Delta CC_i) \tag{8-19}$$

$$\Delta CO_i = \delta_i(\Delta CC_i) \tag{8-20}$$

The coefficients α_i, β_i, and δ_i are estimated from Table 8-3. They are presented in Table 8-4.

Therefore, once ΔPC_i and ΔCC_i are estimated, relations (8-18), (8-19), and (8-20) would allow OSPA to estimate ΔPN_i, ΔCN_i, and ΔCO_i. Then, the requirements for foreign exchange can be estimated if relation (8-17) is rearranged as

$$\Delta(EX_i - IM_i) = (\Delta PC_i + \Delta PN_i) - (\Delta CC_i + \Delta CN_i + \Delta CO_i) \tag{8-21}$$

Similarly, there are some relations between the policy instruments being used in this study to be kept in mind. One of them refers to the relation between prices at the farm level and those at the consumer level. The other refers to the relation between the wage rate in the production process and the income per capita considered in the consumption process. These two aspects require a special study. The latter aspect is more difficult to handle within the framework of this study because the production process of the nonagricultural sector has not as yet been incorporated. The relation is closer the smaller the geographical area under study. For the purpose of illustration, any change in one will be totally reflected in the other. Once again, the assumption of linear homogeneity is being used.

In order to demonstrate the use of the system, six policy runs have been made. Tables 8-5 and 8-6 show, in terms of percentage rates of change, the policies subject to analysis. The policy runs were done with the purpose of illustrating how strong the indirect effect of alternative

Table 8-4. Coefficients of proportionality for production not considered (α_i), consumption not considered (β_i), and consumption in other forms (δ_i)

Products	$\alpha_i = (PN_i/PC_i)$	$\delta_i = (CO_i/CC_i)$	$\beta_i = (CN_i/CC_i)$
01 Rice	.1745	.0203	0
03 White corn	.5312	.0161	.1234
04 Sweet corn	--[a]	.0785	.9625
05 Yellow corn	.4765	--[b]	--[b]
06 Wheat	1.3935	.4225	0
07 Barley	.4140	1.7854	.0823
08 "Quinua"	.3543	.0334	.1177
11 Sweet potatoes	--[a]	1.9777	1.1707
13 Potatoes	.7841	.1885	.0022
14 Manioc	2.7552	2.2849	.1349
16 "Oca"	--[a]	6.0652	.6514
17 Sugar	.1700	.0681	0
19 Dried peas	--[a]	.1147	.9385
21 Beans	4.1870	.2306	4.2541
23 Lima beans	--[a]	-.2148	.5410
25 Broad beans	--[a]	.0822	1.2317
27 Soy beans	--[a]	0	.0088
31 Oranges	--[a]	6.2455	.9170
33 Bananas	--[a]	1.3421	.0295
44 Tomatoes	--[a]	-.0314	.7418
46 Squash	--[a]	0	1.1470
47 Garlic	1.7335	--[b]	--[b]
48 Onions	.1236	.9547	.5778
49 Carrots	--[a]	-.0001	.6386
58 Lamb	--[a]	--	.4225
59 Pork	--[a]	.1150	--
60 Beef	--[a]	-.0015	--
62 Chicken	--[a]	.3425	.1094
66 Game	--[a]	--	.5735
69 Eggs	--[a]	2.9895	15.9708
70 Milk	--[a]	-.0193	--
76 Cotton seed	--[a]	-.0521	--
80 Cotton	.1950	--[c]	--[c]
90 Fish	--[a]	--	.2088

[a]Did not enter portfolio of production selected.

[b]Did not enter food basket of any region.

[c]Not considered in consumption study.

Table 8-5. Production policy runs in percentage rates of change

Description of policy	Variable	Number of policy run					
		1	2	3	4	5	6
Change in price of:							
Rice	DP_{01}	.01	.02	.02	.00	.00	.02
White corn	DP_{03}	.01	.02	.02	.02	.02	.00
Yellow corn	DP_{05}	.01	.02	.00	.00	.00	.00
Wheat	DP_{06}	.01	.02	.02	.00	.00	.02
Barley	DP_{07}	.01	.02	.02	.02	.02	.00
"Quinua"	DP_{08}	.01	.02	.02	.00	.00	.02
Potatoes	DP_{13}	.01	.02	.02	.00	.00	.02
Manioc	DP_{14}	.01	.02	.02	.02	.02	.02
Sugar	DP_{17}	.01	.02	.02	.00	.00	.02
Beans	DP_{21}	.01	.02	.02	.00	.00	.02
Garlic	DP_{47}	.01	.02	.00	.00	.00	.00
Onions	DP_{48}	.01	.02	.02	.00	.00	.00
Cotton	DP_{80}	.01	.02	.00	.00	.00	.00
Change in:							
Wage rate	DP_e	.01	.02	.02	.00	.02	.00
Number worker-owners	DS	.01	.02	.00	.00	.00	.00
Amount of land	DT	.01	.02	.00	.00	.00	.00
Amount of machinery	DM	.01	.02	.00	.00	.00	.00
Amount of "other"	DF	.01	.02	.00	.00	.00	.00

policies could be. This is an aspect that is usually underestimated. At the same time, the policy runs have the purpose of illustrating how the apparently "socially neutral" objective of increasing production is linked to income distribution with a bias towards some social class.

One can assume that the main concern is related to the increase in production, as can be read in the plan of the Food Ministry (43), as well as ". . . an increase in the income of the people involved in agricultural activities . . ." (42, p. 7), as can be read in the plan of the Agricultural Ministry. These are the policy performance indicators that will be considered in this demonstration exercise.

Table 8-6. Consumption policy runs in percentage rates of change

Description of policy	Variable	Number of policy run 1	2	3	4	5	6
Change in price of:							
Rice	01	.01	.02	.02	.00	.00	.02
White corn	03	.01	.02	.02	.02	.02	.00
Sweet corn	04	.01	.02	.00	.00	.00	.02
Wheat	06	.01	.02	.02	.00	.00	.00
Barley	07	.01	.02	.02	.02	.02	.00
"Quinua"	08	.01	.02	.02	.00	.00	.02
Sweet potato	11	.01	.02	.00	.00	.00	.00
Potato	13	.01	.02	.02	.00	.00	.02
Manioc	14	.01	.02	.02	.02	.02	.02
"Oca"	16	.01	.02	.00	.00	.00	.00
Sugar	17	.01	.02	.02	.00	.00	.02
Peas	19	.01	.02	.00	.00	.00	.00
Beans	21	.01	.02	.02	.00	.00	.02
Lima beans	23	.01	.02	.00	.00	.00	.00
Broad beans	25	.01	.02	.00	.00	.00	.00
Soy beans	27	.01	.02	.00	.00	.00	.00
Oranges	31	.01	.02	.00	.00	.00	.00
Bananas	33	.01	.02	.00	.00	.00	.00
Tomatoes	44	.01	.02	.00	.00	.00	.00
Squash	46	.01	.02	.00	.00	.00	.00
Onions	48	.01	.02	.02	.00	.00	.00
Carrots	49	.01	.02	.00	.00	.00	.00
Lamb	58	.01	.02	.00	.00	.00	.00
Pork	59	.01	.02	.00	.00	.00	.00
Beef	60	.01	.02	.00	.00	.00	.00
Chicken	62	.01	.02	.00	.00	.00	.00
Game	66	.01	.02	.00	.00	.00	.00
Eggs	69	.01	.02	.00	.00	.00	.00
Milk	70	.01	.02	.00	.00	.00	.00
Cotton seed	76	.01	.02	.00	.00	.00	.00
Fish	90	.01	.02	.00	.00	.00	.00
Change in income per capita		.01	.02	.02	.00	.02	.00

In the first run, all exogenous variables (or policy instruments) were increased by 1%. Table 8-7 shows that the production of white corn ("maiz amilaceo") would decrease drastically, around 157%; the production of garlic ("ajo") would decrease around 39%; while the production of barley would decrease more moderately, around 0.9%. It should be noted that these negative responses, when the prices of the three products are being increased by 1%, are due to a strong indirect effect that is difficult to foresee if these types of effects are not being looked for. Of course, this is not the whole story. There are high positive responses as well. The production of manioc could show an increase higher than 1000%. In Chapter 7 it was shown that white corn and manioc are two very important products in the diet of some regions but not in the same region. Manioc is the most important product in the jungle. It practically does not enter the food basket of any other region. White corn is extremely important in all of the entire Sierra (north, central, and south).

One must also look at the responses of consumers in terms of these two products. Table 8-8 shows an increase of 0.4% in the demand for white corn and an increase of 0.01% in the demand for manioc. Since the result of this package of policies is creating such a change in our internal balance, relation (8-21) should be used to estimate the impact on our external balance.

White corn: $\Delta(EX_{03} - IM_{03}) = -1{,}013{,}000 - 754 = -1{,}013{,}754$

Manioc: $\Delta(EX_{14} - IM_{14}) = 6{,}177{,}000 - 51 = 6{,}176{,}949$

Therefore, there could be a negative impact of around one million metric tons of white corn and a positive impact of approximately six million metric tons of manioc in the commercial balance of the sector. Table 8-3 indicates that in the base year there was a positive external balance for white corn of 582 metric tons, while a negative external balance for manioc of four metric tons. Table 8-20 shows that the situation of barley is not as bad, but there too the external balance is negative; around 3,000 metric tons would be needed.

It could be noted that there is not an explicit self-sufficiency objective. The increase in the production of yellow corn could be on the order of 488%. Similarly, the increase in production of rice could be around 121%. These results could release the pressure that yellow corn was putting on the external balance. The policies could also increase the positive external balance already obtained with rice. These results would have to be analyzed in a wider framework. For the moment, dependency is not entering our exercise. Whether or not it is more important to feed chickens for animal protein or to produce white corn for the lower income Sierra population is not being considered here.

On the other hand, in relation to the other policy performance indicator, Table 8-7 shows an increase in general employment of 113%. This is distributed between the two workers' classes. The employment of worker-owners could increase by 14%, while the employment of landless workers would increase by 58%. These increases in employment are reflected in increases in income. The worker-owners could have an increase in their income of 8,643% as can be seen in Table 8-7, while the increase in the landless workers would only be on the order of 59%. This extremely high difference in the changes in income would clearly be reflected in a worsening income distribution. Table 8-19 shows the impact of the reactions on the pattern of income distribution. From an initial share of 55% of the total income of the sector, the worker-owners move to 99%. The landless workers would decrease their share of the total income of the sector from almost 8% to 0.2%.

Policy run 2 shows the same pattern of responses at an even higher magnitude. This can be observed in Tables 8-9, 8-10, 8-19, and 8-20. The production of white corn could decrease by 314%, while that of manioc would increase by more than 2,000%. The increase in the income of worker-owners would be on the order of 17,000%, while the landless workers' share of the total income of the sector could decrease to 0.17%. This would be part of the social cost of the favorable external balance that is shown in Table 8-20.

The figures should not be looked at as an exact magnitude of the responses. At this stage of the study, they are indicators of tendencies. On the other hand, it is interesting to note that if one looks at the last operative (two-year) plans of both the Food and Agriculture ministries together, the impression is that, behind them, there is a package of policies such as the ones tried under policy runs 1 and 2. They do not quantify their policies. This is the reason that precludes us from a more definite analysis of them.

From the moment one starts being selective in terms of the policies to use, the picture changes. Policy run 3 took into account those products that were considered in both the production and consumption reaction matrices. The only variables changed were the prices of the ten products and the wage rate together with income per capita. The results can be seen in Tables 8-11, 8-12, 8-19, and 8-20. The higher responses in production corresponded to rice and manioc; both changed by 29%. The former rose while the latter decreased. The income of worker-owners decreased. Table 8-19 shows a decrease in their income share to 51% of the total income of the sector. The landless workers' share changed less than 1% while the owners outside of the agricultural sector increased their share to almost 41%. If the agricultural sector continues to play the role of generator of foreign exchange, this package of policies would not score too highly because of its impact on the production of sugar. Table 8-20 shows that even with a decrease in the consumption of sugar, there is a negative effect in the commercial balance.

Policy runs 4 and 5 show that the policies can also have a different social class orientation. Table 8-19 shows that policy runs 4 and 5 are oriented towards improving the income share of the landless worker while decreasing drastically that of the worker-owners. Policy run 6 follows the pattern of 1 and 2 in terms of increasing the income share of worker-owners. It is clear that, unless the policies are specifically designed to increase the income share of the landless workers, they will be the ones that will be paying the social cost of achieving any other goal. It is also clear from the last operative plans of both Food and Agricultural ministries that the landless workers are not even mentioned.

Tables 8-7, 8-9, 8-11, 8-13, 8-15, and 8-17 present the national reaction to the six production policy runs. Each of them has two parts. The first presents two vectors (DRP and %RP) of 69 elements (vertical entries of the national producers' reaction function described on pages 162 and 163). DRP presents the reactions in terms of absolute changes, while %RP refers to the same in terms of percentage rates of change. The second part shows three vectors (PC, PN, and DP) of 13 elements (products selected in the production process). PC and PN correspond to ΔPC and ΔPN of relation (8-17) discussed on page 187. DP corresponds to the addition of PC and PN, expressed in terms of absolute changes.

Tables 8-8, 8-10, 8-12, 8-14, 8-16, and 8-18 give the national reaction to the six consumption policy runs. They present five vectors (CC, CN, CO, DC, %C) of 31 elements (products that entered the food baskets). CC, CN, and CO correspond to ΔCC, ΔCN, and ΔCO of relation (8-17) discussed on page 187. DC is the sum of the first three vectors expressed in terms of absolute changes. %C refers to the direct reaction of consumers (as measured by CC) expressed in terms of percentage rates of change.

Table 8-7. National reaction to production policy run 1

Variable	DRP	%RP
DIS	8.292E+05	8.643E+03
DL08	4.682E+05	6.205E+01
DL80	2.202E+06	2.260E+01
DT13	1.092E+05	6.940E+01
DM01	1.543E+08	5.046E+01
DM14	0.000E+00	0.000E+00
DF03	1.513E+07	3.387E+00
DF17	-2.395E+07	-2.152E+00
DQ05	1.016E+06	4.882E+02
DQ21	7.963E+03	8.296E+01
DLE	1.272E+07	5.782E+01
DL13	1.279E+07	7.552E+01
DT01	1.986E+05	2.104E+02
DT14	1.204E+05	1.122E+03
DM03	3.847E+07	4.815E+01
DM17	-2.148E+07	-8.267E+00
DF05	6.102E+08	1.993E+02
DF21	2.852E+07	1.110E+02
DQ06	5.518E+04	8.633E+01
DQ47	-1.523E+03	-3.855E+01
DL01	2.181E+07	2.054E+02
DL14	1.363E+07	1.160E+03
DT03	-4.245E+05	-2.497E+02
DT17	2.431E+03	3.278E+00
DM05	5.042E+07	4.848E+01
DM21	1.251E+07	6.945E+01
DF06	1.137E+08	8.140E+01
DF47	-7.738E+06	-3.751E+01
DQ07	-1.485E+03	-8.971E-01
DQ48	1.785E+05	7.649E+01
DL03	-2.219E+07	-2.236E+02
DL17	6.128E+05	2.214E+01
DT05	4.285E+05	7.172E+02
DT21	3.892E+03	3.241E+01
DM06	4.029E+07	1.472E+02
DM47	-2.036E+04	-2.343E+00
DF07	1.361E+07	1.013E+01
DF48	6.157E+07	7.344E+01
DQ08	1.622E+04	7.389E+01
DQ80	6.745E+04	3.386E+01
DL05	2.728E+07	8.029E+02
DL21	4.376E+05	8.284E+01
DT06	3.074E+04	6.159E+01
DT47	-2.025E+02	-4.613E+01
DM07	-2.353E+07	-5.220E+01
DM48	6.944E+06	9.907E+01
DF08	3.387E+07	7.704E+01
DF80	3.057E+08	2.264E+01
DQ13	6.585E+05	6.148E+01
DL	7.097E+07	1.125E+02
DL06	1.144E+06	7.499E+01
DL47	-3.009E+04	-3.803E+01
DT07	-7.267E+04	-5.823E+01
DT48	4.842E+03	7.254E+01
DM08	9.235E+06	9.949E+01
DM80	5.940E+07	1.755E+01
DF13	8.295E+08	3.889E+01
DQ01	5.319E+05	1.205E+02
DQ14	1.645E+06	1.129E+03
DLS	5.893E+06	1.434E+01
DL07	3.027E+06	6.958E+01
DL48	1.001E+06	7.686E+01
DT08	1.049E+04	5.973E+01
DT80	4.377E+04	3.567E+01
DM13	9.116E+07	1.643E+02
DF01	7.256E+08	8.690E+01
DF14	3.482E+08	1.187E+03
DQ03	-6.616E+05	-1.573E+02
DQ17	5.237E+05	3.848E+00

Table 8-7. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	5.319E+05 1.645E+06	-6.616E+05 5.237E+05	1.016E+06 7.968E+03	5.518E+04 -1.523E+03	-1.485E+03 1.785E+05	1.622E+04 6.745E+04	6.585E+05
PN	9.288E+04 4.533E+06	-3.513E+05 8.022E+04	4.844E+05 3.335E+04	7.690E+04 -2.640E+03	-6.148E+02 2.206E+04	5.746E+03 1.315E+04	5.163E+05
DP	6.248E+05 6.177E+06	-1.013E+06 6.039E+05	1.501E+06 4.132E+04	1.321E+05 -4.164E+03	-2.100E+03 2.005E+05	2.197E+04 8.061E+04	1.175E+06

Table 8-8. National reaction to consumption policy run 1

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60	7 19 44 62	8 21 46 66	11 23 48 69
CC	0.184E 04	0.662E 03	0.441E 03	0.244E 04	0.350E 03	0.277E 03	0.125E 03
	0.135E 05	0.150E 02	0.220E 03	0.723E 04	0.242E 03	0.299E 01	0.263E 03
	0.107E 02	0.169E 04	0.234E 03	0.152E 04	0.200E 03	0.550E 02	0.327E 03
	0.161E 03	0.830E 03	0.164E 04	0.106E 04	0.336E 03	0.314E 02	0.912E 00
	0.630E 04	0.623E 03	0.299E 03				
CN	0.000E 00	0.816E 02	0.424E 03	0.000E 00	0.288E 02	0.326E 02	0.147E 03
	0.297E 02	0.202E 01	0.143E 03	0.000E 00	0.227E 03	0.127E 02	0.142E 03
	0.132E 02	0.149E 02	0.215E 03	0.448E 02	0.149E 03	0.631E 02	0.189E 03
	0.103E 03	0.338E 03	0.000E 00	0.000E 00	0.368E 02	0.180E 02	0.146E 02
	0.000E 00	0.790E 02	0.625E 02				
CD	0.374E 02	0.107E 02	0.346E 02	0.103E 04	0.625E 03	0.925E 01	0.248E 03
	0.255E 04	0.342E 02	0.133E 04	0.565E 03	0.278E 02	0.689E 00	-0.565E 02
	0.880E 00	0.000E 00	0.146E 04	0.204E 04	-0.629E 01	0.000E 00	0.312E 03
	-0.161E-01	0.000E 00	0.139E 03	-0.159E 01	0.115E 03	0.000E 00	0.273E 01
	-0.122E 03	-0.325E 02	0.000E 00				
DC	0.188E 04	0.754E 03	0.899E 03	0.347E 04	0.100E 04	0.319E 03	0.519E 03
	0.161E 05	0.513E 02	0.169E 04	0.780E 04	0.497E 03	0.164E 02	0.349E 03
	0.248E 02	0.170E 04	0.191E 04	0.360E 04	0.343E 03	0.118E 03	0.828E 03
	0.263E 03	0.114E 04	0.183E 04	0.106E 04	0.489E 03	0.494E 02	0.182E 02
	0.618E 04	0.669E 03	0.362E 03				
%C	0.614E 00	0.408E 00	0.109E 01	0.526E 00	0.486E 00	0.115E 01	0.503E 00
	0.122E 01	0.106E-01	0.911E 00	0.244E 01	0.189E 01	0.351E-01	0.911E 00
	0.276E 00	0.771E 00	0.798E 00	0.622E 00	0.519E 00	0.304E 00	0.526E 00
	0.568E 00	0.216E 01	0.790E 00	0.971E 00	0.698E 00	0.896E 00	0.504E-01
	0.827E 00	0.636E 00	0.344E 00				

Table 8-9. National reaction to production policy run 2

Variable	DRP	%RP
DIS	1.658E+06	1.729E+04
DL08	9.364E+05	1.241E+02
DL80	4.404E+06	4.521E+01
DT13	2.185E+05	1.383E+02
DM01	3.086E+08	1.009E+02
DM14	0.000E+00	0.000E+00
DF03	3.027E+07	6.775E+00
DF17	-4.791E+07	-4.304E+00
DQ05	2.033E+06	9.764E+02
DQ21	1.594E+04	1.659E+02
DLE	2.545E+07	1.156E+02
DL13	2.559E+07	1.510E+02
DT01	3.972E+05	4.209E+02
DT14	2.408E+05	2.244E+03
DM03	7.693E+07	9.630E+01
DM17	-4.295E+07	-1.653E+01
DF05	1.220E+09	3.985E+02
DF21	5.703E+07	2.220E+02
DQ06	1.104E+05	1.727E+02
DQ47	-3.046E+03	-7.710E+01
DL01	4.363E+07	4.108E+02
DL14	2.727E+07	2.321E+03
DT03	-8.490E+05	-4.994E+02
DT17	4.862E+03	6.557E+00
DM05	1.008E+08	9.695E+01
DM21	2.501E+07	1.389E+02
DF06	2.274E+08	1.628E+02
DF47	-1.548E+07	-7.501E+01
DQ07	-2.969E+03	-1.794E+00
DQ48	3.569E+05	1.530E+02
DL03	-4.437E+07	-4.473E+02
DL17	1.226E+06	4.428E+01
DT05	8.569E+05	1.434E+03
DT21	7.784E+03	6.481E+01
DM06	8.059E+07	2.944E+02
DM47	-4.072E+04	-4.686E+00
DF07	2.722E+07	2.025E+01
DF48	1.231E+08	1.469E+02
DQ08	3.244E+04	1.478E+02
DQ80	1.349E+05	6.772E+01
DL05	5.457E+07	1.606E+03
DL21	8.751E+05	1.657E+02
DT06	6.148E+04	1.232E+02
DT47	-4.050E+02	-9.226E+01
DM07	-4.705E+07	-1.044E+02
DM48	1.389E+07	1.981E+02
DF08	6.773E+07	1.541E+02
DF80	6.114E+08	4.529E+01
DQ13	1.317E+06	1.230E+02
DL	1.419E+08	2.249E+02
DL06	2.289E+06	1.500E+02
DL47	-5.013E+04	-7.616E+01
DT07	-1.453E+05	-1.165E+02
DT48	9.684E+03	1.451E+02
DM08	1.847E+07	1.990E+02
DM80	1.188E+08	3.513E+01
DF13	1.659E+09	7.773E+01
DQ01	1.064E+06	2.412E+02
DQ14	3.289E+06	2.258E+03
DLS	1.179E+07	2.868E+01
DL07	6.053E+06	1.392E+02
DL48	2.001E+06	1.537E+02
DT08	2.099E+04	1.195E+02
DT80	8.753E+04	7.134E+01
DM13	1.823E+08	3.286E+02
DF01	1.451E+09	1.738E+02
DF14	6.964E+08	2.373E+03
DQ03	-1.323E+06	-3.146E+02
DQ17	1.047E+06	7.695E+00

Table 8-9. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	1.064E+06 3.289E+06	-1.323E+06 1.047E+06	2.033E+06 1.594E+04	1.104E+05 -3.046E+03	-2.969E+03 3.569E+05	3.244E+04 1.349E+05	1.317E+06
PN	1.858E+05 9.065E+06	-7.027E+05 1.604E+05	9.688E+05 6.671E+04	1.538E+05 -5.281E+03	-1.230E+03 4.411E+04	1.149E+04 2.631E+04	1.033E+06
DP	1.250E+06 1.235E+07	-2.026E+06 1.208E+06	3.002E+06 8.264E+04	2.642E+05 -8.327E+03	-4.199E+03 4.010E+05	4.393E+04 1.612E+05	2.349E+06

Table 8-10. National reaction to consumption policy run 2

	1 13 25 49 73	3 14 27 58 76	4 16 31 59 90	6 17 33 60	7 19 44 62	8 21 46 66	11 23 48 69
CC	0.368E 04 0.270E 05 0.214E 02 0.321E 03 0.126E 05	0.132E 04 0.300E 02 0.338E 04 0.160E 04 0.125E 04	0.881E 03 0.439E 03 0.468E 03 0.329E 04 0.598E 03	0.487E 04 0.145E 05 0.304E 04 0.212E 04	0.760E 03 0.484E 03 0.401E 03 0.673E 03	0.554E 03 0.508E 01 0.110E 03 0.627E 02	0.250E 03 0.526E 03 0.654E 03 0.182E 01
CA	0.000E 00 0.595E 02 0.264E 02 0.235E 03 0.000E 00	0.163E 03 0.404E 01 0.297E 02 0.676E 03 0.158E 03	0.848E 03 0.286E 03 0.429E 03 0.000E 00 0.125E 03	0.000E 00 0.000E 00 0.896E 02 0.000E 00	0.576E 02 0.454E 03 0.297E 03 0.736E 02	0.652E 02 0.254E 02 0.126E 03 0.360E 02	0.293E 03 0.285E 03 0.378E 03 0.291E 02
CL	0.748E 02 0.510E 04 0.176E 01 -0.321E-01 -0.243E 03	0.213E 02 0.685E 02 0.000E 00 0.000E 00 -0.649E 02	0.692E 02 0.266E 04 0.292E 04 0.378E 03 0.000E 00	0.206E 04 0.113E 04 0.408E 04 -0.317E 01	0.125E 04 0.555E 02 -0.126E 02 0.230E 03	0.185E 02 0.138E 01 0.000E 00 0.000E 00	0.495E 03 -0.113E 03 0.624E 03 0.545E 01
DC	0.376E 04 0.322E 05 0.495E 02 0.526E 03 0.124E 05	0.151E 04 0.103E 03 0.341E 04 0.228E 04 0.134E 04	0.180E 04 0.339E 04 0.382E 04 0.367E 04 0.723E 03	0.693E 04 0.156E 05 0.720E 04 0.211E 04	0.201E 04 0.994E 03 0.685E 03 0.977E 03	0.637E 03 0.328E 02 0.236E 03 0.987E 02	0.104E 04 0.698E 03 0.166E 04 0.364E 02
%C	0.123E 01 0.244E 01 0.553E 00 0.114E 01 0.165E 01	0.817E 00 0.213E-01 0.154E 01 0.431E 01 0.127E 01	0.218E 01 0.182E 01 0.160E 01 0.158E 01 0.688E 00	0.105E 01 0.489E 01 0.124E 01 0.194E 01	0.973E 00 0.378E 01 0.104E 01 0.140E 01	0.231E 01 0.702E-01 0.608E 00 0.179E 01	0.101E 01 0.182E 01 0.105E 01 0.101E 00

Table 8-11. National reaction to production policy run 3

	DIS	DLE	DL01	DL03	DL05	DL06	DL07
	DL08	DL13	DL14	DL17	DL21	DL47	DL48
	DL80	DT01	DT03	DT05	DT06	DT07	DT08
	DT13	DT14	DT17	DT21	DT47	DT48	DT80
	DM01	DM03	DM05	DM06	DM07	DM08	DM13
	DM14	DM17	DM21	DM47	DM48	DM80	DF01
	DF03	DF05	DF06	DF07	DF08	DF13	DF14
	DF17	DF21	DF47	DF48	DF80	DQ01	DQ03
	DQ05	DQ06	DQ07	DQ08	DQ13	DQ14	DQ17
	DQ21	DQ47	DQ48	DQ80	DL	DLS	
DRP	-1.778E+03	-7.359E+05	2.989E+06	8.695E+05	-5.954E+05	-1.053E+04	-2.596E+04
	-1.186E+04	-7.108E+04	-4.087E+05	-4.108E+05	-4.851E+03	-9.081E+02	1.706E+04
	-1.085E+06	2.391E+04	1.476E+04	-1.142E+04	-1.071E+02	3.604E+02	-5.392E+01
	2.188E+02	-3.432E+03	-1.157E+04	-9.167E+01	2.620E+00	5.657E+01	-1.220E+04
	6.674E+07	1.040E+07	-9.757E+06	2.774E+05	6.144E+05	-3.703E+04	4.276E+04
	0.000E+00	-4.040E+07	0.000E+00	4.635E+03	5.781E+04	-2.620E+07	2.543E+08
	4.534E+07	-2.896E+07	-6.300E+05	1.434E+05	-2.208E+05	2.512E+06	-9.109E+06
	-1.446E+08	-1.905E+05	6.091E+04	1.128E+05	-1.059E+08	1.264E+05	3.823E+04
	-2.848E+04	-1.506E+02	5.667E+02	-1.727E+02	5.868E+02	-4.180E+04	-1.822E+06
	-6.295E+01	4.294E+00	1.355E+03	-1.388E+04	5.455E+06	-5.114E+06	
%RP	-1.853E+01	-3.344E+00	2.814E+01	8.765E+00	-1.752E+01	-6.898E-01	-5.969E-01
	-1.572E+00	-4.196E-01	-3.478E+01	-1.484E+01	-9.185E-01	-1.149E+00	1.311E+00
	-1.113E+01	2.533E+01	8.684E+00	-1.911E+01	-2.146E-01	2.890E-01	-3.069E-01
	1.390E-01	-3.198E+01	-1.561E+01	-7.633E-01	5.967E-01	8.474E-01	-9.941E+00
	2.182E+01	1.301E+01	-9.382E+00	1.013E+00	1.363E+00	-3.989E-01	7.707E-02
	0.000E+00	-1.555E+01	0.000E+00	5.334E-01	8.248E-01	-7.747E+00	3.046E+01
	1.015E+01	-9.458E+00	-4.509E-01	1.067E-01	-5.022E-01	1.178E-01	-3.104E+01
	-1.299E+01	-7.415E-01	2.953E-01	1.346E-01	-7.842E+00	2.867E+01	9.090E+00
	-1.368E+01	-2.356E-01	3.424E-01	-7.869E-01	5.479E-02	-2.869E+01	-1.338E+01
	-6.555E-01	1.087E-01	5.808E-01	-6.967E+00	8.643E+00	-1.244E+01	

Table 8-11. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	1.264E+05 -4.180E+04	3.823E+04 -1.822E+06	-2.848E+04 -6.295E+01	-1.506E+02 4.294E+00	5.667E+02 1.355E+03	-1.727E+02 -1.338E+04	5.868E+02
PN	2.208E+04 -1.152E+05	2.030E+04 -2.791E+05	-1.357E+04 -2.635E+02	-2.099E+02 7.444E+00	2.347E+02 1.675E+02	-6.119E+01 -2.706E+03	4.600E+02
DP	1.485E+05 -1.570E+05	5.854E+04 -2.101E+06	-4.205E+04 -3.265E+02	-3.605E+02 1.174E+01	8.013E+02 1.523E+03	-2.339E+02 -1.658E+04	1.047E+03

Table 8-12. National reaction to consumption policy run 3

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60	7 19 44 62	8 21 46 66	11 23 48 69
CC	-0.142E 03	-0.189E 03	0.140E 03	-0.415E 03	0.343E 02	-0.131E 02	0.158E 02
	-0.109E 04	0.882E 02	0.267E 02	-0.293E 03	-0.748E 01	0.291E 00	0.107E 02
	-0.119E 01	-0.759E 02	-0.473E 01	0.322E 02	-0.140E 02	-0.202E 01	-0.526E 02
	-0.625E 01	-0.292E 02	-0.580E 02	-0.454E 02	-0.210E 02	-0.488E 00	-0.745E-01
	-0.331E 03	-0.196E 02	-0.970E 01				
CN	0.000E 00	-0.234E 02	0.135E 03	0.000E 00	0.282E 01	-0.154E 01	0.184E 02
	-0.239E 01	0.119E 02	0.174E 02	0.000E 00	-0.702E 01	0.124E 01	0.579E 01
	-0.147E 01	-0.668E 00	-0.434E 01	0.951E 00	-0.104E 02	-0.232E 01	-0.304E 02
	-0.399E 01	-0.123E 02	0.000E 00	0.000E 00	-0.229E 01	-0.280E 00	-0.119E 01
	0.000E 00	-0.249E 01	-0.203E 01				
CC	-0.287E 01	-0.305E 01	0.110E 02	-0.176E 03	0.612E 02	-0.437E 00	0.312E 02
	-0.205E 03	0.201E 03	0.162E 03	-0.229E 02	-0.858E 00	0.670E-01	-0.230E 01
	-0.981E-01	0.000E 00	-0.295E 02	0.432E 02	0.441E 00	0.000E 00	-0.502E 02
	0.625E-03	0.000E 00	-0.667E 01	0.691E-01	-0.718E 01	0.000E 00	-0.223E 00
	0.639E 01	0.102E 01	0.000E 00				
DC	-0.145E 03	-0.216E 03	0.286E 03	-0.591E 03	0.983E 02	-0.151E 02	0.654E 02
	-0.129E 04	0.301E 03	0.206E 03	-0.316E 03	-0.154E 02	0.159E 01	0.142E 02
	-0.276E 01	-0.766E 02	-0.386E 02	0.764E 02	-0.240E 02	-0.434E 01	-0.133E 03
	-0.102E 02	-0.415E 02	-0.646E 02	-0.453E 02	-0.304E 02	-0.768E 00	-0.149E 01
	-0.325E 03	-0.211E 02	-0.117E 02				
%C	-0.472E-01	-0.117E 00	0.346E 00	-0.897E-01	0.476E-01	-0.545E-01	0.633E-01
	-0.978E-01	0.625E-01	0.111E 00	-0.991E-01	-0.584E-01	0.341E-02	0.370E-01
	-0.308E-01	-0.347E-01	-0.161E-01	0.132E-01	-0.364E-01	-0.112E-01	-0.847E-01
	-0.221E-01	-0.787E-01	-0.279E-01	-0.417E-01	-0.435E-01	-0.139E-01	-0.412E-02
	-0.434E-01	-0.200E-01	-0.112E-01				

Table 8-13. National reaction to production policy run 4

	DIS	DLE	DL01	DL03	DL05	DL06	DL07
	DL08	DL13	DL14	DL17	DL21	DL47	DL48
	DL80	DT01	DT03	DT05	DT06	DT07	DT08
	DT13	DT14	DT17	DT21	DT47	DT48	DT80
	DM01	DM03	DM05	DM06	DM07	DM08	DM13
	DM14	DM17	DM21	DM47	DM48	DM80	DF01
	DF03	DF05	DF06	DF07	DF08	DF13	DF14
	DF17	DF21	DF47	DF48	DF80	DQ01	DQ03
	DQ05	DQ06	DQ07	DQ08	DQ13	DQ14	DQ17
	DQ21	DQ47	DQ48	DQ80	DL	DLS	
DRP	-1.029E+04	1.663E+06	-3.426E+05	2.589E+06	-4.351E+05	-1.031E+05	9.397E+05
	0.000E+00	-5.187E+05	2.637E+05	0.000E+00	-4.387E+04	0.000E+00	-4.690E+04
	-1.283E+05	-9.732E+03	3.118E+04	-1.069E+04	-5.780E+03	1.642E+04	0.000E+00
	-1.385E+04	1.963E+03	0.000E+00	-1.389E+03	0.000E+00	-5.107E+02	-4.092E+03
	-2.711E+06	2.158E+07	-6.916E+06	-2.547E+06	5.042E+06	0.000E+00	-1.544E+06
	0.000E+00	0.000E+00	0.000E+00	0.000E+00	-5.216E+05	-3.081E+06	-2.221E+07
	1.302E+08	-2.397E+07	-6.601E+06	3.271E+07	0.000E+00	-3.282E+07	5.463E+06
	0.000E+00	-2.890E+06	0.000E+00	-1.020E+06	-1.141E+07	-1.407E+04	1.086E+05
	-2.183E+04	-4.474E+03	3.180E+04	0.000E+00	-2.955E+04	2.607E+04	0.000E+00
	-7.974E+02	0.000E+00	-8.409E+03	-3.129E+03	1.004E+07	6.479E+05	
%RP	-1.073E+02	7.647E+00	-3.226E+00	2.610E+01	-1.280E+01	-6.759E+00	2.160E+01
	0.000E+00	-3.062E+00	2.244E+01	0.000E+00	-8.306E+00	0.000E+00	-3.602E+00
	-1.322E+00	-1.031E+01	1.834E+01	-1.789E+01	-1.158E+01	1.317E+01	0.000E+00
	-8.796E+00	1.830E+01	0.000E+00	-1.156E+01	0.000E+00	-7.650E+00	-3.335E+00
	-8.864E-01	2.701E+01	-6.650E+00	-9.306E+00	1.119E+01	0.000E+00	-2.783E+00
	0.000E+00	0.000E+00	0.000E+00	0.000E+00	-7.442E+00	-9.109E-01	-2.660E+00
	2.914E+01	-7.827E+00	-4.725E+00	2.434E+01	0.000E+00	-1.539E+00	1.862E+01
	0.000E+00	-1.125E+01	0.000E+00	-1.216E+00	-8.449E-01	-3.191E+00	2.583E+01
	-1.049E+01	-7.000E+00	1.922E+01	0.000E+00	-2.759E+00	1.789E+01	0.000E+00
	-8.303E+00	0.000E+00	-3.604E+00	-1.571E+00	1.592E+01	1.577E+00	

Table 8-13. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	-1.407E+04 2.607E+04	1.086E+05 0.000E+00	-2.183E+04 -7.974E+02	-4.474E+03 0.000E+00	3.180E+04 -8.409E+03	0.000E+00 -3.129E+03	-2.955E+04
PN	-2.457E+03 7.184E+04	5.769E+04 0.000E+00	-1.040E+04 -3.338E+03	-6.235E+03 0.000E+00	1.317E+04 -1.039E+03	0.000E+00 -6.101E+02	-2.317E+04
DP	-1.653E+04 9.790E+04	1.663E+05 0.000E+00	-3.223E+04 -4.135E+03	-1.071E+04 0.000E+00	4.497E+04 -9.448E+03	0.000E+00 -3.739E+03	-5.272E+04

Table 8-14. National reaction to consumption policy run 4

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60	7 19 44 62	8 21 46 65	11 23 48 69
CC	0.217E 02 0.329E 02 0.000E 00 -0.615E 00 -0.238E 02	-0.205E 03 -0.336E 02 -0.385E 01 -0.647E 01 -0.226E 01	0.796E 02 -0.471E-01 -0.171E 00 -0.115E 02 0.478E 00	0.378E 02 -0.159E 02 0.221E 02 -0.540E 01	-0.773E 02 -0.187E 01 0.625E-01 -0.463E 00	0.642E 01 0.397E 00 0.000E 00 -0.144E 00	-0.239E 00 -0.395E 00 0.254E 00 0.000E 00
CN	0.000E 00 0.723E-01 0.000E 00 -0.392E 00 0.000E 00	-0.253E 02 -0.453E 01 -0.338E-01 -0.273E 01 -0.287E 00	0.766E 02 -0.307E-01 -0.156E 00 0.000E 00 0.997E-01	0.000E 00 0.000E 00 0.652E 00 0.000E 00	-0.636E 01 -0.176E 01 0.464E-01 -0.506E-01	0.755E 00 0.169E 01 0.000E 00 -0.827E-01	-0.280E 00 -0.214E 00 0.147E 00 0.000E 00
CL	0.440E 00 0.619E 01 0.000E 00 0.615E-04 0.460E 00	-0.331E 01 -0.767E 02 0.000E 00 0.000E 00 0.118E 00	0.625E 01 -0.286E 00 -0.107E 01 -0.133E 01 0.000E 00	0.160E 02 -0.124E 01 0.297E 02 0.811E-02	-0.138E 03 -0.215E 00 -0.196E-02 -0.159E 00	0.214E 00 0.914E-01 0.000E 00 0.000E 00	-0.473E 00 0.849E-01 0.243E 00 0.000E 00
DC	0.221E 02 0.391E 02 0.000E 00 -0.101E 01 -0.234E 02	-0.234E 03 -0.115E 03 -0.388E 01 -0.921E 01 -0.243E 01	0.162E 03 -0.363E 00 -0.139E 01 -0.129E 02 0.577E 00	0.538E 02 -0.172E 02 0.524E 02 -0.540E 01	-0.222E 03 -0.385E 01 0.107E 00 -0.672E 00	0.739E 01 0.217E 01 0.000E 00 -0.227E 00	-0.993E 00 -0.524E 00 0.644E 00 0.000E 00
%C	0.723E-02 0.296E-02 0.000E 00 -0.217E-02 -0.313E-02	-0.127E 00 -0.238E-01 -0.176E-02 -0.174E-01 -0.231E-02	0.197E 00 -0.195E-03 -0.582E-03 -0.555E-02 0.550E-03	0.816E-02 -0.538E-02 0.906E-02 -0.496E-02	-0.107E 00 -0.146E-01 0.162E-03 -0.960E-03	0.267E-01 0.465E-02 0.000E 00 -0.412E-02	-0.961E-03 -0.137E-02 0.410E-03 0.000E 00

Table 8-15. National reaction to production policy run 5

Variable	DRP	%RP
DIS	-9.491E+03	-9.893E+01
DL08	-2.257E+04	-2.992E+00
DL80	-9.052E+04	-9.292E-01
DT13	-1.012E+04	-6.429E+00
DM01	-1.252E+07	-4.093E+00
DM14	0.000E+00	0.000E+00
DF03	1.074E+08	2.404E+01
DF17	2.631E+07	2.364E+00
DQ05	-2.709E+04	-1.301E+01
DQ21	-8.904E+02	-9.271E+00
DLE	2.916E+05	1.325E+00
DL13	-9.202E+05	-5.432E+00
DT01	-1.141E+04	-1.209E+01
DT14	2.429E+03	2.263E+01
DM03	1.871E+07	2.342E+01
DM17	7.160E+06	2.756E+00
DF05	-2.843E+07	-9.284E+00
DF21	-2.890E+06	-1.125E+01
DQ06	-4.309E+03	-6.742E+00
DQ47	4.294E+00	1.087E-01
DL01	-9.563E+05	-9.005E+00
DL14	2.871E+05	2.443E+01
DT03	2.512E+04	1.478E+01
DT17	2.278E+03	3.071E+00
DM05	-9.757E+06	-9.382E+00
DM21	0.000E+00	0.000E+00
DF06	-6.307E+06	-4.515E+00
DF47	6.091E+04	2.953E-01
DQ07	2.112E+04	1.276E+01
DQ48	-8.373E+03	-3.589E+00
DL03	1.798E+06	1.813E+01
DL17	4.135E+04	1.494E+00
DT05	-1.060E+04	-1.808E+01
DT21	-1.389E+03	-1.156E+01
DM06	-1.754E+06	-6.407E+00
DM47	4.635E+03	5.334E-01
DF07	2.439E+07	1.815E+01
DF48	-9.256E+05	-1.104E+00
DQ08	-9.825E+01	-4.476E-01
DQ80	1.062E+02	5.331E-02
DL05	-5.545E+05	-1.632E+01
DL21	-6.091E+04	-1.153E+01
DT06	-4.609E+03	-9.234E+00
DT47	2.620E+00	5.967E-01
DM07	3.839E+06	8.517E+00
DM48	-4.734E+05	-6.754E+00
DF08	3.331E+05	7.576E-01
DF80	1.087E+07	8.055E-01
DQ13	-2.861E+04	-2.671E+00
DL	3.136E+06	4.969E+00
DL06	-1.369E+05	-8.972E+00
DL47	-9.081E+02	-1.149E+00
DT07	1.225E+04	9.820E+00
DT48	-4.634E+02	-6.943E+00
DM08	8.153E+04	8.782E-01
DM80	4.263E+06	1.261E+00
DF13	-2.329E+07	-1.092E+00
DQ01	-3.465E+04	-7.860E+00
DQ14	2.977E+04	2.044E+01
DLS	3.798E+06	9.242E+00
DL07	5.229E+05	1.202E+01
DL48	-6.326E+04	-4.858E+00
DT08	1.456E+02	8.287E-01
DT80	-1.202E+03	-9.795E-01
DM13	-1.406E+06	-2.534E+00
DF01	-5.852E+07	-7.008E+00
DF14	6.872E+06	2.342E+01
DQ03	8.443E+04	2.007E+01
DQ17	3.144E+05	2.310E+00

Table 8-15. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	-3.465E+04 2.977E+04	8.443E+04 3.144E+05	-2.709E+04 -8.904E+02	-4.309E+03 4.294E+00	2.112E+04 -8.373E+03	-9.825E+01 1.062E+02	-2.861E+04
PN	-6.052E+03 8.206E+04	4.484E+04 4.816E+04	-1.291E+04 -3.727E+03	-6.005E+03 7.444E+00	8.746E+03 -1.035E+03	-3.481E+01 2.071E+01	-2.243E+04
DP	-4.071E+04 1.118E+05	1.293E+05 3.625E+05	-4.001E+04 -4.617E+03	-1.031E+04 1.174E+01	2.987E+04 -9.408E+03	-1.331E+02 1.269E+02	-5.104E+04

Table 8-16. National reaction to consumption policy run 5

	1 13 25 49 70	3 14 27 58 76	4 16 31 59 90	6 17 33 60	7 19 44 62	9 21 46 66	11 23 48 69
CC	0.392E 04	0.112E 04	0.936E 03	0.530E 04	0.661E 03	0.580E 03	0.270E 03
	0.285E 05	-0.233E 02	0.476E 03	0.148E 05	0.504E 03	0.679E 01	0.564E 03
	0.234E 02	0.361E 04	0.551E 03	0.313E 04	0.437E 03	0.123E 03	0.712E 03
	0.352E 03	0.167E 04	0.349E 04	0.230E 04	0.738E 03	0.647E 02	0.231E 01
	0.136E 05	0.134E 04	0.686E 03				
CN	0.000E 00	0.138E 03	0.901E 03	0.000E 00	0.544E 02	0.682E 02	0.316E 03
	0.627E 02	-0.315E 01	0.310E 03	0.000E 00	0.473E 03	0.289E 02	0.305E 03
	0.289E 02	0.318E 02	0.505E 03	0.924E 02	0.324E 03	0.141E 03	0.412E 03
	0.225E 03	0.705E 03	0.000E 00	0.000E 00	0.807E 02	0.371E 02	0.368E 02
	0.000E 00	0.170E 03	0.143E 03				
CL	0.796E 02	0.181E 02	0.735E 02	0.224E 04	0.119E 04	0.194E 02	0.533E 03
	0.538E 04	-0.533E 02	0.289E 04	0.116E 04	0.578E 02	0.157E 01	-0.121E 03
	0.193E 01	0.000E 00	0.344E 04	0.420E 04	-0.137E 02	0.000E 00	0.680E 03
	-0.352E-01	0.000E 00	0.402E 03	-0.345E 01	0.253E 03	0.000E 00	0.689E 01
	-0.262E 03	-0.699E 02	0.000E 00				
DC	0.400E 04	0.128E 04	0.191E 04	0.754E 04	0.190E 04	0.667E 03	0.112E 04
	0.340E 05	-0.798E 02	0.367E 04	0.160E 05	0.104E 04	0.372E 02	0.748E 03
	0.542E 02	0.364E 04	0.450E 04	0.743E 04	0.747E 03	0.263E 03	0.180E 04
	0.576E 03	0.237E 04	0.389E 04	0.230E 04	0.107E 04	0.102E 03	0.460E 02
	0.133E 05	0.144E 04	0.830E 03				
%C	0.131E 01	0.692E 00	0.231E 01	0.115E 01	0.918E 00	0.242E 01	0.108E 01
	0.257E 01	-0.166E-01	0.197E 01	0.501E 01	0.394E 01	0.797E-01	0.195E 01
	0.605E 00	0.165E 01	0.188E 01	0.128E 01	0.113E 01	0.677E 00	0.115E 01
	0.124E 01	0.450E 01	0.168E 01	0.211E 01	0.153E 01	0.185E 01	0.127E 00
	0.178E 01	0.137E 01	0.790E 00				

Table 8-17. National reaction to production policy run 6

	DIS	DLE	DL01	DL03	DL05	DL06	DL07
	DL08	DL13	DL14	DL17	DL21	DL47	DL48
	DL80	DT01	DT03	DT05	DT06	DT07	DT08
	DT13	DT14	DT17	DT21	DT47	DT48	DT80
	DM01	DM03	DM05	DM06	DM07	DM08	DM13
	DM14	DM17	DM21	DM47	DM48	DM80	DF01
	DF03	DF05	DF06	DF07	DF08	DF13	DF14
	DF17	DF21	DF47	DF48	DF80	DW01	DQ03
	DQ05	DW06	DQ07	DQ08	DQ13	DW14	DQ17
	DQ21	DW47	DQ48	DW80	DL	DLS	
URP	1.898E+04	-7.012E+05	2.538E+06	-1.023E+06	-2.595E+05	1.264E+05	-5.337E+05
	1.071E+04	8.491E+05	-1.255E+05	1.666E+04	5.606E+04	-8.508E+03	0.000E+00
	-9.942E+05	2.195E+04	-1.172E+04	-4.550E+03	4.502E+03	-1.135E+04	-1.995E+02
	1.034E+04	-9.966E+02	1.372E+01	1.297E+03	-6.664E+01	0.000E+00	-1.100E+04
	4.539E+07	-8.313E+06	-6.084E+06	2.031E+06	-2.693E+06	-1.186E+05	1.448E+06
	0.000E+00	-7.483E+06	0.000E+00	-1.179E+05	0.000E+00	-3.045E+07	1.806E+08
	-6.325E+07	-2.954E+07	5.677E+06	-2.321E+07	-5.538E+05	2.580E+07	-4.249E+06
	-1.872E+07	2.700E+06	-1.550E+06	0.000E+00	-1.167E+08	9.735E+04	-4.634E+04
	-1.652E+04	4.159E+03	-1.946E+04	-7.447E+01	2.919E+04	-1.270E+04	-1.496E+05
	8.274E+02	-4.252E+02	0.000E+00	-1.398E+04	1.182E+06	1.484E+06	
%RP	1.979E+02	-3.186E+00	2.390E+01	-1.031E+01	-7.635E+00	8.282E+00	-1.227E+01
	1.420E+00	5.013E+00	-1.068E+01	6.018E-01	1.061E+01	-1.077E+01	0.000E+00
	-1.021E+01	2.326E+01	-6.894E+00	-7.616E+00	9.019E+00	-9.114E+00	-1.136E+00
	6.567E+00	-9.288E+00	1.850E-02	1.080E+01	-1.518E+01	0.000E+00	-8.962E+00
	1.484E+01	-1.041E+01	-5.850E+00	7.421E+00	-5.975E+00	-1.277E+00	2.611E+00
	0.000E+00	-2.880E+00	0.000E+00	-1.357E+01	0.000E+00	-9.007E+00	2.163E+01
	-1.416E+01	-9.646E+00	4.064E+00	-1.727E+01	-1.260E+00	1.209E+00	-1.448E+01
	-1.682E+00	1.051E+01	-7.511E+00	0.000E+00	-8.648E+00	2.203E+01	-1.149E+01
	-7.933E+00	6.506E+00	-1.176E+01	-3.392E-01	2.726E+00	-8.715E+00	-1.099E+00
	8.615E+00	-1.076E+01	0.000E+00	-7.020E+00	1.873E+00	3.611E+00	

Table 8-17. (continued)

	DQ01 DQ14	DQ03 DQ17	DQ05 DQ21	DQ06 DQ47	DQ07 DQ48	DQ08 DQ80	DQ13
PC	9.735E+04 -1.270E+04	-4.834E+04 -1.496E+05	-1.652E+04 8.274E+02	4.159E+03 -4.252E+02	-1.946E+04 0.000E+00	-7.447E+01 -1.393E+04	2.919E+04
PN	1.700E+04 -3.499E+04	-2.567E+04 -2.291E+04	-7.871E+03 3.463E+03	5.796E+03 -7.371E+02	-8.060E+03 0.000E+00	-2.638E+01 -2.727E+03	2.289E+04
DP	1.144E+05 -4.769E+04	-7.401E+04 -1.725E+05	-2.439E+04 4.291E+03	9.954E+03 -1.162E+03	-2.752E+04 0.000E+00	-1.003E+02 -1.671E+04	5.208E+04

Table 8-18. National reaction to consumption policy run 6

	1 13 25 47 70	3 14 27 59 76	4 16 31 59 90	6 17 33 60	7 19 44 62	8 21 46 66	11 23 48 69
CC	-0.151E 03 -0.110E 04 -0.115E 01 -0.533E 01 -0.308E 03	0.344E 02 0.774E 02 -0.733E 02 -0.238E 02 -0.193E 02	0.708E 02 0.267E 02 -0.454E 01 -0.521E 02 -0.906E 01	-0.443E 03 -0.279E 03 0.228E 02 -0.431E 02	0.104E 03 -0.579E 01 -0.113E 02 -0.206E 02	-0.195E 02 0.291E 00 -0.196E 01 -0.488E 00	0.145E 02 0.111E 02 -0.232E 02 -0.725E-01
CN	0.000E 00 -0.242E 01 -0.142E 01 -0.340E 01 0.000E 00	0.424E 01 0.104E 02 -0.645E 00 -0.100E 02 -0.245E 01	0.682E 02 0.174E 02 -0.416E 01 0.000E 00 -0.189E 01	0.000E 00 0.000E 00 0.672E 00 0.000E 00	0.856E 01 -0.544E 01 -0.838E 01 -0.226E 01	-0.229E 01 0.124E 01 -0.225E 01 -0.290E 00	0.170E 02 0.600E 01 -0.134E 02 -0.116E 01
CE	-0.307E 01 -0.207E 03 -0.946E-01 0.533E-03 0.594E 01	0.554E 00 0.177E 03 0.000E 00 0.000E 00 0.100E 01	0.556E 01 0.162E 03 -0.283E 02 -0.599E 01 0.000E 00	-0.187E 03 -0.218E 02 0.306E 02 0.647E-01	0.186E 03 -0.665E 00 0.355E 00 -0.706E 01	-0.651E 00 0.670E-01 0.000E 00 0.000E 00	0.287E 02 -0.238E 01 -0.221E 02 -0.217E 00
DC	-0.154E 03 -0.131E 04 -0.266E 01 -0.873E 01 -0.302E 03	0.392E 02 0.265E 03 -0.739E 02 -0.338E 02 -0.207E 02	0.145E 03 0.236E 03 -0.370E 02 -0.581E 02 -0.109E 02	-0.631E 03 -0.301E 03 0.541E 02 -0.431E 02	0.298E 03 -0.119E 02 -0.193E 02 -0.299E 02	-0.224E 02 0.159E 01 -0.421E 01 -0.768E 00	0.603E 02 0.147E 02 -0.587E 02 -0.145E 01
%C	-0.504E-01 -0.992E-01 -0.297E-01 -0.188E-01 -0.404E-01	0.212E-01 0.549E-01 -0.335E-01 -0.641E-01 -0.197E-01	0.175E 00 0.111E 00 -0.155E-01 -0.251E-01 -0.104E-01	-0.958E-01 -0.942E-01 0.934E-02 -0.396E-01	0.144E 00 -0.453E-01 -0.293E-01 -0.428E-01	-0.812E-01 0.341E-02 -0.108E-01 -0.139E-01	0.584E-01 0.384E-01 -0.373E-01 -0.401E-02

Table 8-19. Impact of policy runs on income distribution (in percentages)

	Worker owners	Landless workers	Nonagricultural owners	Total income
Base year	55.24	7.77	36.99	100.00
Policy run 1	99.03	0.24	0.73	100.00
Policy run 2	99.47	0.17	0.36	100.00
Policy run 3	51.32	8.35	40.33	100.00
Policy run 4	0.00[a]	18.44	81.56	100.00
Policy run 5	1.35	17.60	81.05	100.00
Policy run 6	79.45	3.47	17.08	100.00

[a]Truncated in order to avoid negative values.

Table 8-20. Impact of policy runs on external balance

	Δ internal sources (ΔP)	Δ internal uses (ΔC)	Δ external balance Δ (EX-IM)	External balance base year and %Δ for policy run
01 Rice				17,855
Run 1	419,616	1,880	417,736	2,340%
Run 2	839,500	3,760	835,740	4,681%
Run 3	99,733	-145	99,878	559%
Run 4	-11,102	22	-11,124	-62%
Run 5	-27,341	4,000	-31,341	-176%
Run 6	76,831	-154	76,985	431
06 Wheat				-566,830
Run 1	132,100	3,470	128,630	-23%
Run 2	264,200	6,930	257,270	-45%
Run 3	-356	-591	235	--
Run 4	-10,710	54	-10,764	2%
Run 5	-10,310	7,540	-17,850	3%
Run 6	9,954	-631	10,585	2%
07 Barley				-40,906
Run 1	-2,100	1,000	-3,100	8%
Run 2	-4,199	2,010	-6,209	15%
Run 3	801	98	703	-2%
Run 4	44,970	-222	45,192	-110%
Run 5	29,870	1,900	27,970	68%
Run 6	-27,520	298	-27,818	68%
17 Sugar				438,048
Run 1	34,302	7,800	26,502	6%
Run 2	68,614	15,600	53,014	12%
Run 3	-119,367	-316	-119,051	-27%
Run 4	--	-17	17	--
Run 5	20,590	16,000	4,590	1%
Run 6	-9,798	-301	-9,497	2%

CHAPTER 9. SUMMARY AND CONCLUSIONS

This study presents an effort to develop a system for agricultural policy analysis. Its starting point is the conceptualization of planning as a continuous decision making process. The planning system is in charge of the direction of the stages of this process, namely "formulación," "ejecución," and "control." This function of the planning system requires the continuous design, analysis, and negotiation of policies that would affect numerous groups. The decisions of those same groups condition the outcome of the economic system. Therefore, an important component of the system for policy analysis is the explicit representation of the possible reactions of all those groups that will influence the achievement of national objectives.

This study has put special emphasis on the specification of reaction functions of producers and consumers. The use of such reaction functions facilitates the quantification of direct and indirect effects of single policies or packages of them.

Traditional economic theory served as a basis for the specification of the reaction functions of consumers. It should be noted that the generation of the producers' reaction functions required some adaptations along the lines of the economics of labor-managed enterprises and property rights. This was necessary in order to capture the characteristics of the new types of production enterprises ("empresas asociativas") created by the agrarian reform process such as the agrarian production cooperatives (CAPs), agricultural societies of social interest (SAISs), and reformed peasants' communities ("comunidades campesinas reformadas"). The specification of the producers' reaction function also allows for the representation of other characteristics of the Peruvian agricultural sector such as the existence of smaller family farms and landless workers.

The producers' and consumers' reaction functions have been estimated at different regional levels. The level of estimation has been the minimum geographical area for which information was available. The Peruvian agricultural production process is going through a serious process of agrarian reform which affects the social relations of production. It was initiated in 1969 and is not yet concluded. Because of this there is no unique source of information which captures all relevant variables. Consequently, several sources, independent studies as well as "educated guesses," have been used for the estimation of the regional producers' reaction function. These were estimated for each of the 49 agrarian offices that existed in 1974.

For the estimation of the consumers' reaction functions, available information from the National Consumption Survey (ENCA) was used. The level of estimation was that of the ENCA sector stratum combinations for areas outside Metropolitan Lima. There were 22 regional divisions of the former, while the latter was divided into ten income strata. Hence, a total of 32 regional consumers' reaction functions was estimated.

The estimation of the regional reaction matrices was based on detailed studies that the author conducted during 1973-1975 with members of the Peruvian Agrarian Planning Office and during 1976-1977 with Professor Van de Wetering at Iowa State University. These studies refer to the analysis of the agricultural planning system, the agricultural planning process, the transformation of ENCA's final form of consumption data to agricultural primary products, the agricultural commercial balance for the last ten years, the industrialization of agricultural production, alternative functional forms of the Engel curve for food and selected agricultural products, regional food basket composition, the estimation of income elasticities, a complete set of price elasticities for food, money flexibility and its impact on the estimation of price elasticities, the potential availability of agricultural labor force, and agrarian reform and the landless workers, among others.

The estimation of regional producers' and consumers' reaction functions together with a complete weighting scheme permitted the estimation of the national reaction functions. The national producers' and consumers' reaction functions were complemented by the national food material balances. These balances allowed the estimation of the impact of a package of policies on the requirement for foreign exchange.

All these components form the basis of a system for policy analysis which captures the heterogeneity of the Peruvian population and the characteristics of new institutions that are being created in the agricultural sector. These aspects are linked in a clear and compact analytical framework based on traditional economic theory or an adaptation of new developments in economics.

This type of study should be considered an intermediate product. It must be continuously improved as a result of its practical use. In relation to the components of the system for policy analysis, as they were presented here, some suggestions have already been advanced. The theoretical aspects of the producers' reaction function should be expanded to introduce explicitly the estimation of the elasticity of substitution. Then, studies should be conducted for the estimation of elasticities related to the supply of worker-owners' labor. The results of the different studies that OAPA-OSPA is conducting should be incorporated, and their second stages should be redefined accordingly to the needs of the system here presented. The aspects of uncertainty and reinvestment in the production process should also be studied for their incorporation into the producers' reaction functions.

The consumption side of the study should be improved by providing it with a better estimation of the money flexibility coefficient. The estimation of income elasticities could perhaps be improved by an application of the instrumental variable procedure. The consumption and production sides should be linked with the results of a marketing study that makes explicit the behavior of intermediaries in the formation of prices.

An important aspect for the completion of the process of policy analysis is the design of alternative policies once the gaps between the policy performance indicators and the objective indicators have been identified. In this respect, it is necessary to consider the adaptability of a technique, such as goal programming, to the system here developed. It is important to study, in a systematic way, the possibilities of sacrificing the achievement of some specific goals and minimizing their impact with respect to other global objectives. Then, with given hierarchical objectives and constrained instruments, a sub-optimization routine, such as the one associated with goal programming, could be applied to the derived feasible space of policies and objectives.

Another aspect to be considered refers to the link of policy formulation to the specific administrative actions and their cost for implementation of the policies designed. A technique such as planning, programming, and budgeting (PPBS) should also be studied to evaluate its flexibility and compatibility with the system presented here.

The link with the nonagricultural sectors should be examined by means of a macro-model. Such a model could endogenously generate some of the variables, such as income and industrial consumption, which are now exogenous to the system. This study should also serve as a basis for a comprehensive sector accounting system for the agricultural sector. It, in turn, could serve as a guide for the collection of relevant agricultural statistics.

The demonstration exercises conducted so far discovered the qualitative weaknesses of the last operational plan of the Ministries of Food and Agriculture. Two important aspects mentioned refer to the importance of indirect effects relative to a number of policy performance indicators. The indirect effects are sometimes so strong that they outweigh the expected direct effects. This can make the use of qualitative calculus in the determination of the direction of the reactions impractical. The other aspect refers to the apparent "social neutrality" of some policies. There is always some group bearing the social cost of a development plan. If the policies are not specifically tailored to benefit such target groups, then they may end up sharing the burden of policies which, in principle, ought to benefit them. This, as illustrated, is the case of the landless workers in the Peruvian agricultural sector. Similar second generation problems are associated with the majority of agricultural policies. The system for policy analysis here developed provides the basis for an ex-ante comprehensive social benefit-cost analysis of single policies or combinations thereof.

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APPENDIX A: TECHNICAL NOTES ON CHAPTER 4

Technical Notes on the Model of Economic Behavior of Associative Enterprises with Labor Market

This section presents the procedure used to transform the nonlinear system of equations (4-1) to (4-6) into a linear system presented in Chapter 4 as (4-7) to (4-12).

The following relations are needed

(A-1) $q = \Delta Q/Q$ (A-2) $l = \Delta L/L$ (A-3) $l_e = \Delta L_e/L_e$

(A-4) $l_s = \Delta L_s/L_s$ (A-5) $i_s = \Delta I_s/I_s$ (A-6) $d = \Delta D/D$

(A-7) $p = \Delta P/P$ (A-8) $p_e = \Delta P_e/P_e$ (A-9) $p_f = \Delta P_f/P_f$

(A-10) $s = \Delta S/S$ (A-11) $t = \Delta T/T$ (A-12) $f = \Delta F/F$

(A-13) $a_1 = I_s S/PQ$ (A-14) $a_2 = P_e L_e/PQ$ (A-15) $a_3 = P_f F/PQ$

(A-16) $a_1 + a_2 + a_3 = 1$ (A-17) $c_1 = L_s/L$ (A-18) $c_2 = L_e/L$

(A-19) $c_1 + c_2 = 1$

Besides these 19 relations, it is necessary to present the definitions of elasticity for the worker-owners labor force supply function, as well as the partical elasticities of production and the restriction imposed on them.

$$E_d = (\Delta D/\Delta I_s)(I_s/D) \tag{A-20}$$

$$E_l = (\Delta Q/\Delta L)(L/Q) \tag{A-21}$$

$$E_t = (\Delta Q/\Delta T)(T/Q) \tag{A-22}$$

$$E_f = (\Delta Q/\Delta F)(F/Q) \tag{A-23}$$

The production function is assumed to be homogeneous of degree one. Then, by Euler's Theorem, it can be shown that the sum of the partial elasticities of production equals one, the degree of homogeneity of the production function

$$Q = G(L,T,F) \qquad (4\text{-}1)$$

Euler's Theorem implies

$$L(\partial Q/\partial L) + T(\partial Q/\partial T) + F(\partial Q/\partial F) = Q \qquad (A\text{-}24)$$

If (A-24) is divided by Q

$$(\partial Q/\partial L)(L/Q) + (\partial Q/\partial T)(T/Q) + (\partial Q/\partial F)(F/Q) = 1$$

(A-21), (A-22), and (A-23) allows one to write the last relation as follows

$$E_l + E_t + E_f = 1 \qquad (A\text{-}25)$$

Relations (A-1) to (A-25) are all that are needed to transform the system (4-1) to (4-6). Relation (4-1) is transformed as follows

$$Q = G(L,T,F) \qquad (4\text{-}1)$$

$$\Delta Q = (\Delta Q/\Delta L)\Delta L + (\Delta Q/\Delta T)\Delta T + (\Delta Q/\Delta F)\Delta F$$

$$\Delta Q = (\Delta Q/\Delta L)(L/Q)(\Delta L/L)Q + (\Delta Q/\Delta T)(T/Q)(\Delta T/T)Q + (\Delta Q/\Delta F)(F/Q)(\Delta F/F)Q$$

$$q = E_l \cdot l + E_t \cdot t + E_f \cdot f \qquad (4\text{-}7)$$

Relation (4-2) is transformed into (4-8) as follows

$$P(\partial Q/\partial L) = P_e \qquad (4\text{-}2)$$

$$P(\Delta Q/\Delta L)(L/Q)(Q/L) = P_e$$

$$P\ E_l(Q/L) = P_e$$

$$E_l = P_e L/PQ$$

$$\Delta E_l = (P_e \Delta L/PQ) + (L\Delta P_e/PQ) - (P_e L/PQ)(\Delta Q/Q) - (P_e L/PQ)(\Delta P/P)$$

$$\Delta E_l = (P_e L/PQ)(l + p_e - q - p)$$

$$(\Delta E_l/E_l) = l + p_e - q - p$$

Assumption (6) in Chapter 4 (constancy of partial elasticities of production) implies $\Delta E_1/E_1 = 0$. Then, the last relation can be ordered in the following way

$$p + q - 1 = p_e \tag{4-8}$$

Relation (4-3) is transformed into (4-9) as follows

$$I_s = (PQ - P_eL_e - P_fF)/S \tag{4-3}$$

$$PQ = I_sS + P_eL_e + P_fF$$

$$P\cdot\Delta Q + Q\Delta P = I_s\Delta S + S\cdot\Delta I_s + P_e\cdot\Delta L_e + L_e\cdot\Delta P_e + P_f\cdot\Delta F + F\cdot\Delta P_f$$

Each term of this relation can be transformed further.

$$(P\cdot\Delta Q)/PQ = \Delta Q/Q = q$$

$$(Q\cdot\Delta P)/PQ = \Delta P/P = p$$

$$(I_s\Delta S)/PQ = (I_sS/PQ)(\Delta S/S) = a_1s$$

$$(S\Delta I_s)/PQ = (I_sS/PQ)(\Delta I_s/I_s) = a_1i_s$$

$$(P_e\Delta L_e)/PQ = (P_eL_e/PQ)(\Delta L_e/L_e) = a_2l_e$$

$$(L_e\Delta P_e)/PQ = (P_eL_e/PQ)(\Delta P_e/P_e) = a_2p_e$$

$$(P_f\Delta F)/PQ = (P_fF/PQ)(\Delta F/F) = a_3f$$

$$(F\Delta P_f)/PQ = (P_fF/PQ)(\Delta P_f/P_f) = a_3p_f$$

$$a_1s + a_1i_s + a_2l_e + a_2p_e + a_3f + a_3p_f = q + p \tag{4-9}$$

Relation (4-4) is transformed into (4-10) as follows

$$D = H(I_s) \tag{4-4}$$

$$\Delta D = \Delta D(\Delta I_s/\Delta I_s)(D/D)(I_s/I_s)$$

$$\Delta D/D = (\Delta D/\Delta I_s)(I_s/D)(\Delta I_s/I_s)$$

$$d = E_d \cdot i_s \qquad (4\text{-}10)$$

Relation (4-5) is transformed into (4-11) as follows

$$L_s = S \cdot D \qquad (4\text{-}5)$$

$$\Delta L_s = S \cdot \Delta D + D \cdot \Delta S$$

$$\Delta L_s / L_s = \Delta D/D + \Delta S/S$$

$$l_s = d + s \qquad (4\text{-}11)$$

Relation (4-6) is transformed into (4-12) as follows

$$L = L_s + L_e \qquad (4\text{-}6)$$

$$\Delta L = \Delta L_s + \Delta L_e$$

$$\Delta L/L = (\Delta L_s/L_s)(L_s/L) + (\Delta L_e/L_e)(L_e/L)$$

$$l = c_1 l_s + c_2 l_e \qquad (4\text{-}12)$$

Therefore, this is the procedure that was followed in Chapter 4 to transform the nonlinear system (4-1) to (4-6) into a linear system (4-7) to (4-12).

Technical Notes on the General Model of Economic Behavior of Agricultural Producers

As was done in the previous section, this presents the procedure used to transform the nonlinear system of equations (4-40) to (4-54) into a linear system as was represented by (4-55) to (4-69).

The following relations will be used

(A-26) $q_i = \Delta Q_i / Q_i$	(A-27) $l_i = \Delta L_i / L_i$	(A-28) $t_i = \Delta T_i / T_i$
(A-29) $m_i = \Delta M_i / M_i$	(A-30) $f_i = \Delta F_i / F_i$	(A-31) $\pi_i = P_i Q_i / \sum_i P_i Q_i$
(A-32) $p_i = \Delta P_i / P_i$	(A-33) $h_i = T_i / T$	(A-34) $g_i = M_i / M$

(A-35) $k_i = F_i/F$ (A-36) $b_i = L_i/L$ (A-37) $\sum_i h_i = 1$

(A-38) $\sum_i g_i = 1$ (A-39) $\sum_i k_i = 1$ (A-40) $\sum_i b_i = 1$

(4-41) $m = \Delta M/M$

These relations have to be complemented with some from the last section such as (A-2) to (A-6), (A-8) to (A-20). Besides the relations (A-21) to (A-23) and (A-25) should be modified as follows.

$$E_{li} = (\Delta Q_i/\Delta L_i)(L_i/Q_i) \tag{A-42}$$

$$E_{ti} = (\Delta Q_i/\Delta T_i)(T_i/Q_i) \tag{A-43}$$

$$E_{fi} = (\Delta Q_i/\Delta F_i)(F_i/Q_i) \tag{A-44}$$

$$E_{mi} = (\Delta Q_i/\Delta M_i)(M_i/Q_i) \tag{A-45}$$

$$E_{li} + E_{ti} + E_{fi} + E_{mi} = 1 \tag{A-46}$$

The transformation of (4-40) and (4-41) into (4-55) and (4-56) follows the same procedure as that presented for the relation (4-1) in the last section.

The transformation of (4-42) and (4-43) into (4-57) and (4-58) follows the same procedure as the transformation of (4-2) presented in the last section.

The transformation of (4-44) into (4-59) is done as follows

$$L = L_1 + L_2 \tag{4-44}$$

$$\Delta L = \Delta L_1 + \Delta L_2$$

$$(\Delta L/L) = (\Delta L_1/L_1)(L_1/L) + (\Delta L_2/L_2)(L_2/L)$$

$$l = b_1 l_1 + b_2 l_2 \tag{4-59}$$

The transformation of (4-45), (4-46), and (4-47) is similar to the three relations as follows.

$$P_1(\partial Q_1/\partial T_1) = P_2(\partial Q_2/\partial T_2) \tag{4-45}$$

$$P_1(\Delta Q_1/\Delta T_1)(T_1/Q_1)(Q_1/T_1) = P_2(\Delta Q_2/\Delta T_2)(T_2/Q_2)(Q_2/T_2)$$

$$P_1E_{t1}(Q_1/T_1) = P_2E_{t2}(Q_2/T_2)$$

$$E_{t1}/E_{t2} = (P_2Q_2/P_1Q_1)(T_1/T_2)$$

$$\Delta(E_{t1}/E_{t2}) = (P_2Q_2/P_1Q_1)\Delta(T_1/T_2) + (T_1/T_2)\Delta(P_2Q_2/P_1Q_1)$$

$$\Delta(T_1/T_2) = (T_2 \cdot \Delta T_1 - T_1 \cdot \Delta T_2)/(T_2)^2$$

$$= (1/T_2^2)(T_2\Delta T_1(T_1/T_1) - T_1\Delta T_2(T_2/T_2)$$

$$= (T_1/T_2)(t_1 - t_2)$$

$$\Delta(P_2Q_2/P_1Q_1) = (P_1Q_1(P_2\Delta Q_2 + Q_2\Delta P_2) - P_2Q_2(P_1\Delta Q_1 + Q_1\Delta P_1))/(P_1Q_1)^2$$

$$= (P_2Q_2/P_1Q_1)(q_2 + p_2 - q_1 - p_1)$$

$$\Delta(E_{t1}/E_{t2}) = (P_2Q_2/P_1Q_1)(T_1/T_2)(t_1 - t_2) +$$

$$(P_2Q_2/P_1Q_1)(T_1/T_2)(q_2 + p_2 - q_1 - p_1)$$

$$\Delta(E_{t1}/E_{t2}) = (E_{t1}/E_{t2})(t_1 - t_2 + q_2 + p_2 - q_1 - p_1)$$

$$\Delta(E_{t1}/E_{t2})/(E_{t1}/E_{t2}) = t_1 - t_2 + q_2 + p_2 - q_1 - p_1$$

As was pointed out in the last section, the assumption of constancy of partial elasticities of production implies

$$\Delta(E_{t1}/E_{t2})/(E_{t1}/E_{t2}) = 0$$

Then, the last relation can be ordered in the following way

$$p_1 + q_1 - t_1 = p_2 + q_2 - t_2 \tag{4-60}$$

In the same way, the other two relations are transformed. Relations (4-48), (4-49), and (4-50) are transformed into (4-63), (4-64), and (4-65) following the same procedure used for the transformation of (4-44).

Relations (4-51) to (4-54) are transformed into (4-66) to (4-60) following a similar procedure as the one used in the last section for the transformation of (4-3), (4-4), (4-5), and (4-6).

APPENDIX B: TABLES FOR CHAPTER 5

Table B-1. Agrarian zones and offices of the Ministry of Agriculture (1974)

Agrarian zones	Agrarian offices
01 Piura	01-01 Alto Piura
	01-02 Medio y Bajo Piura
	01-03 Sullana
	01-04 Tumbes
	01-05 San Lorenzo
02 Lambayeque	02-01 Lambayeque
	02-02 Chepen
	02-03 Jaen
	02-04 Chota
	02-05 Cajamarca
03 Huaraz	03-01 Huaraz
	03-02 Trujillo
	03-03 Chimbote
	03-04 Huamachuco
04 Lima	04-01 Cañete
	04-02 Lima
	04-03 Huacho
05 Ica	05-01 Chincha
	05-02 Ica
	05-03 Nazca
06 Arequipa	06-01 Arequipa
	06-02 Tambo
	06-03 Caylloma
	06-04 Majes
07 Tacna	07-01 Tacna
	07-02 Moquegua
08 Iquitos	08-01 Iquitos
	08-02 Pucallpa
09 Tarapoto	09-01 Alto Marañon o Yurimaguas
	09-02 Alto Mayo
	09-03 San Martin
	09-04 Tingo Maria

Table B-1. (continued)

Agrarian zones	Agrarian offices
10 Huancayo	10-01 Pasco
	10-02 Ayacucho
	10-03 Huancavelica
	10-04 Mantaro
	10-05 Selva
	10-06 Huanuco
11 Cuzco	11-01 Quillabamba
	11-02 Anta
	11-03 Paucartambo
	11-04 Sicuani
	11-05 Apurimac
	11-06 Puerto Maldonado
12 Puno	12-01 Ilave
	12-02 Juliaca
	12-03 Huancane
	12-04 Ayaviri
	12-05 San Juan del Loro

Table B-2. Distribution of the 13 crops selected by agrarian offices (in hectares)

Agrarian zones and offices	Rice 01	White corn 03	Yellow corn 05	Wheat 06	Barley 07	"Quinua" 08	Potatoes 13
01 Piura	13,470	8,524					
01-01		4,586					
01-02		2,493					
01-03	7,227						
01-04	2,842	1,445					
01-05	3,401						
02 Lambayeque	69,645	36,785		7,095	7,913		
02-01	24,737						
02-02	23,933	7,628					
02-03	20,975	11,414					
02-04		17,743					
02-05				7,095	7,913		
03 Huaraz		17,969	22,192	35,744	47,443		
03-01				20,418	29,173		
03-02			10,619				
03-03		17,969	11,573				
03-04				15,326	18,270		
04 Lima		28,886	16,198				
04-01		6,182					
04-02		5,607	5,064				
04-03		17,097	11,134				
05 ICA		3,788	7,173		6,411		
05-01			7,173				
05-02		3,788					
05-03					6,411		
06 Arequipa		2,916			7,092		2,204
06-01					5,276		
06-02							
06-03		1,221			1,816		
06-04		1,695					2,204
07 Tacna		2,941					2,921
07-01		1,869					1,640
07-02		1,072					1,281

Manioc 14	Sugar cane 17	Beans 21	Garlic 47	Onions 48	Cotton 80	Sub-total	Total products considered
					68,609	90,603	122,338
					4,807	9,393	23,654
					28,011	30,504	32,137
					21,358	28,585	35,038
						4,287	6,946
					14,433	17,834	24,563
	36,474	12,005				169,917	280,749
	36,474					61,211	95,681
						31,561	51,002
						32,389	53,665
		12,005				29,748	50,944
						15,008	29,451
	36,009					159,357	296,153
						49,591	93,766
	36,009					46,628	81,174
						29,542	51,427
						33,596	69,786
					9,065	54,149	121,141
					9,065	15,247	32,928
						10,671	22,092
						28,231	66,121
					45,057	62,429	106,296
					18,127	25,300	51,205
					16,521	20,309	25,681
					10,409	16,820	29,410
	1,672		439	6,675		20,998	52,909
				6,675		11,951	34,332
	1,672		439			2,111	5,128
						3,037	5,956
						3,899	7,493
						5,862	9,645
						3,509	5,779
						2,353	3,866

Table B-2. (continued)

Agrarian zones and offices	Rice 01	White corn 03	Yellow corn 05	Wheat 06	Barley 07	"Quinua" 08	Potatoes 13
08 Iquitos	4,777	7,078					
08-01	4,777						
08-02		7,078					
09 Tarapoto	5,324	11,191	10,338				
09-01	3,429		1,511				
09-02	1,895	2,218					
09-03		5,309	4,553				
09-04		3,664	4,274				
10 Huancayo		24,174	3,840	7,073	46,571		91,382
10-01				7,073			18,863
10-02		13,534			14,899		
10-03					15,704		18,553
10-04					15,968		39,256
10-05		2,466	3,840				
10-06		8,174					14,710
11 Cuzco	1,165	18,468			6,393		31,033
11-01		1,545					1,614
11-02		6,231					11,635
11-03					2,446		2,563
11-04					3,947		3,919
11-05		10,692					11,302
11-06	1,165						
12 Puno		1,246			2,829	17,565	35,928
12-01						10,633	16,760
12-02						1,743	2,332
12-03					2,829		4,024
12-04						5,189	11,274
12-05		1,246					1,538
Total	94,381	163,966	59,741	49,912	124,652	17,565	163,468

Manioc 14	Sugar cane 17	Beans 21	Garlic 47	Onions 48	Cotton 80	Sub-total	Total products considered
9,918						21,773	34,368
4,845						9,622	15,150
5,073						12,151	19,218
						26,853	53,035
						4,940	7,948
						4,113	8,247
						9,862	21,077
						7,938	15,763
						173,040	272,282
						25,936	36,714
						28,435	54,354
						34,257	48,849
						55,224	87,438
						6,306	9,765
						22,884	35,162
812						57,871	96,171
						3,159	5,014
						17,866	27,802
						5,009	6,964
						7,866	12,798
						21,994	40,446
812						1,977	3,147
						57,568	72,540
						27,393	35,436
						4,075	4,845
						6,853	8,732
						16,463	18,973
						2,784	4,554
10,730	74,155	12,005	439	6,675	122,731	900,420	1,517,627

Table B-3. Estimation of worker-owners labor force by agrarian offices

	Labor units per family	Working days per year	Associative enterprises (families)	Individual beneficiary (families)
01 Piura			20,564	3,689
01-01	2.35	259	2,499	1,578
01-02	2.33	259	9,958	433
01-03	2.51	259	7,947	352
01-04	2.48	259	104	237
01-05	2.40	259	56	1,089
02 Lambayeque			26,272	2,003
02-01	2.49	249	17,522	343
02-02	2.40	249	4,483	253
02-03	2.30	249	59	723
02-04	2.36	249	878	373
02-05	2.30	249	3,330	311
03 Huaraz			43,664	973
03-01	2.18	238	11,708	484
03-02	2.42	238	12,827	344
03-03	2.41	238	7,097	112
03-04	2.31	238	12,032	33
04 Lima			12,403	1,727
04-01	2.30	248	2,455	536
04-02	2.28	248	408	449
04-03	2.27	248	9,540	742
05 Ica			8,599	799
05-01	2.35	284	5,280	205
05-02	2.38	284	2,862	294
05-03	2.22	284	457	300
06 Arequipa			1,589	1,208
06-01	1.92	259	463	720
06-02	2.30	259	493	100
06-03	2.16	259	551	81
06-04	2.14	259	82	307
07 Tacna			223	508
07-01	2.24	283	223	325
07-02	2.22	283		183

Individuals families/ land ratio	Total individual owners (families)	Associative owner labor force (days-labor per year) (000)	Individuals owners labor force (days-labor per year) (000)	Worker-owners labor force (days-labor per year) (000)
.1354	26,159	12,798	16,167	28,965
	11,188	1,521	6,810	8,331
	3,072	6,009	1,854	7,863
	2,496	5,166	1,623	6,789
	1,683	67	1,081	1,148
	7,720	35	4,799	4,834
.0822	57,607	16,000	33,800	49,800
	9,866	10,864	6,117	16,981
	7,289	2,679	4,356	7,035
	20,769	34	11,894	11,928
	10,732	516	6,307	6,823
	8,951	1,907	5,126	7,033
.1369	37,456	24,149	20,465	44,614
	18,651	6,075	9,677	15,752
	13,261	7,388	7,638	15,026
	4,294	4,071	2,463	6,534
	1,250	6,615	687	7,302
.2098	28,050	7,002	15,874	22,876
	8,704	1,400	4,965	6,365
	7,299	231	4,127	4,358
	12,047	5,371	6,782	12,153
.2028	27,092	5,747	17,791	23,538
	6,948	3,524	4,637	8,161
	9,977	1,935	6,744	8,679
	10,167	288	6,410	6,698
.1878	17,652	878	9,252	10,130
	10,512	230	5,227	5,457
	1,463	294	872	1,166
	1,190	308	666	974
	4,487	46	2,487	2,533
.1801	6,848	142	4,327	4,469
	4,384	142	2,779	2,920
	2,464		1,548	1,548

Table B-3. (continued)

	Labor units per family	Working days per year	Associative enterprises (families)	Individual beneficiary (families)
08 Iquitos			128	2,686
08-01	2.52	287	128	2,048
08-02	2.42	287		638
09 Tarapoto			1,117	4,621
09-01	2.48	356		716
09-02	2.38	356		288
09-03	2.46	356	148	1,812
09-04	2.24	356	969	1,805
10 Huancayo			49,432	2,985
10-01	2.25	238	15,882	13
10-02	2.12	238	1,954	680
10-03	2.24	238	12,344	509
10-04	2.22	238	17,646	484
10-05	2.39	238	94	592
10-06	2.25	238	1,512	707
11 Cuzco			22,711	9,629
11-01	2.31	288	2,212	2,312
11-02	2.27	288	13,913	1,531
11-03	2.30	288	712	685
11-04	2.19	288	3,206	2,027
11-05	2.18	288	2,668	2,651
11-06	2.27	288		423
12 Puno			17,012	83
12-01	2.22	286	5,015	33
12-02	2.18	286	6,197	7
12-03	2.15	286	2,217	26
12-04	2.17	286	3,010	13
12-05	2.03	286	573	4
Total nation			203,714	30,911

Individuals families/ land ratio	Total individual owners (families)	Associative owner labor force (days-labor per year) (000)	Individuals owners labor force (days-labor per year (000)	Worker-owners labor force (days-labor per year) (000)
.0540	3,184	93	2,281	2,374
	2,428	93	1,756	1,849
	756		525	525
.0362	4,439	903	3,749	4,652
	688		607	607
	277		235	235
	1,740	130	1,524	1,654
	1,734	773	1,383	2,156
.0473	31,699	26,258	16,912	43,170
	134	8,505	72	8,577
	7,224	986	3,645	4,631
	5,406	6,581	2,882	9,463
	5,137	9,323	2,714	12,037
	6,290	53	3,578	3,631
	7,508	810	4,021	4,831
.0963	24,020	14,737	15,497	30,234
	5,767	1,472	3,837	5,309
	3,819	9,096	2,497	11,593
	1,708	472	1,131	1,603
	5,056	2,022	3,189	5,211
	6,614	1,675	4,153	5,828
	1,056		690	690
.0138	4,692	10,612	2,923	13,535
	1,892	3,184	1,201	4,385
	386	3,864	241	4,105
	1,485	1,363	913	2,276
	714	1,868	443	2,311
	215	333	125	458
	268,898	119,319	159,038	278,357

Table B-4. Estimation of landless workers labor force

	Working days per year	Agricultural labor force: Persons	Agricultural labor force: Days-labor per year (000)	Worker-owners days-labor per year (000)	Landless workers days-labor per year (000)
01 Piura		162,403	42,063	28,965	13,553
01-01	259	55,141	14,282	8,331	5,951
01-02	259	34,940	9,050	7,863	1,187
01-03	259	24,457	6,334	6,789	--
01-04	259	8,785	2,275	1,148	1,127
01-05	259	39,080	10,122	4,834	5,288
02 Lambayeque		337,160	83,953	49,800	39,553
02-01	249	52,337	13,032	16,981	--
02-02	249	22,427	5,584	7,035	--
02-03	249	61,685	15,360	11,928	3,432
02-04	249	111,892	27,861	6,823	21,038
02-05	249	88,819	22,116	7,033	15,083
03 Huaraz		227,136	54,060	44,614	17,515
03-01	238	91,536	21,786	15,752	6,034
03-02	238	29,229	6,957	15,026	--
03-03	238	30,226	7,194	6,534	660
03-04	238	76,145	18,123	7,302	10,821
04 Lima		116,933	28,999	22,876	6,123
04-01	248	26,520	6,577	6,365	212
04-02	248	37,367	9,267	4,358	4,909
04-03	248	53,046	13,155	12,153	1,002
05 Ica		83,687	23,767	23,538	3,799
05-01	284	42,111	11,960	8,161	3,799
05-02	284	19,895	5,650	8,679	--
05-03	284	21,681	6,157	6,698	--
06 Arequipa		48,708	12,615	10,130	2,628
06-01	259	24,247	6,280	5,457	823
06-02	259	3,951	1,023	1,166	--
06-03	259	5,766	1,493	974	519
06-04	259	14,744	3,819	2,533	1,286
07 Tacna		24,472	6,926	4,469	2,457
07-01	283	11,267	3,189	2,921	268
07-02	283	13,205	3,737	1,548	2,189

Table B-4. (continued)

	Working days per year	Agricultural labor force: Persons	Agricultural labor force: Days-labor per year (000)	Worker-owners days-labor per year (000)	Landless workers days-labor per year (000)
08 Iquitos		75,287	21,608	2,374	19,234
08-01	287	51,682	14,833	1,849	12,984
08-02	287	23,605	6,775	525	6,250
09 Tarapoto		63,371	22,560	4,652	17,908
09-01	356	11,430	4,069	607	3,462
09-02	356	1,227	437	235	202
09-03	356	25,182	8,965	1,654	7,311
09-04	356	25,532	9,089	2,156	6,933
10 Huancayo		339,208	80,733	43,170	42,809
10-01	238	15,939	3,794	8,577	--
10-02	238	71,971	17,129	4,631	12,498
10-03	238	65,091	15,492	9,463	6,029
10-04	238	95,612	22,756	12,038	10,718
10-05	238	13,309	3,168	3,631	--
10-06	238	77,286	18,394	4,830	13,564
11 Cuzco		230,662	66,431	30,234	36,197
11-01	288	34,036	9,802	5,309	4,493
11-02	288	55,691	16,039	11,593	4,446
11-03	288	9,874	2,844	1,603	1,241
11-04	288	54,423	15,674	5,211	10,463
11-05	288	70,311	20,250	5,828	14,422
11-06	288	6,327	1,822	690	1,132
12 Puno		210,366	60,165	13,535	46,630
12-01	286	88,690	25,365	4,385	20,980
12-02	286	17,378	4,970	4,105	865
12-03	286	33,794	9,665	2,276	7,389
12-04	286	53,236	15,226	2,311	12,915
12-05	286	17,268	4,939	458	4,481
Total nation		1,919,393	503,880	278,357	248,406

Table B-5. Generation of gross value of production by products and agrarian offices

	Area Has.	Yield TM/Has.	Production TM	Price soles/ TM
01-01	9,392			
03 White corn	4,585	1.7300	7,932.05	3,500
80 Cotton	4,807	1.4216	6,833.63	26,600
01-02	30,504			
03 White corn	2,493	1.7300	4,312.89	3,500
80 Cotton	28,011	1.3846	38,784.03	26,600
01-03	28,585			
01 Rice	7,227	5.4679	39,516.51	6,000
80 Cotton	21,358	1.4239	30,411.66	26,600
01-04	4,287			
01 Rice	2,842	4.0365	11,471.73	6,000
03 White corn	1,445	1.7299	2,499.71	3,500
01-05	17,834			
01 Rice	3,401	5.0622	17,216.54	6,000
80 Cotton	14,433	1.5107	21,803.93	26,600
02-01	61,211			
01 Rice	24,737	5.5258	136,691.71	6,000
17 Sugar cane	36,474	179.9994	6,565,298.12	200
02-02	31,561			
01 Rice	23,933	5.0000	119,665.00	6,000
03 White corn	7,628	2.1006	16,023.38	3,500
02-03	32,389			
01 Rice	20,975	4.5000	94,387.50	6,500
03 White corn	11,414	1.6000	18,262.40	3,500
02-04	29,748			
03 White corn	17,743	1.7000	30,163.10	3,500
21 Beans	12,005	0.8000	9,604.00	10,000
02-05	15,007			
06 Wheat	7,094	1.2300	8,725.62	6,000
07 Barley	7,913	0.9100	7,200.83	3,500

Gross value (000)	Value machinery (000)	Value labor (000)	Value land (000)	Value other means of production (000)	Required labor force (days-labor)
209,537	12,181	67,378	56,904	73,074	646,573
27,762	0	16,245	2,072	9,445	155,890
181,775	12,181	51,133	54,832	63,629	490.683
1,046,750	67,169	307,773	303,145	368,663	2,953,437
15,095	0	8,833	1,127	5,135	84,762
1,031,655	67,169	298,940	302,018	363,528	2,868,675
1,046,049	76,031	322,161	290,603	357,254	3,091,514
237,099	23,897	94,460	40,439	78,303	906,456
808,950	52,134	227,701	250,164	278,951	2,185,058
77,579	3,411	46,598	8,754	18,816	447,178
68,830	3,411	41,478	8,101	15,840	398,048
8,749	0	5,120	653	2,976	49,130
683,284	32,442	204,636	248,901	197,305	1,963,731
103,299	7,161	48,203	20,332	27,603	462,578
579,985	25,281	156,433	228,569	169,702	1,501,153
2,133,210	212,657	560,591	535,929	824,033	4,481,966
820,150	82,992	242,918	223,514	270,726	3,092,125
1,313,060	129,665	317,673	312,415	553,307	1,389,841
774,072	84,109	240,135	130,080	319,748	3,403,537
717,990	80,295	207,762	126,510	303,423	2,991,625
56,082	3,814	32,373	3,570	16,325	411,912
677,437	97,324	295,610	160,718	123,785	2,713,856
613,519	97,324	247,169	155,970	113,056	2,097,500
63,918	0	48,441	4,748	10,729	616,356
201,611	18,008	83,675	38,751	61,177	1,486,342
105,571	0	53,939	16,146	35,486	958,122
96,040	18,008	29,736	22,605	25,691	528,220
77,557	0	29,905	16,792	30,860	531,243
52,354	0	18,771	13,010	20,573	333,418
25,203	0	11,134	3,782	10,287	197,825

Table B-5. (continued)

	Area Has.	Yield TM/HAS.	Production TM	Price soles/ TM
03-01	49,591			
06 Wheat	20,418	1.3529	27,623.51	5,500
07 Barley	29,173	1.3000	37,924.90	3,500
03-02	46,628			
05 Yellow corn	10,619	3.6000	38,228.40	4,000
17 Sugar cane	36,009	187.0001	6,733,686.60	200
03-03	29,542			
03 White corn	17,969	1.3100	23,539.39	4,000
05 Yellow corn	11,573	3.6201	41,895.42	4,000
03-04	33,596			
06 Wheat	15,326	1.3373	20,495.46	4,500
07 Barley	18,270	1.3000	23,751.00	3,500
04-01	15,247			
03 White corn	6,182	1.6000	9,891.20	4,000
80 Cotton	9,065	1.4779	13,397.16	22,290
04-02	10,671			
03 White corn	5,607	2.0000	11,214.00	4,000
05 Yellow corn	5,064	4.5001	22,788.51	5,200
04-03	28,232			
03 White corn	17,098	2.0000	34,196.00	4,000
05 Yellow corn	11,134	3.9920	44,446.93	4,900
05-01	25,300			
05 Yellow corn	7,173	3.9981	28,678.37	5,000
80 Cotton	18,127	1.8771	34,026.19	22,290
05-02	20,309			
03 White corn	3,788	2.0000	7,576.00	5,000
80 Cotton	16,521	1.9714	32,569.50	22,290
05-03	16,820			
07 Barley	6,411	1.8000	11,539.80	4,200
80 Cotton	10,409	2.0547	21,387.37	22,290

Gross value (000)	Value machinery (000)	Value labor (000)	Value land (000)	Value other means of production (000)	Required labor force (days-labor)
284,666	23,973	126,385	46,009	88,299	1,948,651
151,929	2,968	45,022	30,226	73,713	694,212
132,737	21,005	81,363	15,783	14,586	1,254,439
1,499,651	142,082	355,562	387,788	614,219	1,776,494
152,914	14,070	37,963	32,919	67,962	552,188
1,346,737	128,012	317,599	354,869	546,257	1,224,306
261,740	15,334	94,975	46,692	104,739	1,428,370
94,158	0	53,602	9,883	30,673	826,574
167,582	15,334	41,373	36,809	74,066	601,796
175,359	33,902	51,119	49,718	40,620	961.296
92,230	24,402	17,119	21,052	29,657	321,846
83,129	9,500	34,000	28,666	10,963	639,450
338,188	31,283	87,043	121,203	98,559	896,245
39,565	3,091	21,013	6,188	9,273	216,370
298,623	28,192	66,030	115,015	89,386	679,875
163,356	20,040	47,584	55,753	39,979	489,957
44,856	5,607	19,058	8,977	11,214	196,245
118,500	14,433	28,526	46,776	28,765	293,712
354,574	55,398	127,743	49,947	121,486	1,233,068
136,784	17,098	61,997	23,493	34,196	598,430
217,790	38,300	65,746	26,454	87,290	634,638
901,836	80,416	101,737	578,083	141,600	1,304,646
143,392	17,660	29,646	64,311	31,775	380,169
758,444	62,756	72,091	513,772	109,825	924,477
763,854	67,089	58,645	428,519	209,601	694,294
37,880	4,887	11,197	6,902	14,894	132,580
725,974	62,202	47,448	421,617	194,707	561,714
525,191	35,057	51,381	351,028	87,725	659,079
48,467	6,796	9,995	23,984	7,692	128,220
476,724	28,261	41,386	327,044	80,033	530,859

Table B-5. (continued)

	Area Has.	Yield TM/Has.	Production TM	Price soles/ TM
06-01	11,951			
07 Barley	5,276	1.8000	9,496.80	4,200
48 Onions	6,675	34.9500	233,291.25	2,000
06-02	2,111			
17 Sugar cane	1,672	187.0036	312,670.02	200
47 Garlic	439	9.0000	3,951.00	11,000
06-03	3,037			
03 White corn	1,221	2.0002	2,442.24	4,000
07 Barley	1,816	1.7999	3,268.62	4,200
06-04	3,899			
03 White corn	1,695	1.9999	3,389.83	4,000
13 Potatoes	2,204	10.0001	22,040.22	4,000
07-01	3,509			
03 White corn	1,869	1.8000	3,364.20	4,000
13 Potatoes	1,640	19.3098	31,668.07	5,000
07-02	2,353			
03 White corn	1,072	1.9000	2,036.80	4,000
13 Potatoes	1,281	10.0000	12,810.00	4,000
08-01	9,622			
01 Rice	4,777	2.0000	9,554.00	5,000
14 Manioc	4,845	13.2000	63,954.00	1,500
08-02	12,151			
03 White corn	7,078	1.5000	10,617.00	4,000
14 Manioc	5,073	13.1999	66,963.09	1,000
09-01	4,940			
01 Rice	3,429	1.6733	5,737.75	6,000
05 Yellow corn	1,511	2.2001	3,324.35	3,700
09-02	4,113			
01 Rice	1,895	1.6700	3,164.65	6,000
03 White corn	2,218	1.5000	3,327.00	3,700

Gross value (000)	Value machinery (000)	Value labor (000)	Value land (000)	Value other means of production (000)	Required labor force (days-labor)
506,470	12,285	143,302	260,714	90,169	1,433,525
39,887	5,276	11,671	16,609	6,331	131,900
466,583	7,009	131,631	244,105	83,838	1,301,625
105,995	2,976	23,548	45,546	33,925	232,844
62,534	2,107	15,557	31,578	13,292	153,824
43,461	869	7,991	13,968	20,633	79,020
23,498	3,037	7,599	6,347	6,515	100,190
9,769	1,221	2,778	1,435	4,335	36,630
13,729	1,816	4,821	4,912	2,180	63,560
101,720	7,734	30,602	21,000	42,384	403,490
13,559	1,695	3,856	1,991	6,017	50,850
88,161	6,039	26,746	19,009	36,367	352,640
171,797	6,619	44,580	45,955	74,643	303,709
13,457	1,869	4,256	1,725	5,607	56,070
158,340	4,750	40,324	44,230	69,036	247,639
59,387	3,378	17,121	9,787	29,101	225,591
8,147	1,072	2,441	1,418	3,216	32,160
51,240	2,306	14,680	8,369	25,885	193,431
143,701	0	67,066	48,106	28,529	792,200
47,770	0	14,154	21,076	12,540	167,195
95,931	0	52,912	27,030	15,989	625,005
109,431	0	66,317	30,596	12,518	893,280
42,468	0	34,682	4,247	3,539	467,148
66,963	0	31,635	26,349	8,979	426,132
46,727	0	32,989	7,389	6,349	389,680
34,427	0	24,675	4,523	5,229	291,465
12,300	0	8,314	2,866	1,120	98,215
31,298	0	22,453	4,690	4,155	273,590
18,988	0	12,439	3,659	2,890	151,600
12,310	0	10,014	1,031	1,265	121,990

Table B-5. (continued)

	Area Has.	Yield TM/Has.	Production TM	Price soles/ TM
09-03	9,862			
03 White corn	5,309	1.5000	7,963.50	3,700
05 Yellow corn	4,553	2.2000	10,016.60	3,700
09-04	7,938			
03 White corn	3,664	1.4999	5,495.63	3,700
05 Yellow corn	4,274	2.2000	9,402.80	3,700
10-01	25,936			
06 Wheat	7,073	1.0000	7,073.00	6,000
13 Potatoes	18,863	10.0811	190,159.79	3,500
10-02	28,433			
03 White corn	13,534	1.2000	16,240.80	4,500
07 Barley	14,899	1.0000	14,899.00	3,500
10-03	34,257			
07 Barley	15,704	1.0000	15,704.00	3,500
13 Potatoes	18,553	7.0000	129,871.00	3,500
10-04	55,225			
07 Barley	15,968	2.0000	31,936.00	3,500
13 Potatoes	39,257	7.9787	313,219.83	3,500
10-05	6,306			
03 White corn	2,466	2.0000	4,932.00	4,500
05 Yellow corn	3,840	2.4455	9,390.72	4,500
10-06	22,884			
03 White corn	8,174	2.0000	16,348.00	4,500
13 Potatoes	14,710	8.0000	117,680.00	3,500
11-01	3,159			
03 White corn	1,545	1.5000	2,317.50	4,500
13 Potatoes	1,614	7.1999	11,620.64	3,500
11-02	17,865			
03 White corn	6,231	1.5000	9,346.50	4,500
13 Potatoes	11,634	7.1471	83,149.36	3,500

Gross value (000)	Value machinery (000)	Value labor (000)	Value land (000)	Value other means of production (000)	Required labor force (days-labor)
66,526	0	43,024	14,885	8,617	524,198
29,465	0	23,970	2,469	3,026	291,995
37,061	0	19,054	12,416	5,591	232,203
55,124	0	38,996	10,874	5,254	461,010
20,334	0	15,480	2,766	2,088	183,200
34,790	0	23,516	8,108	3,166	277,810
707,998	2,544	242,692	146,997	315,765	3,388,104
42,438	0	12,668	13,997	15,773	176,825
665,560	2,544	230,024	133,000	299,992	3,211,279
125,231	7,308	54,947	31,938	31,038	1,057,365
73,084	7,308	30,885	26,500	8,391	595,496
52,147	0	24,062	5,438	22,647	461,869
509,513	0	69,036	42,866	397,611	1,649,896
54,964	0	16,364	21,326	17,274	314,080
454,549	0	52,672	21,540	380,337	1,335,816
1,208,045	0	293,798	202,011	712,236	4,511,847
111,776	0	50,954	32,559	28,263	782,432
1,096,269	0	242,844	169,452	683,973	3,729,415
64,452	4,226	40,011	7,856	12,359	512,020
22,194	0	14,453	1,822	5,919	184,950
42,258	4,226	25,558	6,034	6,440	327,070
485,446	7,357	91,671	147,749	238,669	1,564,270
73,566	7,357	28,742	10,623	26,844	490,440
411,880	0	62,929	137,126	211,825	1,073,830
51,101	1,549	13,809	20,918	14,825	308,286
10,429	0	4,845	3,251	2,333	108,150
40,672	1,549	8,964	17,667	12,492	200,136
333,082	11,289	83,843	138,464	99,486	1,871,814
42,059	0	19,540	13,110	9,409	436,170
291,023	11,289	64,303	125,354	90,077	1,435,644

Table B-5. (continued)

	Area Has.	Yield TM/Has.	Production TM	Price soles/ TM
11-03	5,009			
07 Barley	2,446	1.0001	2,446.24	3,500
13 Potatoes	2,563	7.2124	18,485.38	3,500
11-04	7,866			
07 Barley	3,947	1.0000	3,947.00	3,500
13 Potatoes	3,919	7.1000	27,824.90	3,500
11-05	21,993			
03 White corn	10,691	1.5000	16,036.50	4,500
13 Potatoes	11,302	7.1774	81,118.97	3,500
11-06	1,978			
01 Rice	1,165	3.0601	3,565.02	6,000
14 Manioc	813	18.1820	14,781.97	1,000
12-01	27,393			
08 Quinua	10,633	1.2000	12,759.60	6,000
13 Potatoes	16,760	5.2074	87,276.02	3,500
12-02	4,075			
08 Quinua	1,743	1.6999	2,962.93	6,000
13 Potatoes	2,332	5.9982	13,987.80	3,500
12-03	6,853			
07 Barley	2,829	1.2000	3,394.80	3,800
13 Potatoes	4,024	5.1634	20,777.52	3,500
12-04	16,463			
08 Quinua	5,189	1.2000	6,226.80	6,000
13 Potatoes	11,274	4.5459	51,250.48	3,500
12-05	2,784			
03 White corn	1,246	2.0000	2,492.00	4,000
13 Potatoes	1,538	4.2001	6,459.75	3,500

Gross value (000)	Value machinery (000)	Value labor (000)	Value land (000)	Value other means of production (000)	Required labor force (days-labor)
73,261	2,590	17,745	28,886	24,040	418,624
8,562	0	3,596	2,104	2,862	102,732
64,699	2,590	14,149	26,782	21,178	315,892
111,202	3,762	27,568	44,920	34,952	651,730
13,815	0	5,802	3,394	4,619	165,774
97,387	3,762	21,766	41,526	30,333	485,956
356,080	11,033	96,383	142,650	106,014	2,151,718
72,164	0	33,527	22,494	16,143	748,370
283,916	11,033	62,856	120,156	89,871	1,403,348
36,172	10,695	8,459	7,203	9,815	188,816
21,390	10,695	2,922	2,332	5,441	65,240
14,782	0	5,537	4,871	4,374	123,576
382,024	22,096	115,926	42,253	201,749	2,607,840
76,558	5,954	18,905	26,178	25,521	425,320
305,466	16,142	97,021	16,075	176,228	2,182,520
66,735	3,263	17,265	13,601	32,606	388,400
17,778	838	3,099	6,813	7,028	69,720
48,957	2,425	14,166	6,788	25,578	318,680
85,621	4,625	28,263	6,664	46,069	635,812
12,900	679	4,778	761	6,682	107,502
72,721	3,946	23,485	5,903	39,387	528,310
216,738	13,463	76,958	23,446	102,877	1,731,280
37,361	2,491	11,530	11,924	11,416	259,450
179,377	10,972	65,428	11,522	91,455	1,471,830
32,577	997	11,359	3,410	16,811	324,540
9,968	997	4,361	872	3,738	124,600
22,609	0	6,998	2,538	13,073	199,940

Table B-6. Distribution of gross value of production among workers' classes and owners of means of production bought by enterprises

	Gross value of production (000)	Income of worker-owners (000)	Income of landless workers (000)	Income of owner other means of production (000)
01-01	209,537	108,387	28,076	73,074
01-02	1,046,750	637,738	40,349	368,663
01-03	1,046,049	688,795	--	357,254
01-04	77,579	35,674	23,089	18,816
01-05	683,284	379,057	106,922	197,305
02-01	2,133,210	1,309.177	--	824,033
02-02	774,072	454,324	--	319,748
02-03	677,437	487,613	66,039	123,785
02-04	201,611	77,251	63,183	61,177
02-05	77,557	26,302	20,395	30,860
03-01	284,666	121,762	74,605	88,299
03-02	1,499,651	885,432	--	614,219
03-03	261,740	148,282	8,719	104,739
03-04	175,359	104,216	30,523	40,620
04-01	338,188	236,726	2,803	98,659
04-02	163,356	98,167	25,210	39,979
04-03	354,574	223,354	9,734	121,486
05-01	901,836	727,924	32,312	141,600
05-02	763,854	554,253	--	209,601
05-03	525,191	437,466	--	87,725
06-01	506,470	397,543	18,758	90,169
06-02	105,995	72,070	--	33,925
06-03	23,498	14,340	2,643	6,515
06-04	101,720	49,029	10,307	42,384
07-01	171,797	93,405	3,749	74,643
07-02	59,387	20,257	10,029	29,101
08-01	143,701	56,462	58,710	28,529
08-02	109,431	35,736	61,177	12,518

Table B-6. (continued)

	Gross value of production (000)	Income of worker-owners (000)	Income of landless workers (000)	Income of owner other means of production (000)
09-01	46,727	12,314	28,064	6,349
09-02	31,298	16,754	10,389	4,155
09-03	66,526	22,819	35,090	8,617
09-04	55,124	20,120	29,750	5,254
10-01	707,998	392,233	--	315,765
10-02	125,231	54,098	40,095	31,038
10-03	509,513	85,033	26,869	397,611
10-04	1,208,045	357,430	138,379	712,236
10-05	64,452	52,093	--	12,359
10-06	485,446	179,179	67,598	238,669
11-01	51,101	29,945	6,331	14,825
11-02	333,082	210,355	23,241	99,486
11-03	73,261	41,479	7,742	24,040
11-04	111,202	57,848	18,402	34,952
11-05	356,080	181,422	68,644	106,014
11-06	36,172	21,103	5,254	9,815
12-01	382,024	84,393	95,882	201,749
12-02	66,735	31,121	3,008	32,606
12-03	85,621	17,945	21,607	46,069
12-04	216,738	48,591	65,276	102,871
12-05	32,577	5,459	10,307	16,811

The following symbols are used in Tables B-7 through B-55.

Horizontal entries refer to percentage rates of change in exogenous variables (policy instruments).

DP#/: percentage rate of change in farm price of product #

DPE/: percentage rate of change in wages for landless workers

DS/: percentage rate of change in number of worker-owners

DT/: percentage rate of change in land used by enterprises

DM/: percentage rate of change in machinery used by enterprises

DF/: percentage rate of change in other means of production used by enterprises

Vertical entries refer to percentage rates of change in endogenous variables (policy performance indicators).

DIS/: percentage rate of change in income per worker-owner

DLE/: percentage rate of change in landless workers employment

DL#/: percentage rate of change in labor force for crop #

DT#/: percentage rate of change in land for crop #

DM#/: percentage rate of change in machinery for crop #

DF#/: percentage rate of change in other means of production for crop #

DQ#/: percentage rate of change in production of #

DL/: percentage rate of change in total labor

DLS/: percentage rate of change in worker-owners employment

Table B-7. Producers' reaction function agrarian office 01-01 Alto Piura

THE PRODUCTS FOR REGION "01 01" ARE COTTON (ALGODON) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 80 AND 03.

	DP80/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	4.5267	-2.1443	0.1101	-0.8779	-0.1906	0.3033	0.7652
DLE/	-3.4192	4.4759	-3.8480	-0.4167	1.0008	-0.2291	0.6449
DL80/	3.1391	-1.9944	-1.1437	0.0000	-0.2845	0.2103	1.0743
DL03/	-7.0257	9.8634	-2.8376	0.0000	2.2564	-0.4707	-0.7857
DT80/	4.9620	-5.7890	0.8270	0.0000	-0.2405	0.3325	0.908[illegible]
DT03/	-5.2018	6.0688	-0.8670	0.0000	2.3005	-0.3485	-0.9519
DM80/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-10.1638	11.8578	-1.6940	0.0000	2.5410	0.3190	-1.86[illegible]
DF80/	1.3142	-1.5332	0.2190	0.0000	-0.3285	0.0081	1.2405
DF03/	-8.8496	10.3246	-1.4749	0.0000	2.2124	-0.5929	-0.6195
DQ80/	2.1381	-1.9944	-0.1437	0.0000	-0.2845	0.2103	1.0743
DQ03/	-7.0257	8.8634	-1.8376	0.0000	2.2564	-0.4707	-0.7857
DL/	-3.8877	7.3689	-3.9813	0.0000	1.9719	-0.2605	0.2886
DLS/	-0.4685	3.3931	-0.1333	0.4167	0.9711	-0.0314	-0.3564

Table B-8. Producers' reaction function agrarian office 01-02 Medio y Bajo Piura

THE PRODUCTS FOR REGION "01 02" ARE COTTON (ALGODON) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 80 AND 03.

	DP80/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.2435	-1.1781	0.3112	-0.9735	0.8615	0.2112	-0.1284
DLE/	-5.2836	4.4910	-11.8094	-1.9962	-1.2115	-0.3440	4.2822
DL80/	1.9341	-0.7668	-1.1473	0.0000	0.5074	0.1259	0.4139
DL03/	-11.0319	18.6075	-7.5756	0.0000	-1.8409	-0.7182	2.4426
DT80/	1.0593	-1.5645	0.5252	0.0000	1.1919	0.0690	-0.1657
DT03/	-11.9066	17.8098	-5.9032	0.0000	-1.1565	-0.7751	1.8630
DM80/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-12.9659	19.3943	-6.4284	0.0000	-2.3483	0.1559	2.0287
DF80/	0.1802	-0.2696	0.0894	0.0000	0.0326	0.0117	0.9713
DF03/	-12.7857	19.1247	-6.3390	0.0000	-2.3157	-0.8324	3.0005
DQ80/	0.9341	-0.7868	-0.1473	0.0000	0.5074	0.1259	0.4139
DQ03/	-11.0319	17.6075	-6.5756	0.0000	-1.8409	-0.7182	2.4426
DL/	-9.0978	17.8207	-8.7229	0.0000	-1.3335	-0.5923	2.8565
DLS/	-3.8142	13.3297	3.0855	1.9962	-0.1220	-0.2483	-1.4256

Table B-9. Producers' reaction function agrarian office 01-03 Sullana

THE PRODUCTS FOR REGION "01 03" ARE COTTON (ALGODON) AND RICE (ARROZ).

NUMBERS 80 AND 01.

	DP80/	DP01/	DPE/	DS/	DT/	DM/	DF/
DIS/	2.1557	0.1157	0.4621	-0.8121	0.2503	0.1194	0.4425
DLE/	-28.9480	35.4568	-21.0021	-2.3218	7.7422	2.0983	-6.5187
DL80/	13.9878	-16.9837	2.9959	0.0000	-3.6963	-0.9990	5.6953
DL01/	-41.5523	57.0698	-15.5174	0.0000	12.9657	3.6294	-15.5951
DT80/	14.0405	-13.7207	4.6802	0.0000	-3.2122	-1.1700	5.3022
DT01/	-41.4996	55.3328	-13.8332	0.0000	13.4499	3.4583	-15.9082
DM80/	17.4563	-23.2750	5.8198	0.0000	-5.2369	-0.4547	6.6916
DM01/	-38.0839	50.7785	-12.6946	0.0000	11.4252	4.1737	-14.5988
DF80/	12.1744	-16.2325	4.0581	0.0000	-3.6523	-1.0145	5.6669
DF01/	-43.3657	57.8210	-14.4552	0.0000	13.0097	3.6138	-15.6235
DQ80/	12.9878	-16.9837	3.9959	0.0000	-3.6963	-0.9990	5.6953
DQ01/	-41.5523	56.0698	-14.5174	0.0000	12.9657	3.6294	-15.5951
DL/	-27.5646	40.0861	-12.5215	0.0000	9.2694	2.6304	-9.8998
DLS/	1.3835	4.6293	8.4806	2.3218	1.5271	0.5321	-3.3610

Table B-10. Producers' reaction function agrarian office 01-04 Tumbes

THE PRODUCTS FOR REGION "01 04" ARE RICE (ARROZ) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 01 AND 03.

	DPC1/	DPC3/	DPE/	DS/	DT/	DM/	DF/
DIS/	5.6159	-1.7435	-0.6414	-0.7212	-0.1647	0.2796	0.6096
DLE/	2.1078	-1.9166	-3.7229	-0.4307	-0.1252	0.1045	1.4479
DLD1/	6.4619	-4.3567	-2.1053	0.0000	-0.6009	0.3205	1.2604
DLD3/	-22.3717	24.4770	-2.1053	0.0000	3.7242	-1.1096	-1.6145
DT01/	9.7198	-9.7198	0.0000	0.0000	-0.4540	0.4821	0.9759
DT03/	-19.1138	19.1138	0.0000	0.0000	3.9671	-0.9490	-1.9190
DM01/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-28.8336	28.8336	0.0000	0.0000	4.3250	-0.4301	-2.9949
DF01/	4.5615	-4.5615	0.0000	0.0000	-0.6842	0.2262	1.4580
DF03/	-24.2722	24.2722	0.0000	0.0000	3.6406	-1.2039	-1.4365
DQ01/	5.4619	-4.3567	-1.1053	0.0000	-0.6009	0.3205	1.2604
DQ03/	-22.3717	23.4770	-1.1053	0.0000	3.7242	-1.1096	-1.6145
DL/	-15.9098	20.1203	-4.2105	0.0000	3.1233	-0.7891	-0.3342
DLS/	-18.0176	21.1369	-0.4876	0.4307	3.2495	-0.8937	-1.7821

Table B-11. Producers' reaction function agrarian office 01-05 San Lorenzo

THE PRODUCTS FOR REGION "01 05" ARE COTTON (ALGODON) AND RICE (ARRUZ).
NUMBERS 80 AND 01.

	DP80/	DP01/	DPE/	DS/	DT/	DN/	DF/
DIS/	4.5598	-3.1429	0.4984	-0.9351	-0.7445	-0.0193	1.6989
DLE/	-7.5027	10.4344	-4.3319	-0.2302	3.5407	0.3970	-2.7076
DL80/	7.6886	-7.9282	0.2395	0.0000	-2.4120	-0.2150	3.6270
DL01/	-34.1915	43.7677	-9.5761	0.0000	14.4710	1.5467	-15.0177
DT80/	7.9865	-9.8584	1.8718	0.0000	-2.2196	-0.3360	3.5555
DT01/	-33.8936	41.8374	-7.9438	0.0000	14.6634	1.4256	-15.0891
DM80/	9.2430	-11.4093	2.1663	0.0000	-3.7261	0.6112	4.1149
DM01/	-32.6372	40.2866	-7.6493	0.0000	13.1569	2.3729	-14.5298
DF80/	5.8590	-7.2322	1.3732	0.0000	-2.3619	-0.2465	3.6084
DF01/	-36.0211	44.4636	-8.4425	0.0000	14.5210	1.5153	-15.0363
DQ80/	6.6886	-7.9282	1.2395	0.0000	-2.4120	-0.2150	3.6270
DQ01/	-34.1915	42.7677	-8.5761	0.0000	14.4710	1.5467	-15.0177
DL/	-26.5029	35.8395	-9.3366	0.0000	12.0590	1.3317	-11.3907
DLS/	-19.0001	25.4051	-5.0047	0.2302	8.5182	0.9347	-8.6832

Table B-12. Producers' reaction function agrarian office 02-01 Lambayeque

THE PRODUCTS FOR REGION "02 01" ARE RICE (ARROZ) AND SUGAR CANE (CANA DE AZUCAR). NUMBERS 01 AND 17.

	DP01/	DP17/	DPE/	DS/	DT/	DM/	DF/
DIS/	-13.5289	12.0276	4.5010	-0.8063	-3.2392	-0.1808	4.2262
DLE/	122.9094	-90.4339	-42.0747	-1.4200	31.8764	3.5036	-32.9600
DL01/	30.2902	-20.7652	-9.5251	0.0000	9.0536	1.0138	-8.0673
DL17/	-16.0396	12.6952	3.3443	0.0000	-4.0437	-0.3689	5.4126
DT01/	27.6079	-19.9391	-7.6689	0.0000	9.2097	0.8239	-9.0327
DT17/	-18.7219	13.5213	5.2005	0.0000	-3.8885	-0.5587	5.4472
DM01/	28.2473	-20.4008	-7.8465	0.0000	7.3757	1.0430	-8.2197
DM17/	-18.0825	13.0596	5.0229	0.0000	-4.7215	0.4603	5.2612
DF01/	31.1105	-22.4687	-8.6418	0.0000	9.1233	0.9285	-8.0515
DF17/	-15.2193	10.9917	4.2276	0.0000	-3.9739	-0.4542	5.4281
DQ01/	29.2902	-20.7652	-9.5251	0.0000	8.0536	1.0138	-8.0673
DQ17/	-16.0396	11.6952	4.3443	0.0000	-4.0437	-0.3689	5.4126
DL/	14.2506	-9.0699	-6.1807	0.0000	4.0099	0.6449	-2.6547
DLS/	-108.6587	82.3639	35.8939	1.4200	-27.8665	-2.9587	30.3053

Table B-13. Producers' reaction function agrarian office 02-02 Chepen

THE PRODUCTS FOR REGION "02 02" ARE RICE (ARROZ) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 01 AND 03.

	DP01/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.3853	-1.3885	0.9542	-0.8284	-0.0468	0.2841	0.5911
DLE/	-10.6966	16.6606	-16.7198	-1.5366	2.3571	-0.0630	0.2424
DL01/	2.3877	-2.2663	-0.1214	0.0000	-0.2647	0.1128	1.1518
DL03/	-14.3377	32.5406	-18.2029	0.0000	4.9970	0.6098	-4.6069
DT01/	4.0425	-8.4128	4.3703	0.0000	-0.2718	-0.1201	1.3919
DT03/	-12.6829	26.3940	-13.7112	0.0000	4.9900	0.3769	-4.3668
DM01/	0.7577	-1.5768	0.9191	0.0000	-0.2384	0.9775	0.2609
DM03/	-15.9677	33.2301	-17.2624	0.0000	5.0234	1.4745	-5.4978
DF01/	0.8547	-1.7786	0.9240	0.0000	-0.2699	-0.0254	1.2943
DF03/	-15.8707	33.0282	-17.1575	0.0000	4.9928	0.4716	-4.4644
DQ01/	1.3877	-2.2663	0.8786	0.0000	-0.2647	0.1128	1.1518
DQ03/	-14.3377	31.5406	-17.2029	0.0000	4.9970	0.6098	-4.6069
DL/	-11.9500	30.2743	-18.3243	0.0000	4.7324	0.7226	-3.4550
DLS/	-1.2534	13.6137	-1.6055	1.5366	2.3753	0.7856	-3.6974

Table B-14. Producers' reaction function agrarian office 02-03 Jaen

THE PRODUCTS FOR REGION "02 03" ARE RICE (ARROZ) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 01 AND 03.

	DP01/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.6283	-1.9963	0.3773	-0.4539	-0.2451	0.5755	0.5235
DLE/	-9.7049	14.9848	-10.8680	-1.1017	3.0669	-1.5392	0.5740
DL01/	2.7988	-1.5095	-1.2893	0.0000	-0.1815	0.4439	0.7376
DL03/	-9.1460	14.4169	-5.2709	0.0000	2.9640	-1.4506	-0.5134
DT01/	4.2094	-5.6125	1.4031	0.0000	-0.1055	0.6676	0.4409
DT03/	-7.7355	10.3140	-2.5785	0.0000	3.0370	-1.2268	-0.8102
DM01/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-11.9448	15.9264	-3.9816	0.0000	3.1455	-0.8944	-1.2510
DF01/	1.0356	-1.3898	0.3452	0.0000	-0.2727	0.1642	1.1085
DF03/	-10.9092	14.5456	-3.6364	0.0000	2.8728	-1.7302	-0.1426
DQ01/	1.7988	-1.5095	-0.2893	0.0000	-0.1815	0.4439	0.7376
DQ03/	-9.1460	13.4169	-4.2709	0.0000	2.9640	-1.4506	-0.5134
DL/	-6.3472	12.9074	-6.5602	0.0000	2.7825	-1.0067	0.2241
DLS/	3.3577	-2.0774	4.3078	1.1017	-0.2843	0.5325	-0.3459

Table B-15. Producers' reaction function agrarian office 02-04 Chota

THE PRODUCTS FOR REGION "02 04" ARE BEANS (FRIJOL) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 21 AND 03.

	DP21/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	2.8693	0.4782	-0.6587	-0.9309	0.5499	0.5380	-0.1570
DLE/	-1.4484	2.4717	-1.7210	-0.0828	0.4007	-0.2716	0.9537
DL21/	5.3073	-3.8787	-1.4286	0.0000	-0.1736	0.9951	0.1785
DL03/	-3.7508	5.1793	-1.4286	0.0000	0.7322	-0.7033	0.9710
DT21/	5.4022	-5.4022	-0.0000	0.0000	0.4596	1.0129	-0.4727
DT03/	-3.6558	3.6558	0.0000	0.0000	1.3656	-0.6855	0.3199
DM21/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-9.0581	9.0581	0.0000	0.0000	0.9058	-0.6984	0.7926
DF21/	5.2546	-5.2546	0.0000	0.0000	-0.5255	0.9852	0.5402
DF03/	-3.9035	3.9035	0.0000	0.0000	0.3803	-0.7132	1.3326
DQ21/	4.3073	-3.9787	-0.4286	0.0000	-0.1736	0.9951	0.1785
DQ03/	-3.7508	4.1793	-0.4286	0.0000	0.7322	-0.7033	0.9710
DL/	1.5566	1.3606	-2.8571	0.0000	0.5586	0.2919	1.1495
DLS/	3.0049	-1.1711	-1.1362	0.0828	0.1580	0.5634	0.1958

Table B-16. Producers' reaction function agrarian office 02-05 Cajamarca

THE PRODUCTS FOR REGION "02 05" ARE WHEAT (TRIGO) AND BARLEY (CEBADA).

NUMBERS 06 AND 07.

	DP06/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	19.2842	-13.1985	-1.4973	-0.8318	-1.7269	1.9284	0.8384
DLE/	-15.1020	14.5674	-1.5160	-0.1869	2.8333	-1.5102	-0.3675
DL06/	6.0691	-4.5306	-1.5385	0.0000	-0.6754	0.6069	1.0684
DL07/	-7.7948	9.3333	-1.5385	0.0000	2.0974	-0.7795	-0.3179
DT06/	7.3104	-7.3104	0.0000	0.0000	-0.4621	0.7310	0.7310
DT07/	-6.5534	6.5534	0.0000	0.0000	2.3107	-0.6553	-0.6553
DM06/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM07/	-13.8639	13.8639	0.0000	0.0000	2.7728	-0.3864	-1.3864
DF06/	4.6208	-4.6208	0.0000	0.0000	-0.9242	0.4621	1.4621
DF07/	-9.2430	9.2430	0.0000	0.0000	1.8486	-0.9243	0.0757
DQ06/	5.0691	-4.5306	-0.5385	0.0000	-0.6754	0.6069	1.0684
DQ07/	-7.7948	8.3333	-0.5385	0.0000	2.0974	-0.7795	-0.3179
DL/	-1.7257	4.8027	-3.0769	0.0000	1.4221	-0.1726	0.7505
DLS/	13.3763	-9.7647	-1.5609	0.1869	-1.4112	1.3376	1.1180

Table B-17. Producers' reaction function agrarian office 03-01 Huaraz

THE PRODUCTS FOR REGION "03 01" ARE WHEAT (TRIGO) AND BARLEY (CEBADA). NUMBERS 06 AND 07.

	DPC6/	DPO7/	DPE/	DS/	DT/	DM/	DF/
DIS/	2.0613	1.7144	-1.3090	-0.9324	0.5664	0.3602	0.0058
DLE/	-1.5982	4.0772	-3.8486	-0.1764	0.3718	0.5317	0.2728
DLU6/	2.9720	-2.7009	-0.2710	0.0000	0.0407	-0.2565	1.2159
DLU7/	-2.0611	6.1069	-4.0458	0.0000	0.6069	0.8130	-0.4199
DTU6/	2.9609	-5.1817	2.2207	0.0000	0.6669	-0.6292	0.9623
DT07/	-2.0721	3.6262	-1.5541	0.0000	1.2331	0.4403	-0.6734
DM06/	4.4100	-7.7174	3.3075	0.0000	-0.4961	0.0629	1.4332
DM07/	-0.6231	1.0904	-0.4673	0.0000	0.0701	1.1324	-0.2025
DF06/	0.8315	-1.4551	0.6236	0.0000	-0.0935	-0.1767	1.2702
DF07/	-4.2016	7.3528	-3.1512	0.0000	0.4727	0.3928	-0.3655
DQ06/	1.9720	-2.7009	0.7290	0.0000	0.0407	-0.2565	1.2159
DQ07/	-2.0611	5.1069	-3.0458	0.0000	0.6069	0.8130	-0.4199
DL/	0.9109	3.4060	-4.3169	0.0000	0.6475	0.5564	0.7960
DLS/	2.5091	-0.6712	-0.4692	0.1764	0.2757	0.0248	0.5232

Table B-18. Producers' reaction function agrarian office 03-02 Trujillo

THE PRODUCTS FOR REGION "03 02" ARE YELLOW CORN (MAIZ) AND SUGAR CANE (CANA DE AZUCAR). NUMBERS 05 AND 17.

	DP05/	DP17/	DPE/	DS/	DT/	DM/	DF/
DIS/	-5.4792	6.6971	1.3567	-0.8820	-1.2355	0.5663	1.5512
DLE/	119.3190	-99.9626	-42.4848	-3.3046	31.9590	-5.4489	-22.2055
DL05/	26.9211	-19.7921	-7.1290	0.0000	7.5145	-0.8151	-5.6993
DL17/	-3.8173	4.1989	-0.3816	0.0000	-0.9124	0.3244	1.5879
DT05/	23.7393	-18.5292	-5.2111	0.0000	7.5080	-0.8801	-5.6279
DT17/	-6.9991	5.4627	1.5364	0.0000	-0.9188	0.2595	1.6593
DM05/	27.6953	-21.6159	-6.0795	0.0000	7.5926	-0.0268	-6.5658
DM17/	-3.0431	2.3751	0.6690	0.0000	-0.8343	1.1128	0.7214
DF05/	27.3387	-21.3376	-6.0012	0.0000	7.4948	-1.0135	-5.4813
DF17/	-3.3997	2.6534	0.7463	0.0000	-0.9320	0.1260	1.8060
DQ05/	25.9211	-19.7921	-6.1290	0.0000	7.5145	-0.8151	-5.6993
DQ17/	-3.8173	3.1989	0.6184	0.0000	-0.9124	0.3244	1.5879
DL/	23.1038	-15.5932	-7.5106	0.0000	6.6021	-0.4907	-4.1114
DLS/	-96.2152	84.3693	34.9742	3.3046	-25.3568	4.9582	18.0940

Table B-19. Producers' reaction function agrarian office 03-03 Chimbote

THE PRODUCTS FOR REGION "03 03" ARE YELLOW CORN (MAIZ) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 05 AND 03.

	DP05/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.5009	-0.5660	-0.4325	-0.8710	0.2256	0.3501	0.2953
DLE/	-42.0453	49.9178	-27.5778	-3.0000	6.7554	-4.2045	1.4491
DL05/	4.8024	-4.3755	-0.4269	0.0000	-0.4824	0.4802	1.0021
DL03/	-5.7705	10.3775	-4.6069	0.0000	1.7060	-0.5771	-0.1289
DT05/	6.4315	-8.9742	2.5427	0.0000	-0.3312	0.6432	0.6880
DT03/	-4.1414	5.7787	-1.6373	0.0000	1.8572	-0.4141	-0.4430
DM05/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-10.5729	14.7529	-4.1800	0.0000	2.1884	-0.0573	-1.1311
DF05/	3.0958	-4.3197	1.2239	0.0000	-0.6407	0.3096	1.3312
DF03/	-7.4772	10.4333	-2.9561	0.0000	1.5476	-0.7477	0.2001
DQ05/	3.8024	-4.3755	0.5731	0.0000	-0.4824	0.4802	1.0021
DQ03/	-5.7705	9.3775	-3.6069	0.0000	1.7060	-0.5771	-0.1289
DL/	-0.9681	6.0020	-5.0339	0.0000	1.2236	-0.0968	0.8732
DLS/	41.0772	-43.8158	22.5439	3.0000	-5.5318	4.1077	-0.5759

Table B-20. Producers' reaction function agrarian office 03-04 Huamachuco

THE PRODUCTS FOR REGION "03 04" ARE WHEAT (TRIGO) AND BARLEY (CEBADA).

NUMBERS 06 AND 07.

	DP06/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	1.6328	1.5606	-0.5449	-0.9188	0.9508	0.4826	-0.5146
DLE/	-4.7809	7.1482	-3.7970	-0.1788	1.9031	-0.2414	-0.4829
DL06/	5.0127	-5.0169	0.0042	0.0000	-1.0042	0.5008	1.5034
DL07/	-6.0232	9.6976	-3.6744	0.0000	2.6744	-0.2349	-1.4395
DT06/	6.0013	-8.0018	2.0004	0.0000	-1.0004	0.4001	1.6004
DT07/	-5.0346	6.7128	-1.6782	0.0000	2.6782	-0.3356	-1.3426
DM06/	3.0923	-4.1230	1.0308	0.0000	-1.0308	1.2062	0.8246
DM07/	-7.9436	10.5915	-2.6479	0.0000	2.6479	0.4704	-2.1143
DF06/	2.9786	-3.9715	0.9929	0.0000	-0.9929	0.1986	1.7943
DF07/	-8.0573	10.7431	-2.6858	0.0000	2.6858	-0.5372	-1.1496
DQ06/	4.0127	-5.0169	1.0042	0.0000	-1.0042	0.5008	1.5034
DQ07/	-6.0232	8.6976	-2.6744	0.0000	2.6744	-0.2349	-1.4395
DL/	-1.0105	4.6807	-3.6702	0.0000	1.6702	0.2660	0.0635
DLS/	3.7704	-2.4675	0.1268	0.1788	-0.2329	0.5073	0.5468

Table B-21. Producers' reaction function agrarian office 04-01 Cañete

THE PRODUCTS FOR REGION "04 01" ARE COTTON (ALGODON) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 80 AND 03.

	DP80/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.3404	-1.1216	-0.3072	-0.9283	-0.0366	0.2219	0.7431
DLE/	-70.4094	61.4292	-36.9797	-7.7348	15.5083	-0.8980	-5.8755
DL80/	3.1893	-1.7607	-1.4286	0.0000	-0.3040	0.1429	1.1611
DL03/	-8.7006	10.1292	-1.4286	0.0000	2.9063	0.1429	-2.0492
DT80/	4.8214	-4.8214	0.0000	0.0000	-0.3018	0.0000	1.3018
DT03/	-7.0685	7.0685	-0.0000	0.0000	2.9085	0.0000	-1.9085
DM80/	1.1747	-1.1747	0.0000	0.0000	-0.3172	1.0000	0.3172
DM03/	-10.7152	10.7152	-0.0000	0.0000	2.8931	1.0000	-2.8931
DF80/	1.1177	-1.1177	0.0000	0.0000	-0.3018	0.0000	1.3018
DF03/	-10.7722	10.7722	-0.0000	0.0000	2.9085	0.0000	-1.9085
DW80/	2.1893	-1.7607	-0.4286	0.0000	-0.3040	0.1429	1.1611
DW03/	-8.7006	9.1292	-0.4286	0.0000	2.9063	0.1429	-2.0492
DL/	-5.5113	8.3685	-2.8571	0.0000	2.6023	0.2857	-0.8881
DLS/	64.8981	-53.0607	34.1226	7.7348	-12.9059	1.1837	4.9874

Table B-22. Producers' reaction function agrarian office 04-02 Lima

THE PRODUCTS FOR REGION "04 02" ARE YELLOW CORN (MAIZ) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 05 AND 03.

	DP05/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	4.9005	-3.1508	0.0072	-0.9552	-0.2802	0.5775	0.6579
DLE/	-2.7143	4.1688	-2.7025	-0.2094	1.1247	-0.1987	0.2834
DL05/	7.1792	-6.4476	-0.7316	0.0000	-1.1432	0.7545	1.3887
DL03/	-9.7326	12.2051	-2.4725	0.0000	2.9355	-0.8496	-1.0859
DT05/	8.8854	-9.8001	0.9147	0.0000	-1.1430	0.8428	1.3001
DT03/	-8.0263	8.8526	-0.8262	0.0000	2.9358	-0.7613	-1.1744
DM05/	4.7319	-5.2190	0.4871	0.0000	-1.1412	1.4488	0.6924
DM03/	-12.1798	13.4336	-1.2538	0.0000	2.9375	-0.1553	-1.7822
DF05/	4.7437	-5.2321	0.4883	0.0000	-1.1441	0.4500	1.6941
DF03/	-12.1680	13.4206	-1.2526	0.0000	2.9346	-1.1542	-0.7805
DQ05/	6.1792	-6.4476	0.2684	0.0000	-1.1432	0.7545	1.3887
DQ03/	-9.7326	11.2051	-1.4725	0.0000	2.9355	-0.8496	-1.0859
DL/	-2.5534	5.7575	-3.2040	0.0000	1.7923	-0.0951	0.3028
DLS/	0.1609	1.5886	-0.5016	0.2094	0.6676	0.1036	0.0194

Table B-23. Producers' reaction function agrarian office 04-03 Huacho

THE PRODUCTS FOR REGION "04 03" ARE YELLOW CORN (MAIZ) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 05 AND 03.

	DP05/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	1.7091	1.0652	-0.5263	-0.9069	0.3838	0.4160	0.1071
DLE/	-36.7024	39.1574	-24.2479	-3.3276	4.1612	0.3683	-0.2019
DL05/	7.9447	-8.2933	0.3486	0.0000	-0.8642	-0.0523	1.9165
DL03/	-11.5877	16.5662	-4.9785	0.0000	2.1545	0.7468	-1.9012
DT05/	11.8299	-15.0549	3.2261	0.0000	-0.8281	-0.4839	2.3120
DT03/	-7.7036	9.8046	-2.1010	0.0000	2.1906	0.3151	-1.5057
DM05/	6.0277	-7.6716	1.6439	0.0000	-0.9316	0.7534	1.1781
DM03/	-13.5047	17.1879	-3.6831	0.0000	2.0871	1.5525	-2.6396
DF05/	5.4984	-6.9979	1.4996	0.0000	-0.9498	-0.2249	2.0747
DF03/	-14.0341	17.8616	-3.8275	0.0000	2.1689	0.5741	-1.7430
DQ05/	6.9447	-8.2933	1.3486	0.0000	-0.8642	-0.0523	1.9165
DQ03/	-11.5877	15.5662	-3.9785	0.0000	2.1545	0.7468	-1.9012
DL/	-3.6430	8.2729	-4.6299	0.0000	1.2903	0.6945	0.0152
DLS/	33.0594	-30.8845	19.6180	3.3276	-2.8710	0.3262	0.2172

Table B-24. Producers' reaction function agrarian office 05-01 Chincha

THE PRODUCTS FOR REGION "05 01" ARE COTTON (ALGODON) AND YELLOW CORN (MAIZ). NUMBERS 80 AND 05.

	DP80/	DP05/	DPE/	DS/	DT/	DM/	DF/
DTS/	7.5834	-7.9903	1.7606	-0.9756	-1.7201	0.2645	2.4249
DLE/	-17.1362	23.5053	-9.6960	-0.4716	6.6118	-0.1719	-4.9642
DL80/	12.9937	-15.2777	2.2839	0.0000	-3.7407	0.3293	4.4037
DL05/	-35.9493	47.6490	-11.6998	0.0000	13.0397	-0.4904	-11.5378
DT80/	13.8753	-17.8397	3.9644	0.0000	-3.7573	0.2324	4.5194
DT05/	-35.0676	45.0870	-10.0193	0.0000	13.0232	-0.5873	-11.4220
DM80/	10.5001	-13.5001	3.0000	0.0000	-3.6000	1.1528	3.4200
DM05/	-38.4429	49.4266	-10.9837	0.0000	13.1864	0.2331	-12.5214
DF80/	10.9828	-14.1207	3.1379	0.0000	-3.7655	0.1839	4.5773
DF05/	-37.9602	48.8059	-10.8458	0.0000	13.0149	-0.6357	-11.3642
DQ80/	11.9937	-15.2777	3.2839	0.0000	-3.7407	0.3293	4.4037
DQ05/	-35.9493	46.6490	-10.6998	0.0000	13.0397	-0.4904	-11.5378
DL/	-22.9555	32.3714	-9.4159	0.0000	9.2990	-0.1611	-7.1341
DLS/	-5.8193	8.8661	-0.7199	0.4716	2.6873	0.0107	-2.1698

Table B-25. Producers' reaction function agrarian office 05-02 Ica

THE PRODUCTS FOR REGION "05 02" ARE COTTON (ALGODON) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 80 AND 03.

	DP80/	DPC3/	DPE/	DS/	DT/	DM/	DF/
DI3/	4.2080	-1.8928	-0.6548	-0.9584	-0.6570	0.1165	1.4989
DLE/	-9.1656	8.3959	-1.8367	-0.4577	4.1018	0.2976	-2.9417
DL80/	3.3135	-1.6502	-1.6634	0.0000	-0.6172	0.0711	1.5461
DL03/	-18.5605	16.5782	1.9823	0.0000	8.0413	0.5480	-7.5893
DT80/	4.0795	-3.3996	-0.6799	0.0000	-0.6148	-0.0889	1.7037
DT03/	-17.7946	14.9298	2.9658	0.0000	8.0437	0.3879	-7.4316
DM80/	1.5924	-1.3270	-0.2654	0.0000	-0.6303	0.9653	0.6651
DM03/	-20.2816	16.9014	3.3803	0.0000	8.0281	1.4421	-8.4703
DF80/	1.5552	-1.2960	-0.2592	0.0000	-0.6156	-0.0339	1.6495
DF03/	-20.3188	16.9324	3.3865	0.0000	8.0429	0.4430	-7.4858
DQ80/	2.3135	-1.6502	-0.6634	0.0000	-0.6172	0.0711	1.5461
DQ03/	-18.5605	15.5782	2.9823	0.0000	8.0413	0.5480	-7.5893
DL/	-15.2470	14.9280	0.3199	0.0000	7.4242	0.6191	-6.0432
DLS/	-6.0814	6.5321	2.1556	0.4577	3.3224	0.3215	-3.1015

Table B-26. Producers' reaction function agrarian office 05-03 Nazca

THE PRODUCTS FOR REGION "05 03" ARE COTTON (ALGODON) AND BARLEY (CEBADA), NUMBERS 60 AND 07.

	DP80/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.0169	-1.9854	0.2273	-0.9794	-0.0376	0.0189	0.9981
DLE/	-2.0564	3.6198	-4.2249	-0.5300	1.1930	0.3373	-0.0004
DL80/	3.3095	-2.5464	-0.7631	0.0000	-0.2804	-0.0510	1.3314
DL07/	-7.9618	10.4370	-2.4752	0.0000	2.8300	0.7694	-2.5993
DT80/	4.2966	-4.9493	0.6527	0.0000	-0.1856	-0.3127	1.4984
DT07/	-6.9747	8.0341	-1.0594	0.0000	2.9247	0.5077	-2.4323
DM80/	2.1855	-2.5175	0.3320	0.0000	-0.6031	0.8409	0.7622
DM07/	-9.0858	10.4659	-1.3801	0.0000	2.5072	1.6613	-3.1685
DF80/	0.9885	-1.1386	0.1502	0.0000	-0.2728	-0.0719	1.3447
DF07/	-10.2828	11.3448	-1.5619	0.0000	2.8375	0.7484	-2.5860
DQ80/	2.3095	-2.5464	0.2369	0.0000	-0.2804	-0.0510	1.3314
DQ07/	-7.9618	9.4370	-1.4752	0.0000	2.8300	0.7694	-2.5993
DL/	-4.6523	7.9906	-3.2383	0.0000	2.5496	0.7184	-1.2680
DLS/	-2.5959	4.2707	0.9866	0.5300	1.3566	0.3810	-1.2676

Table B-27. Producers' reaction function agrarian office 06-01 Arequipa

THE PRODUCTS FOR REGION "06 01" ARE UNIONS (CEBOLLA) AND BARLEY (CEBADA), NUMBERS 49 AND 07.

	DP48/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	3.1741	-1.7707	0.4061	-0.8981	-0.1266	0.1403	0.8843
DLE/	0.5042	0.4741	-10.5900	-1.8694	0.3047	0.0978	2.4669
DL49/	3.0846	-2.0967	-0.9879	0.0000	-0.2847	0.0988	1.1855
DL07/	-5.7384	7.9867	-2.2483	0.0000	2.2866	0.2248	-1.5114
DT48/	3.8953	-4.4518	0.5565	0.0000	-0.1352	-0.0556	1.1909
DT07/	-4.9276	5.6316	-0.7039	0.0000	2.4361	0.0704	-1.5064
DM48/	3.7895	-4.3308	0.5414	0.0000	-1.1044	0.9459	1.1585
DM07/	-5.0335	5.7526	-0.7191	0.0000	1.4669	1.0719	-1.5388
DF48/	0.6194	-0.7079	0.0885	0.0000	-0.1805	-0.0088	1.1894
DF07/	-8.2036	9.3756	-1.1719	0.0000	2.3908	0.1172	-1.5080
DQ48/	2.0846	-2.0967	0.0121	0.0000	-0.2847	0.0988	1.1859
DQ07/	-5.7384	6.9867	-1.2483	0.0000	2.2866	0.2248	-1.5114
DL/	-2.6537	5.8900	-3.2362	0.0000	2.0019	0.3236	-0.3256
DLS/	-3.1580	5.4159	7.3538	1.8694	1.6972	0.2258	-2.7924

Table B-28. Producers' reaction function agrarian office 06-02 Tambo

THE PRODUCTS FOR REGION "06 02" ARE GARLIC (AJO) AND SUGAR CANE (CANA DE AZUCAR). NUMBERS 47 AND 17.

	DP47/	DP17/	DPE/	DS/	DT/	DM/	DF/
DIS/	1.9008	0.0652	0.0101	-0.9187	0.6028	0.1016	0.2143
DLE/	-3.3847	3.8452	-5.5555	-0.8542	0.9072	0.2153	0.7318
DL47/	6.2962	-5.3827	-0.9136	0.0000	-0.8025	-0.2235	2.0259
DL17/	-2.6886	4.2012	-1.5126	0.0000	1.2940	0.2857	-0.5797
DT47/	7.1160	-7.5904	0.4744	0.0000	-0.6604	-0.4032	2.0636
DT17/	-1.8689	1.9934	-0.1246	0.0000	1.4361	0.1059	-0.5420
DM47/	6.3613	-6.7854	0.4241	0.0000	-1.4843	0.6395	1.8446
DM17/	-2.6236	2.7985	-0.1749	0.0000	0.6122	1.1487	-0.7608
DF47/	3.5203	-3.7550	0.2347	0.0000	-0.8214	-0.1995	2.0209
DF17/	-5.4646	5.8289	-0.3643	0.0000	1.2751	0.3097	-0.5847
DQ47/	5.2962	-5.3827	0.0864	0.0000	-0.8025	-0.2235	2.0259
DQ17/	-2.6886	3.2012	-0.5126	0.0000	1.2940	0.2857	-0.5797
DL/	3.6076	-1.1815	-2.4262	0.0000	0.4916	0.0622	1.4462
DLS/	6.9923	-5.0267	3.1293	0.8542	-0.4156	-0.1530	0.7145

Table B-29. Producers' reaction function agrarian office 06-03 Caylloma

THE PRODUCTS FOR REGION "06 03" ARE WHITE CORN (MAIZ AMILACEO) AND BARLEY (CEBADA). NUMBERS 03 AND 07.

	DP03/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	-0.4290	3.5212	-0.5383	-0.8783	1.2033	0.4638	-0.7888
DLE/	-2.4584	2.9587	-4.3316	-0.5575	0.6964	0.0751	0.7861
DL03/	6.2683	-6.1763	-0.0919	0.0000	-1.2832	0.0138	2.2694
DL07/	-5.3129	8.0774	-2.7645	0.0000	2.1109	0.4147	-1.5256
DT03/	6.9256	-8.5238	1.5982	0.0000	-1.0297	-0.2397	2.2694
DT07/	-4.6556	5.7300	-1.0744	0.0000	2.3645	0.1612	-1.5256
DM03/	6.9256	-8.5238	1.5982	0.0000	-2.0297	0.7603	2.2694
DM07/	-4.6556	5.7300	-1.0744	0.0000	1.3645	1.1612	-1.5256
DF03/	3.8739	-4.7679	0.8940	0.0000	-1.1354	-0.1341	2.2694
DF07/	-7.7073	9.4859	-1.7786	0.0000	2.2588	0.2666	-1.5256
DQ03/	5.2683	-6.1763	0.9081	0.0000	-1.2832	0.0138	2.2694
DQ07/	-5.3129	7.0774	-1.7645	0.0000	2.1109	0.4147	-1.5256
DL/	0.9554	1.9011	-2.8565	0.0000	0.8277	0.4285	0.7438
DLS/	3.4137	-1.0576	1.4752	0.5575	0.1313	0.3534	-0.0423

Table B-30. Producers' reaction function agrarian office 06-04 Majes

THE PRODUCTS FOR REGION "06 04" ARE WHITE CORN (MAIZ AMILACEO) AND POTATOES (PAPA), NUMBERS 03 AND 13.

	DP03/	DP13/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.7242	3.8453	0.1346	-0.9015	-0.0465	0.0479	0.9002
DLE/	-0.7698	0.9225	-3.7060	-0.5490	-0.1002	-0.0330	1.6822
DL03/	15.3556	-11.9749	-3.3808	0.0000	2.6414	1.0992	-2.7406
DL13/	-3.5571	4.4161	-0.8591	0.0000	-0.4477	-0.1421	1.5898
DT03/	10.6913	-9.2658	-1.4255	0.0000	2.7463	0.7017	-2.4490
DT13/	-8.2213	7.1252	1.0962	0.0000	-0.3428	-0.5396	1.8824
DM03/	14.7670	-12.7981	-1.9689	0.0000	2.4119	1.9692	-3.3812
DM13/	-4.1457	3.5929	0.5528	0.0000	-0.6771	0.7279	0.9492
DF03/	16.2271	-14.0635	-2.1636	0.0000	2.6504	1.0650	-2.7155
DF13/	-2.6856	2.3275	0.3581	0.0000	-0.4386	-0.1763	1.6149
DQ03/	14.3556	-11.9749	-2.3808	0.0000	2.6414	1.0992	-2.7406
DQ13/	-3.5571	3.4161	0.1409	0.0000	-0.4477	-0.1421	1.5898
DL/	11.7986	-7.5588	-4.2398	0.0000	2.1978	0.9570	-1.1508
DLS/	12.5694	-9.4813	-0.5338	0.5490	2.2940	0.9901	-2.8330

Table B-31. Producers' reaction function agrarian office 07-01 Tacna

THE PRODUCTS FOR REGION "07 01" ARE WHITE CORN (MAIZ AMILACEO) AND POTATOES (PAPA), NUMBERS 03 AND 13.

	DP03/	DP13/	DPE/	DS/	DT/	DM/	DF/
DIS/	-0.1028	2.5878	-0.5591	-0.9806	0.2280	0.1140	0.5442
DLE/	1.0081	-2.1655	-2.2305	-0.4767	0.0839	0.0419	0.6013
DL03/	7.3724	-6.0391	-1.3333	0.0000	1.6078	0.8039	-1.1098
DL13/	-1.2494	2.5827	-1.3333	0.0000	-0.1165	-0.0583	1.0457
DT03/	4.0298	-4.0298	0.0000	0.0000	1.8060	0.4030	-1.0075
DT13/	-4.5920	4.5920	0.0000	0.0000	0.0816	-0.4592	1.1480
DM03/	6.1870	-6.1870	0.0000	0.0000	1.2374	1.6187	-1.5468
DM13/	-2.4348	2.4348	0.0000	0.0000	-0.4870	0.7565	0.6087
DF03/	7.9743	-7.9743	0.0000	0.0000	1.5949	0.7974	-0.9936
DF13/	-0.6475	0.6475	0.0000	0.0000	-0.1295	-0.0647	1.1619
DQ03/	6.3724	-6.0391	-0.3333	0.0000	1.6078	0.8039	-1.1098
DQ13/	-1.2494	1.5827	-0.3333	0.0000	-0.1165	-0.0593	1.0457
DL/	6.1230	-3.4563	-2.6667	0.0000	1.4913	0.7456	-0.0641
DLS/	5.1148	-1.2708	-0.4361	0.4767	1.4074	0.7037	-0.6654

Table B-32. Producers' reaction function agrarian office 07-02 Moquegua

THE PRODUCTS FOR REGION "07 02" ARE WHITE CORN (MAIZ AMILACEO) AND POTATOES (PAPA). NUMBERS 03 AND 13.

	DP03/	DP13/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.1764	3.7012	-0.2382	-0.9864	0.1348	0.0086	0.5767
DLE/	-0.6696	2.6017	-2.1950	-0.0303	0.1263	0.0296	1.4684
DL03/	14.2496	-11.9663	-2.2833	0.0000	1.6533	1.5391	-2.1924
DL13/	-2.9198	4.0595	-1.1387	0.0000	-0.1781	-0.2350	1.4132
DT03/	9.3470	-8.7239	-0.6221	0.0000	1.9970	0.9659	-1.9629
DT13/	-7.8224	7.3009	0.5215	0.0000	0.1656	-0.8083	1.6427
DM03/	11.7216	-10.9401	-0.7814	0.0000	1.2503	2.2112	-2.4615
DM13/	-5.4479	5.0847	0.3632	0.0000	-0.5811	0.4371	1.1441
DF03/	15.2774	-14.2589	-1.0185	0.0000	1.6296	1.5787	-2.2082
DF13/	-1.8921	1.7659	0.1261	0.0000	-0.2018	-0.1955	1.3973
DQ03/	13.2496	-11.9663	-1.2833	0.0000	1.6533	1.5391	-2.1924
DQ13/	-2.9198	3.0585	-0.1387	0.0000	-0.1781	-0.2350	1.4132
DL/	11.3298	-7.9078	-3.4220	0.0000	1.4752	1.3041	-0.7793
DLS/	11.9993	-10.5095	-1.2269	0.0303	1.3489	1.2744	-2.2476

Table B-33. Producers' reaction function agrarian office 08-01 Iquitos

THE PRODUCTS FOR REGION "08 01" ARE RICE (ARROZ) AND MANIOC (YUCA), NUMBERS 01 AND 14.

	DP01/	DP14/	DPE/	DS/	DT/	DM/	DF/
DIS/	0.7082	1.5292	-0.4828	-0.9572	0.7578	0.0000	0.1994
DLE/	-16.4780	13.5049	2.7733	-0.0333	-4.6737	0.0000	5.7070
DL01/	31.2101	-21.9038	-9.4063	0.0000	9.8489	0.0000	-8.8489
DL14/	-26.5467	21.0133	5.5334	0.0000	-7.7258	0.0000	8.7258
DT01/	29.0805	-21.5584	-7.5222	0.0000	9.8489	0.0000	-8.9489
DT14/	-28.6762	21.2587	7.4176	0.0000	-7.7258	0.0000	8.7258
DM01/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM14/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF01/	32.3669	-23.9947	-8.3722	0.0000	9.8489	0.0000	-8.8489
DF14/	-25.3899	18.8224	6.5675	0.0000	-7.7258	0.0000	8.7258
DQ01/	30.2101	-21.8038	-8.4063	0.0000	9.8489	0.0000	-8.8489
DQ14/	-26.5467	20.0133	6.5334	0.0000	-7.7258	0.0000	8.7258
DL/	4.6634	-0.7905	-3.8729	0.0000	2.1230	0.0000	-0.1230
DLS/	21.1414	-14.2954	-6.6462	0.0333	6.7967	0.0000	-5.8301

Table B-34. Producers' reaction function agrarian office 08-02 Pucallpa

THE PRODUCTS FOR REGION "08 02" ARE WHITE CORN (MAIZ AMILACEO) AND MANIOC (YUCA), NUMBERS 03 AND 14.

	DPC3/	DP14/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.0609	4.1478	-1.6889	-0.9753	-0.2700	0.0000	1.2453
DLE/	1.9558	0.1386	-2.1883	-0.0185	0.8870	0.0000	0.1314
DL03/	5.7747	-4.1206	-1.6541	0.0000	2.3926	0.0000	-1.3926
DL14/	-2.6872	5.3252	-2.6380	0.0000	-0.9430	0.0000	1.9430
DT03/	3.5328	-3.9436	0.4108	0.0000	2.3926	0.0000	-1.3926
DT14/	-4.9290	5.5022	-0.5731	0.0000	-0.9430	0.0000	1.9430
DM03/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM14/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF03/	6.0697	-6.7755	0.7058	0.0000	2.3926	0.0000	-1.3926
DF14/	-2.3922	2.6703	-0.2782	0.0000	-0.9430	0.0000	1.9430
DQ03/	4.7747	-4.1206	-0.6541	0.0000	2.3926	0.0000	-1.3926
DQ14/	-2.6872	4.3252	-1.6380	0.0000	-0.9430	0.0000	1.9430
DL/	3.0876	1.2046	-4.2921	0.0000	1.4496	0.0000	0.5504
DLS/	1.1318	1.0660	-2.1078	0.0185	0.5626	0.0000	0.4189

Table B-35. Producers' reaction function agrarian office 09-01 Alto Marañon o Yurimaguas

THE PRODUCTS FOR REGION "09 01" ARE RICE (ARROZ) AND YELLOW CORN (MAIZ AMARILLO). NUMBERS 01 AND 05.

	DP01/	DP05/	DPE/	DS/	DT/	DM/	DF/
DIS/	6.9909	-4.0459	-0.9598	-0.8978	-1.0979	0.0000	1.6534
DLE/	-2.1121	5.7643	-3.9398	-0.0494	1.6034	0.0000	-0.3884
DL01/	8.3726	-5.9397	-2.4329	0.0000	-1.6213	0.0000	2.6213
DL05/	-20.5241	25.1798	-4.6557	0.0000	6.9477	0.0000	-5.9477
DT01/	8.8395	-9.5195	0.6800	0.0000	-1.6213	0.0000	2.6213
DT05/	-20.0572	21.6001	-1.5429	0.0000	6.9477	0.0000	-5.9477
DM01/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM05/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF01/	5.4673	-5.8878	0.4206	0.0000	-1.6213	0.0000	2.6213
DF05/	-23.4294	25.2317	-1.8023	0.0000	6.9477	0.0000	-5.9477
DQ01/	7.3726	-5.9397	-1.4329	0.0000	-1.6213	0.0000	2.6213
DQ05/	-20.5241	24.1798	-3.6557	0.0000	6.9477	0.0000	-5.9477
DL/	-12.1515	19.2401	-7.0886	0.0000	5.3265	0.0000	-3.3265
DLS/	-10.0394	13.4759	-3.1577	0.0494	3.7230	0.0000	-2.9381

Table B-36. Producers' reaction function agrarian office 09-02 Alto Mayo

THE PRODUCTS FOR REGION "09 02" ARE RICE (ARROZ) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 01 AND 03.

	DPO1/	DPO3/	DPE/	DS/	DT/	DM/	DF/
DIS/	6.4021	-3.3607	-0.4837	-0.7099	-0.5993	0.0000	1.6293
DLE/	-2.7353	7.1296	-6.7703	-0.5017	1.6510	0.0000	-0.2861
DLO1/	12.0783	-10.2026	-1.8757	0.0000	-2.0769	0.0000	3.6808
DLO3/	-11.6761	16.8369	-5.1609	0.0000	3.7164	0.0000	-3.3002
DTO1/	12.8107	-14.5824	1.7717	0.0000	-2.1243	0.0000	3.7649
DTO3/	-10.9436	12.4571	-1.5135	0.0000	3.6690	0.0000	-3.2162
DMO1/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DMO3/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DFO1/	7.2285	-8.2281	0.9997	0.0000	-1.7629	0.0000	3.1243
DFO3/	-16.5259	18.8114	-2.2855	0.0000	4.0304	0.0000	-3.8567
DQO1/	11.0783	-10.2026	-0.8757	0.0000	-2.0769	0.0000	3.6808
DQO3/	-11.6761	15.8369	-4.1609	0.0000	3.7164	0.0000	-3.3002
DL/	0.4022	6.6343	-7.0366	0.0000	1.6395	0.0000	0.3606
DLS/	3.1376	-0.4953	-0.2662	0.5017	-0.0115	0.0000	0.6667

Table B-37. Producers' reaction function agrarian office 09-03 San Martin

THE PRODUCTS FOR REGION "09 03" ARE YELLOW CORN (MAIZ AMARILLO) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 05 AND 03.

	DP05/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	33.0477	-33.5986	2.4492	-0.9023	-7.4495	0.0000	8.3519
DLE/	-7.0271	10.0326	-3.3488	-0.0629	2.6961	0.0000	-1.6332
DL05/	10.4741	-9.3916	-1.0825	0.0000	-1.8771	0.0000	2.8771
DL03/	-9.8674	13.2614	-3.3940	0.0000	3.4677	0.0000	-2.4677
DT05/	10.9498	-12.1941	1.2443	0.0000	-1.8771	0.0000	2.8771
DT03/	-9.3917	10.4589	-1.0672	0.0000	3.4677	0.0000	-2.4677
DM05/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM03/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF05/	7.1439	-7.9558	0.8118	0.0000	-1.8771	0.0000	2.8771
DF03/	-13.1976	14.6973	-1.4997	0.0000	3.4677	0.0000	-2.4677
DQ05/	9.4741	-9.3916	-0.0825	0.0000	-1.8771	0.0000	2.8771
DQ03/	-9.8674	12.2614	-2.3940	0.0000	3.4677	0.0000	-2.4677
DL/	0.6067	3.8698	-4.4765	0.0000	1.5906	0.0000	0.4094
DLS/	7.6338	-6.1628	-1.1277	0.0629	-1.1055	0.0000	2.0426

Table B-38. Producers' reaction function agrarian office 09-04 Tingo Maria

THE PRODUCTS FOR REGION "09 04" ARE YELLOW CORN (MAIZ AMARILLO) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 05 AND 03.

	DP05/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	12.4330	-10.1853	-0.2275	-0.9664	-1.8460	0.0000	2.7124
DLE/	1.6143	1.1361	-3.2527	-0.0954	0.4610	0.0000	0.6344
DL05/	28.9353	-30.3100	1.3747	0.0000	-6.1788	0.0000	7.1788
DL03/	-34.8430	43.2804	-8.4374	0.0000	9.3733	0.0000	-8.3733
DT05/	29.4401	-33.9693	4.5292	0.0000	-6.1788	0.0000	7.1788
DT03/	-34.3383	39.6211	-5.2828	0.0000	9.3733	0.0000	-8.3733
DM05/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM03/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF05/	25.3391	-29.2375	3.8983	0.0000	-6.1788	0.0000	7.1788
DF03/	-38.4392	44.3529	-5.9137	0.0000	9.3733	0.0000	-8.3733
DQ05/	27.9353	-30.3100	2.3747	0.0000	-6.1788	0.0000	7.1788
DQ03/	-34.8430	42.2804	-7.4374	0.0000	9.3733	0.0000	-8.3733
DL/	-5.9076	12.9704	-7.0627	0.0000	3.1944	0.0000	-1.1944
DLS/	-7.5219	11.8342	-3.8100	0.0954	2.7334	0.0000	-1.8288

Table B-39. Producers' reaction function agrarian office 10-01 Pasco

THE PRODUCTS FOR REGION "10 01" ARE POTATOES (PAPA) AND WHEAT (TRIGO).

NUMBERS 13 AND 06.

	DP13/	DP06/	DPE/	DS/	DT/	DM/	DF/
DIS/	2.9701	-0.4300	-0.3230	-0.9548	0.1680	0.2970	0.4909
DLE/	0.4256	-0.4492	-2.7517	-0.3694	-0.0919	0.0426	1.4173
DL13/	2.3224	-1.3487	-0.9737	0.0000	-0.1724	0.2322	0.9401
DL06/	-11.2214	17.1201	-5.8987	0.0000	4.0139	-1.1221	-1.8917
DT13/	3.6934	-5.0364	1.3431	0.0000	-0.1416	0.3693	0.7723
DT06/	-9.8504	13.4324	-3.5820	0.0000	4.0447	-0.9850	-2.0596
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM06/	-13.5438	18.4688	-4.9250	0.0000	4.1863	-0.3544	-2.8315
DF13/	0.6772	-0.9234	0.2463	0.0000	-0.2093	0.0677	1.1416
DF06/	-12.8666	17.5454	-4.6788	0.0000	3.9770	-1.2667	-1.6903
DQ13/	1.3224	-1.3487	0.0263	0.0000	-0.1724	0.2322	0.9401
DQ06/	-11.2214	16.1201	-4.8987	0.0000	4.0139	-1.1221	-1.8917
DL/	-8.8990	15.7714	-6.8724	0.0000	3.8415	-0.8899	-0.9516
DLS/	-9.3246	16.2196	-4.1207	0.3694	3.9334	-0.9325	-2.3689

Table B-40. Producers' reaction function agrarian office 10-02 Ayacucho

THE PRODUCTS FOR REGION "10 02" ARE WHITE CORN (MAIZ AMILACEO) AND BARLEY (CEBADA), NUMBERS 03 AND 07.

	DP03/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.7074	-6.1755	7.0711	1.1391	0.0000	-6.0683	0.0243
DLE/	0.4651	-2.7413	2.2762	0.4620	0.0000	-2.8885	-0.6419
DL03/	1.5898	3.0178	-4.6066	0.0000	0.0000	3.1798	0.7066
DL07/	1.6637	2.9919	-4.6556	0.0000	0.0000	3.5839	0.7964
DT03/	0.8034	2.2971	-3.1004	0.0000	0.0000	2.5382	0.5641
DT07/	-1.5272	1.0178	0.5095	0.0000	-0.7735	-1.4889	-0.1344
DM03/	0.5399	-3.7672	3.2272	0.0000	0.0000	-2.4844	-0.5521
DM07/	-1.2870	-0.5823	1.8694	0.0000	2.6103	-1.6469	-0.4503
DF03/	1.3204	2.4620	-3.7824	0.0000	0.0000	4.5300	0.7645
DF07/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DQ03/	1.2080	2.0397	-3.2477	0.0000	0.0000	2.6234	0.5497
DQ07/	0.2632	0.8498	-1.1130	0.0000	-0.0774	0.7471	0.1857
DL/	3.2525	6.0097	-9.2622	0.0000	0.0000	6.7637	1.5030
DLS/	2.7874	8.7510	-11.5384	-0.4620	0.0000	9.6522	2.1449

Table B-41. Producers' reaction function agrarian office 10-03 Huancavelica

THE PRODUCTS FOR REGION "10 03" ARE POTATOES (PAPA) AND BARLEY (CEBADA).
NUMBERS 13 AND 07.

	DP13/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	8.3326	1.7314	-0.6602	-0.8358	1.0667	0.0000	-0.2309
DLE/	-9.3066	0.0308	-2.5307	-0.5200	-0.4292	0.0000	1.9492
DL13/	1.4898	-0.4515	-1.0382	0.0000	-0.1046	0.0000	1.1046
DL07/	-3.9738	6.4263	-2.4526	0.0000	2.3051	0.0000	-1.3051
DT13/	2.5045	-3.1528	0.6483	0.0000	-0.1046	0.0000	1.1046
DT07/	-2.9591	3.7251	-0.7660	0.0000	2.3051	0.0000	-1.3051
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM07/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF13/	0.2371	-0.2985	0.0614	0.0000	-0.1046	0.0000	1.1046
DF07/	-5.2264	6.5794	-1.3529	0.0000	2.3051	0.0000	-1.3051
DQ13/	0.4898	-0.4515	-0.0382	0.0000	-0.1046	0.0000	1.1046
DQ07/	-3.9738	5.4263	-1.4526	0.0000	2.3051	0.0000	-1.3051
DL/	-2.4840	5.9748	-3.4908	0.0000	2.2005	0.0000	-0.2005
DLS/	6.8226	5.9440	-0.9601	0.5200	2.6297	0.0000	-2.1497

Table B-42. Producers' reaction function agrarian office 10-04 Mantaro

THE PRODUCTS FOR REGION "10 04" ARE POTATOES (PAPA) AND BARLEY (CEBADA).
NUMBERS 13 AND 07.

	DP13/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	6.3990	-1.9496	0.1373	-0.8667	0.4216	0.0000	0.4451
DLE/	-5.7553	5.6612	-4.0279	-0.3444	0.7593	0.0000	0.5850
DL13/	2.6490	-1.9524	-0.6967	0.0000	-0.1592	0.0000	1.1592
DL07/	-12.6436	19.9284	-7.2848	0.0000	3.8504	0.0000	-2.8504
DT13/	4.4211	-6.3257	1.9046	0.0000	-0.1592	0.0000	1.1592
DT07/	-10.8715	15.5550	-4.6835	0.0000	3.8504	0.0000	-2.8504
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DM07/	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DF13/	0.6071	-0.8687	0.2615	0.0000	-0.1592	0.0000	1.1592
DF07/	-14.6855	21.0121	-6.3266	0.0000	3.8504	0.0000	-2.8504
DQ13/	1.6490	-1.9524	0.3033	0.0000	-0.1592	0.0000	1.1592
DQ07/	-12.6436	18.9284	-6.2848	0.0000	3.8504	0.0000	-2.8504
DL/	-9.9945	17.9760	-7.9815	0.0000	3.6913	0.0000	-1.6913
DLS/	-4.2392	12.3148	-3.9536	0.3444	2.9319	0.0000	-2.2763

Table B-43. Producers' reaction function agrarian office 10-05 Selva

THE PRODUCTS FOR REGION "10 05" ARE YELLOW CORN (MAIZ AMARILLO) AND WHITE CORN (MAIZ AMILACEO), NUMBERS 05 AND 03.

	DPU5/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	0.9769	1.9536	-1.4439	-0.9664	0.4024	0.0977	0.4663
DLE/	-0.5559	2.5948	-3.8228	-0.3403	0.4789	-0.0556	0.9169
DL05/	9.0131	-6.7908	-2.2222	0.0000	-1.0267	0.9013	1.1254
DL03/	-15.2574	17.4797	-2.2222	0.0000	2.8809	-1.5257	-0.3551
DT05/	9.4922	-9.4922	0.0000	0.0000	-0.5282	0.9492	0.579[illegible]
DT03/	-14.7783	14.7783	0.0000	0.0000	3.3793	-1.4778	-0.9015
DM05/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-24.2705	24.2705	0.0000	0.0000	3.9075	-1.4270	-1.4805
DF05/	8.6597	-8.6597	0.0000	0.0000	-1.3942	0.9660	1.5282
DF03/	-15.6108	15.6108	0.0000	0.0000	2.5133	-1.5611	0.0477
DQ05/	8.0131	-6.7908	-1.2222	0.0000	-1.0267	0.9013	1.1254
DQ03/	-15.2574	16.4797	-1.2222	0.0000	2.8809	-1.5257	-0.3551
DL/	-6.2444	10.6888	-4.4444	0.0000	1.8542	-0.6244	0.7702
DLS/	-5.6885	8.0940	-0.6216	0.3403	1.3753	-0.5688	-0.1467

Table B-44. Producers' reaction function agrarian office 10-06 Huanuco

THE PRODUCTS FOR REGION "10 06" ARE WHITE CORN (MAIZ AMILACEO) AND POTATOES (PAPA). NUMBERS 03 AND 13.

	DP03/	DP13/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.0726	4.2348	-0.4160	-0.9680	0.1017	-0.1073	0.9735
DLE/	1.8222	-0.5105	-2.0941	-0.0803	0.4956	0.1822	0.4025
DL03/	6.1369	-3.1670	-2.9698	0.0000	1.5244	0.6137	-1.1380
DL13/	-1.2400	2.2427	-1.0027	0.0000	-0.1477	-0.1240	1.2717
DT03/	4.7419	-3.4774	-1.2645	0.0000	2.0748	0.4742	-1.5490
DT13/	-2.6350	1.9323	0.7027	0.0000	0.4027	-0.2635	0.9608
DM03/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM13/	-7.3769	5.4097	1.9672	0.0000	-1.6721	0.2623	2.4098
DF03/	6.3515	-4.6578	-1.6937	0.0000	1.4397	0.6351	-1.0748
DF13/	-1.0254	0.7519	0.2734	0.0000	-0.2324	-0.1025	1.3350
DQ03/	5.1369	-3.1670	-1.9698	0.0000	1.5244	0.6137	-1.1380
DQ13/	-1.2400	1.2427	-0.0027	0.0000	-0.1477	-0.1240	1.2717
DL/	4.8969	-0.9244	-3.9725	0.0000	1.3766	0.4897	0.1337
DLS/	3.0746	-0.4139	-1.8794	0.0803	0.8810	0.3075	-0.2688

Table B-45. Producers' reaction function agrarian office 11-01 Quillabamba

THE PRODUCTS FOR REGION "11 01" ARE POTATOES (PAPA) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 13 AND 03.

	DP13/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	5.3507	-3.7389	0.4598	-0.9184	-0.0025	0.2039	0.7170
DLE/	-4.7304	6.2768	-3.5037	-0.3133	1.2799	-0.1802	0.2137
DL13/	5.1970	-4.5108	-0.6861	0.0000	-0.3806	0.1980	1.1826
DL03/	-9.1928	11.9346	-2.7418	0.0000	2.3740	-0.3502	-1.0238
DT13/	7.0380	-8.0435	1.0054	0.0000	-0.3473	0.2681	1.0791
DT03/	-7.3517	8.4020	-1.0502	0.0000	2.4073	-0.2801	-1.1272
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-14.3898	16.4455	-2.0557	0.0000	2.7546	0.4517	-2.2064
DF13/	2.2650	-2.5685	0.3236	0.0000	-0.4336	0.0863	1.3473
DF03/	-12.1248	13.8569	-1.7321	0.0000	2.3210	-0.4620	-0.8591
DQ13/	4.1970	-4.5108	0.3139	0.0000	-0.3806	0.1980	1.1826
DQ03/	-9.1928	10.9346	-1.7418	0.0000	2.3740	-0.3502	-1.0238
DL/	-3.9958	7.4238	-3.4280	0.0000	1.9935	-0.1522	0.1588
DLS/	0.7346	1.1470	0.0757	0.3133	0.7136	0.0280	-0.0549

Table B-46. Producers' reaction function agrarian office 11-02 Anta

THE PRODUCTS FOR REGION "11 02" ARE POTATOES (PAPA) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 13 AND 03.

	DP13/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	4.8187	-3.2838	0.4176	-0.9208	0.0336	0.1870	0.7002
DLE/	-8.8280	10.6050	-5.8498	-0.6868	1.9117	-0.3425	0.1176
DL13/	4.7916	-4.0475	-0.7441	0.0000	-0.3030	0.1859	1.1170
DL03/	-14.3173	17.7912	-3.4739	0.0000	3.3550	-0.5555	-1.7995
DT13/	6.6652	-7.6174	0.9522	0.0000	-0.2759	0.2586	1.0173
DT03/	-12.4437	14.2214	-1.7777	0.0000	3.3821	-0.4828	-1.8993
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-19.1089	21.8387	-2.7298	0.0000	3.6580	0.2586	-2.9166
DF13/	1.8077	-2.0659	0.2582	0.0000	-0.3460	0.0701	1.2759
DF03/	-17.3012	19.7728	-2.4716	0.0000	3.3119	-0.6713	-1.6407
DQ13/	3.7916	-4.0475	0.2559	0.0000	-0.3030	0.1859	1.1170
DQ03/	-14.3173	16.7912	-2.4739	0.0000	3.3550	-0.5555	-1.7995
DL/	-9.5257	13.7437	-4.2180	0.0000	3.0521	-0.3696	-0.6825
DLS/	-0.6977	3.1387	1.6319	0.6868	1.1403	-0.0271	-0.8001

Table B-47. Producers' reaction function agrarian office 11-03 Paucartambo

THE PRODUCTS FOR REGION "11 03" ARE POTATOES (PAPA) AND BARLEY (CEBADA).
NUMBERS 13 AND 07.

	DP13/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	4.2527	-2.9335	0.6378	-0.9402	-0.1395	0.1701	0.9097
DLE/	-1.7937	3.4397	-3.6689	-0.3202	0.9619	-0.0717	0.4301
DL13/	3.2036	-2.6394	-0.5642	0.0000	-0.2813	0.1281	1.1531
DL07/	-5.2250	8.9410	-3.6160	0.0000	2.3185	-0.2090	-1.1095
DT13/	4.1157	-5.6059	1.4902	0.0000	-0.2695	0.1646	1.1049
DT07/	-4.3129	5.8745	-1.5616	0.0000	2.3303	-0.1725	-1.1578
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM07/	-8.4286	11.4804	-3.0517	0.0000	2.5998	0.6629	-2.2627
DF13/	1.0039	-1.3673	0.3635	0.0000	-0.3096	0.0402	1.2695
DF07/	-7.4248	10.1131	-2.6883	0.0000	2.2902	-0.2970	-0.9932
DQ13/	2.2036	-2.6394	0.4358	0.0000	-0.2813	0.1281	1.1531
DQ07/	-5.2250	7.9410	-2.6160	0.0000	2.3185	-0.2090	-1.1095
DL/	-2.0214	6.2016	-4.1802	0.0000	2.0373	-0.0809	0.0436
DLS/	-0.2277	2.7618	-0.5112	0.3202	1.0754	-0.0091	-0.3865

Table B-48. Producers' reaction function agrarian office 11-04 Sicuani

THE PRODUCTS FOR REGION "11 04" ARE POTATOES (PAPA) AND BARLEY (CEBADA).

NUMBERS 13 AND 07.

	DP13/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	6.0495	-4.5728	0.3506	-0.9623	-0.1514	0.2335	0.8802
DLE/	-0.3413	1.5974	-1.9843	-0.1147	0.5845	-0.0132	0.5434
DL13/	4.7344	-3.9822	-0.7522	0.0000	-0.2920	0.1827	1.1093
DL07/	-8.4460	11.0811	-2.6351	0.0000	2.2311	-0.3260	-0.9051
DT13/	6.6139	-7.5588	0.9448	0.0000	-0.2661	0.2553	1.0108
DT07/	-6.5665	7.5045	-0.9381	0.0000	2.2570	-0.2535	-1.0035
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM07/	-13.1804	15.0693	-1.8829	0.0000	2.5231	0.4912	-2.0143
DF13/	1.7411	-1.9899	0.2487	0.0000	-0.3333	0.0672	1.2661
DF07/	-11.4393	13.0735	-1.6342	0.0000	2.1898	-0.4416	-0.7482
DQ13/	3.7344	-3.9822	0.2478	0.0000	-0.2920	0.1827	1.1093
DQ07/	-8.4460	10.0811	-1.6351	0.0000	2.2311	-0.3260	-0.9051
DL/	-3.7116	7.0989	-3.3874	0.0000	1.9391	-0.1433	0.2042
DLS/	-3.3702	5.5015	-1.4031	0.1147	1.3546	-0.1301	-0.3392

Table B-49. Producers' reaction function agrarian office 11-05 Apurimac

THE PRODUCTS FOR REGION "11 05" ARE POTATOES (PAPA) AND WHITE CORN (MAIZ AMILACEO). NUMBERS 13 AND 03.

	DP13/	DP03/	DPE/	DS/	DT/	DM/	DF/
DIS/	5.1960	-3.4722	0.1926	-0.9620	0.0657	0.2021	0.6941
DLE/	-1.4877	2.9089	-2.0407	-0.0931	0.8045	-0.0579	0.3465
DL13/	5.1179	-4.4205	-0.6974	0.0000	-0.3654	0.1991	1.1663
DL03/	-9.2040	11.9474	-2.7434	0.0000	2.3762	-0.3580	-1.0182
DT13/	6.9619	-7.9564	0.9946	0.0000	-0.3327	0.2708	1.0619
DT03/	-7.3600	8.4114	-1.0514	0.0000	2.4089	-0.2863	-1.1226
DM13/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM03/	-14.3219	16.3678	-2.0460	0.0000	2.7416	0.4429	-2.1845
DF13/	2.1812	-2.4928	0.3116	0.0000	-0.4175	0.0848	1.3327
DF03/	-12.1406	13.8750	-1.7344	0.0000	2.3241	-0.4723	-0.8518
DQ13/	4.1179	-4.4205	0.3026	0.0000	-0.3654	0.1991	1.1663
DQ03/	-9.2040	10.9474	-1.7434	0.0000	2.3762	-0.3580	-1.0182
DL/	-4.0861	7.5269	-3.4409	0.0000	2.0108	-0.1589	0.1482
DLS/	-2.5983	4.6180	-1.4002	0.0931	1.2063	-0.1011	-0.1982

Table B-50. Producers' reaction function agrarian office 11-06 Puerto Maldonado

THE PRODUCTS FOR REGION "11 06" ARE RICE (ARROZ) AND MANIOC (YUCA). NUMBERS 01 AND 14.

	DP01/	DP14/	DPE/	DS/	DT/	DM/	DF/
DIS/	-0.9019	3.6412	-1.0426	-0.9604	1.1015	-0.4510	0.3099
DLE/	-1.2943	3.1920	-2.7257	-0.1414	0.9107	-0.6472	0.8779
DL01/	2.0271	-1.1995	-0.8276	0.0000	-0.1743	1.0135	0.1608
DL14/	-2.7160	5.3486	-2.6326	0.0000	1.4663	-1.3580	0.8917
DT01/	1.9494	-2.6913	0.7419	0.0000	0.3257	0.9747	-0.3004
DT14/	-2.7937	3.8568	-1.0632	0.0000	1.9663	-1.3968	0.4305
DM01/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM14/	-4.7431	6.5481	-1.8050	0.0000	1.6406	-1.3716	0.7309
DF01/	2.1135	-2.9178	0.8043	0.0000	-0.7311	1.0568	0.6743
DF14/	-2.6296	3.6303	-1.0007	0.0000	0.9096	-1.3148	1.4052
DQ01/	1.0271	-1.1995	0.1724	0.0000	-0.1743	1.0135	0.1608
DQ14/	-2.7160	4.3486	-1.6326	0.0000	1.4663	-1.3580	0.8917
DL/	-0.6890	4.1491	-3.4601	0.0000	1.2920	-0.3445	1.0525
DLS/	0.6054	0.9572	-0.7345	0.1414	0.3814	0.3027	0.1746

Table B-51. Producers' reaction function agrarian office 12-01 Ilave

THE PRODUCTS FOR REGION "12 01" ARE POTATOES (PAPA) AND QUINUA (QUINUA).
NUMBERS 13 AND 08.

	DP13/	DP08/	DPE/	DS/	DT/	DM/	DF/
DIS/	1.5762	3.4077	-1.3479	-0.9506	0.9307	0.4196	-0.3997
DLE/	1.3733	-0.4288	-1.5526	-0.0501	-0.0385	0.0258	1.0628
DL13/	4.0972	-2.6266	-1.4706	0.0000	-0.4518	-0.0578	1.5096
DL08/	-12.7123	14.1829	-1.4706	0.0000	2.9101	0.7827	-2.6928
DT13/	6.5255	-6.5255	0.0000	0.0000	-0.3051	-0.3263	1.6314
DT08/	-10.2841	10.2841	-0.0000	0.0000	3.0568	0.5142	-2.5710
DM13/	4.5302	-4.5302	0.0000	0.0000	-0.9060	0.7735	1.1325
DM08/	-12.2794	12.2794	-0.0000	0.0000	2.4559	1.6140	-3.0698
DF13/	2.1264	-2.1264	0.0000	0.0000	-0.4253	-0.1063	1.5316
DF08/	-14.6831	14.6831	-0.0000	0.0000	2.9366	0.7342	-2.6708
DQ13/	3.0972	-2.6266	-0.4706	0.0000	-0.4518	-0.0578	1.5096
DQ08/	-12.7123	13.1829	-0.4706	0.0000	2.9101	0.7827	-2.6928
DL/	-8.6151	11.5563	-2.9412	0.0000	2.4583	0.7249	-1.1832
DLS/	-9.9885	11.9851	-1.3886	0.0501	2.4969	0.6991	-2.2460

Table B-52. Producers' reaction function agrarian office 12-02 Juliaca

THE PRODUCTS FOR REGION "12 02" ARE POTATOES (PAPA) AND QUINUA (QUINUA).
NUMBERS 13 AND 08.

	DP13/	DP08/	DPE/	DS/	DT/	DM/	DF/
DIS/	1.4472	1.7866	-0.0670	-0.8608	0.9074	0.1560	-0.2025
DLE/	6.0873	-11.5644	-6.5324	-1.4759	-4.4827	-0.2445	7.2031
DL13/	4.2203	-3.2330	-0.9873	0.0000	-1.0265	0.0563	1.9702
DL08/	-8.0573	10.1303	-2.0731	0.0000	3.6815	0.0793	-2.7609
DT13/	5.2511	-5.7155	0.4644	0.0000	-1.0136	-0.0098	2.0235
DT08/	-7.0264	7.6478	-0.6214	0.0000	3.6944	0.0132	-2.7076
DM13/	3.1529	-3.4317	0.2798	0.0000	-1.2090	0.9941	1.2149
DM08/	-9.1247	9.9316	-0.8069	0.0000	3.4990	1.0171	-3.5161
DF13/	2.6458	-2.8798	0.2340	0.0000	-1.0146	-0.0050	2.0195
DF08/	-9.6317	10.4835	-0.8518	0.0000	3.6935	0.0181	-2.7115
DQ13/	3.2203	-3.2330	0.0127	0.0000	-1.0265	0.0563	1.9702
DQ08/	-8.0573	9.1303	-1.0731	0.0000	3.6815	0.0793	-2.7609
DL/	-3.8370	6.8974	-3.0604	0.0000	2.6550	0.1356	-0.7907
DLS/	-9.9243	18.4618	3.4720	1.4759	7.1377	0.3801	-7.9938

Table B-53. Producers' reaction function agrarian office 12-03 Huancane

THE PRODUCTS FOR REGION "12 03" ARE POTATOES (PAPA) AND BARLEY (CEBADA).
NUMBERS 13 AND 07.

	DP13/	DP07/	DPE/	DS/	DT/	DM/	DF/
DIS/	9.6276	-5.1129	-0.0717	-0.9113	-0.0299	0.2257	0.7155
DLE/	-1.1552	1.8870	-1.8267	-0.0835	0.1309	0.0366	0.9159
DL13/	10.1565	-10.5038	0.3473	0.0000	-0.5426	-0.0174	1.5599
DL07/	-44.4017	54.4465	-10.0448	0.0000	3.2246	0.5022	-2.7268
DT13/	22.5216	-26.8115	4.2898	0.0000	-0.5551	-0.2145	1.7696
DT07/	-32.0366	38.1388	-6.1022	0.0000	3.2120	0.3051	-2.5172
DM13/	6.9835	-8.3136	1.3302	0.0000	-0.4872	0.9335	0.5487
DM07/	-47.5748	56.6366	-9.0619	0.0000	3.2849	1.4531	-3.7380
DF13/	7.9109	-9.4178	1.5068	0.0000	-0.5462	-0.0753	1.6216
DF07/	-46.6473	55.5325	-8.8852	0.0000	3.2209	0.4443	-2.6651
DQ13/	9.1565	-10.5038	1.3473	0.0000	-0.5426	-0.0174	1.5599
DQ07/	-44.4017	53.4465	-9.0448	0.0000	3.2246	0.5022	-2.7268
DL/	-34.2452	43.9427	-9.6975	0.0000	2.6820	0.4849	-1.1669
DLS/	-33.0900	42.0558	-7.8708	0.0835	2.5511	0.4493	-2.0828

Table B-54. Producers' reaction function agrarian office 12-04 Ayaviri

THE PRODUCTS FOR REGION "12 04" ARE POTATOES (PAPA) AND QUINUA (QUINUA).

NUMBERS 13 AND 08.

	DP13/	DP08/	DPE/	DS/	DT/	DM/	DF/
DIS/	2.1016	3.2203	-1.4628	-0.9405	1.1625	0.3434	-0.5655
DLE/	1.2745	-0.2032	-1.6238	-0.0443	0.0170	0.0644	0.9629
DL13/	4.5420	-2.7265	-1.8155	0.0000	-0.5784	0.0961	1.4823
DL08/	-16.8439	16.9211	-0.0772	0.0000	4.3181	0.0978	-3.4159
DT13/	6.7408	-6.1929	-0.5479	0.0000	-0.5434	-0.0005	1.5439
DT08/	-14.6450	13.4546	1.1904	0.0000	4.3532	0.0011	-3.3543
DM13/	3.9564	-3.6348	-0.3216	0.0000	-0.9059	0.9997	0.9062
DM08/	-17.4295	16.0127	1.4167	0.0000	3.9907	1.0014	-3.9921
DF13/	2.3738	-2.1809	-0.1930	0.0000	-0.5435	-0.0002	1.5437
DF08/	-19.0120	17.4666	1.5454	0.0000	4.3530	0.0015	-3.3545
DQ13/	3.5420	-2.7265	-0.8155	0.0000	-0.5784	0.0961	1.4823
DQ08/	-16.8439	15.9211	0.9228	0.0000	4.3181	0.0978	-3.4159
DL/	-12.3019	14.1946	-1.8927	0.0000	3.7397	0.1939	-1.9326
DLS/	-13.5764	14.3978	-0.2689	0.0443	3.7227	0.1295	-2.8965

Table B-55. Producers' reaction function agrarian office 12-05 San Juan del Loro

THE PRODUCTS FOR REGION "12 05" ARE WHITE CORN (MAIZ AMILACEO) AND POTATOES (PAPA). NUMBERS 03 AND 13.

	DP03/	DP13/	DPE/	DS/	DT/	DM/	DF/
DIS/	-1.6130	8.6002	-1.8989	-0.9552	0.6880	-0.1613	0.4285
DLE/	1.2164	0.2424	-1.8742	-0.0241	0.2213	0.1216	0.6811
DL03/	7.9345	-3.9546	-3.9798	0.0000	0.8345	0.7934	-0.6280
DL13/	-3.3465	3.8553	-0.5088	0.0000	-0.1114	-0.3346	1.4460
DT03/	6.2316	-4.3142	-1.9174	0.0000	1.5225	0.6232	-1.1457
DT13/	-5.0494	3.4957	1.5537	0.0000	0.5766	-0.5049	0.9283
DM03/	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
DM13/	-11.2810	7.8099	3.4711	0.0000	-0.9459	-0.1281	2.0740
DF03/	8.2814	-5.7333	-2.5481	0.0000	0.6944	0.8281	-0.5225
DF13/	-2.9996	2.0767	0.9230	0.0000	-0.2515	-0.3000	1.5515
DQ03/	6.9345	-3.9546	-2.9798	0.0000	0.8345	0.7934	-0.6280
DQ13/	-3.3465	2.8553	0.4912	0.0000	-0.1114	-0.3346	1.4460
DL/	4.5880	-0.0994	-4.4896	0.0000	0.7231	0.4588	0.8181
DLS/	3.3716	-0.3418	-2.6144	0.0241	0.5019	0.3372	0.1369

APPENDIX C. TABLES FOR CHAPTER 7

Table C-1. Consumers' food basket and budget shares for North Coast large cities (ENCA 11-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	378.71	41.076	0.0379	9.35
06 Wheat	440.40	34.413	0.0441	16.51
13 Potatoes	154.45	31.643	0.0154	6.04
14[a]Manioc	35.88	9.705	0.0035	4.05
17 Sugar	527.93	28.670	0.0529	22.36
27 Soy beans	205.12	29.237	0.0205	22.78
33 Bananas	62.22	12.815	0.0062	5.90
59 Pork	479.74	20.230	0.0480	25.61
60 Beef	588.73	12.758	0.0590	47.46
62 Chicken	266.09	6.394	0.0266	43.36
70 Milk	427.01	65.216	0.0428	25.12
76 Cotton seed	207.61	12.420	0.0208	22.76
90 Fish	173.96	17.548	0.0174	18.29
Food considered	3,947.85		0.3951	
Other food	1,318.75		0.1328	
Total food	5,266.60		0.5279	26.06
Total nonfood	4,709.42		0.4721	
Total expenditure	9,976.02		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-2. Consumers' food basket and budget shares for North Coast towns (ENCA 11-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	429.73	46.271	0.0493	9.69
06 Wheat	372.60	32.307	0.0427	13.21
13 Potatoes	112.22	20.467	0.0128	6.80
14 Manioc	41.78	10.620	0.0047	4.31
17 Sugar	560.67	45.870	0.0643	21.27
27 Soy beans	180.62	29.641	0.0207	22.90
33 Bananas	59.12	14.763	0.0067	5.65
59 Pork	438.16	20.274	0.0502	21.58
60 Beef	652.45	15.724	0.0748	43.39
62[a] Chicken	159.63	3.665	0.0183	44.74
70 Milk	373.68	60.286	0.0428	24.04
76 Cotton seed	186.30	13.655	0.0213	23.00
90 Fish	125.20	10.276	0.0143	19.24
Food considered	3,692.16		0.4229	
Other food	1,108.63		0.1282	
Total food	4,800.79		0.5511	24.82
Total nonfood	3,911.02		0.4489	
Total expenditure	8,711.81		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-3. Consumers' food basket and budget shares for North Coast rural areas (ENCA 11-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	419.01	44.163	0.0720	9.56
06 Wheat	313.88	24.240	0.0539	15.69
13 Potatoes	107.72	22.079	0.0185	5.46
14 Manioc	35.44	10.957	0.0060	7.03
17 Sugar	537.17	33.923	0.0923	14.76
27 Soy beans	174.80	30.900	0.0300	20.40
33 Bananas	53.17	12.745	0.0091	5.38
59 Pork	334.58	17.338	0.0575	22.28
60 Beef	268.44	6.675	0.0461	42.08
62[a] Chicken	79.36	1.901	0.0136	41.89
70 Milk	110.38	18.031	0.0189	21.54
76 Cotton seed	188.16	15.323	0.0323	20.71
90 Fish	111.05	11.239	0.0190	18.11
Food considered	2,733.16		0.4692	
Other food	933.11		0.1609	
Total food	3,666.27		0.6301	19.56
Total nonfood	2,151.89		0.3699	
Total expenditure	5,818.16		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-4. Consumers' food basket and budget shares for North Sierra towns (ENCA 12-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	199.56	21.391	0.0293	9.48
03[a]White corn	42.84	9.427	0.0063	9.83
04[a]Sweet corn	9.62	2.949	0.0014	3.59
06 Wheat	513.13	45.251	0.0754	15.25
07[a]Barley	8.99	2.859	0.0013	3.21
13 Potatoes	227.02	61.070	0.0333	5.01
14[a]Manioc	24.60	7.513	0.0036	4.14
17 Sugar	479.25	18.341	0.0705	26.13
19[a]Dried peas	34.48	3.201	0.0050	17.53
27[a]Soy beans	113.12	9.978	0.0166	29.30
33[a]Bananas	23.86	4.611	0.0035	5.69
58 Lamb	333.48	10.879	0.0490	31.02
59 Pork	506.09	25.107	0.0744	21.51
60 Beef	229.44	7.119	0.0337	35.46
70 Milk	228.26	40.569	0.0335	30.45
76 Cotton seed	188.40	29.710	0.0277	24.20
Food considered	3,162.14		0.4645	
Other food	897.37		0.1329	
Total food	4,059.51		0.5972	
Total nonfood	2,737.73		0.4028	
Total expenditure	6,797.24		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-5. Consumers' food basket and budget shares for North Sierra rural areas (ENCA 12-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	155.33	14.912	0.0362	11.38
03 White corn	242.02	33.839	0.0564	8.38
04 Sweet corn	59.19	12.700	0.0138	5.46
06 Wheat	386.85	37.422	0.0902	12.20
07 Barley	88.97	10.072	0.0207	14.77
13 Potatoes	371.90	105.810	0.0867	4.07
14 Manioc	58.70	18.037	0.0136	3.75
17 Sugar	322.07	30.037	0.0751	15.46
19 Dried peas	89.72	7.326	0.0209	13.65
27[a] Soy beans	39.63	4.934	0.0092	28.49
33 Bananas	39.28	12.995	0.0091	4.27
58[a] Lamb	55.91	1.854	0.0130	31.50
59 Pork	278.45	17.114	0.0649	21.85
60[a] Beef	43.61	1.396	0.0101	26.07
70 Milk	144.51	27.348	0.0337	24.80
76[a] Cotton seed	50.12	4.125	0.0116	28.20
Food considered	2,426.26		0.5652	
Other food	506.85		0.1192	
Total food	2,933.11		0.6844	15.57
Total nonfood	1,352.71		0.3156	
Total expenditure	4,285.82		1.0000	

[a] Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-6. Consumers' food basket and budget shares for Central Coast large cities (ENCA 21-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	436.65	45.176	0.0383	9.97
03[a]White corn	22.77	1.179	0.0020	16.62
06 Wheat	479.88	43.996	0.0421	10.24
11 Sweet potatoes	30.97	10.808	0.0027	2.96
13 Potatoes	212.58	38.518	0.0186	7.02
17 Sugar	576.29	37.436	0.0506	11.60
27 Soy beans	274.54	33.195	0.0241	21.87
33[a]Bananas	46.55	6.958	0.0040	7.82
44 Tomatoes	92.09	13.810	0.0080	8.81
48 Onions	80.78	12.936	0.0071	8.59
58 Lamb	131.03	3.075	0.0715	42.58
59 Pork	507.00	18.614	0.0445	19.06
60 Beef	606.32	13.931	0.0532	45.58
62 Chicken	566.48	12.854	0.0497	44.98
70 Milk	473.54	86.681	0.0416	17.90
76 Cotton seed	274.54	12.806	0.0241	21.87
90 Fish	314.54	34.391	0.0276	22.46
Food considered	5,126.55		0.5097	
Other food	1,283.97		0.0537	
Total food	6,410.52		0.5634	22.98
Total nonfood	4,967.24		0.4366	
Total expenditure	11,377.76		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-7. Consumers' food basket and budget shares for Central Coast towns (ENCA 21-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	334.15	35.886	0.0262	9.63
03 White corn	408.43	2.474	0.0320	17.32
06 Wheat	530.67	47.944	0.0416	13.34
11[a]Sweet potatoes	17.60	5.645	0.0013	4.04
13 Potatoes	233.65	47.997	0.0183	5.96
17 Sugar	778.41	29.060	0.0611	21.69
27 Soy beans	259.27	32.711	0.0203	24.57
33 Bananas	64.55	11.541	0.0050	6.12
44 Tomatoes	79.15	10.326	0.0062	12.80
48 Onions	84.44	12.445	0.0066	10.93
58[a]Lamb	205.75	4.882	0.0161	43.61
59 Pork	570.83	18.845	0.0448	26.07
60 Beef	659.49	14.395	0.0518	50.48
62 Chicken	375.05	8.503	0.0294	45.56
70 Milk	580.59	95.305	0.0456	26.25
76 Cotton seed	258.76	12.591	0.0203	24.61
90 Fish	212.30	17.806	0.0166	24.20
Food considered	5,653.09		0.4432	
Other food	1,434.80		0.1137	
Total food	7,087.89		0.5569	27.25
Total nonfood	5,639.67		0.4431	
Total expenditure	12,727.56		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-8. Consumers' food basket and budget shares for Central Coast rural areas (ENCA 21-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	339.05	34.171	0.0407	10.04
03 White corn	115.89	10.603	0.0139	14.46
06 Wheat	600.65	54.392	0.0721	11.29
11 Sweet potatoes	62.07	21.899	0.0074	2.96
13 Potatoes	189.22	32.457	0.0227	6.53
17 Sugar	644.33	30.504	0.0773	20.60
27 Soy beans	206.00	25.095	0.0247	25.58
33[a]Bananas	26.68	4.296	0.0032	6.98
44[a]Tomatoes	64.16	8.302	0.0077	9.91
48[a]Onions	62.45	8.636	0.0075	10.31
58[a]Lamb	82.70	2.117	0.0099	40.05
59 Pork	500.62	16.353	0.0601	18.24
60 Beef	202.88	4.320	0.0243	48.73
62 Chicken	261.41	5.871	0.0314	45.37
70 Milk	373.16	65.690	0.0448	27.28
76 Cotton seed	202.90	9.613	0.0243	25.91
90 Fish	156.51	14.963	0.0188	25.65
Food considered	4,090.68		0.4908	
Other food	1,204.26		0.1452	
Total food	5,294.94		0.6360	24.37
Total nonfood	3,029.90		0.3640	
Total expenditure	8,324.84		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-9. Consumers' food basket and budget shares for Central Sierra large cities (ENCA 22-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	238.60	21.880	0.0205	11.04
03[a]White corn	62.64	8.454	0.0054	10.40
04 Sweet corn	36.86	10.038	0.0031	4.39
06 Wheat	772.18	61.747	0.0666	28.59
07[a]Barley	52.15	9.802	0.0044	8.59
13 Potatoes	463.69	112.353	0.0400	4.41
17 Sugar	647.26	23.412	0.0558	20.68
27 Soy beans	222.59	28.974	0.0192	25.13
33 Bananas	57.91	12.338	0.0049	5.23
44 Tomatoes	109.73	11.242	0.0094	12.50
48 Onions	59.85	15.148	0.0051	8.50
49 Carrots	42.92	12.887	0.0037	9.81
58[a]Lamb	63.38	1.473	0.0054	43.48
59 Pork	676.47	19.069	0.0583	36.06
60 Beef	801.80	15.653	0.0691	51.93
70 Milk	399.97	60.931	0.0345	31.13
76 Cotton seed	222.59	11.177	0.0192	25.13
Food considered	4,930.59		0.4246	
Other food	1,296.89		0.1127	
Total food	6,227.48		0.5373	29.60
Total nonfood	5,363.03		0.4627	
Total expenditure	11,590.51		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-10. Consumers' food basket and budget shares for Central Sierra towns (ENCA 22-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	166.95	14.444	0.0188	11.75
03 White corn	174.84	19.512	0.0197	11.85
04[a]Sweet corn	31.57	4.510	0.0035	7.52
06 Wheat	569.53	51.447	0.0643	12.36
07[a]Barley	117.82	8.230	0.0133	12.90
13 Potatoes	480.73	131.671	0.0543	4.38
17 Sugar	615.61	23.930	0.0695	17.17
27 Soy beans	155.38	16.332	0.0175	37.03
33[a]Bananas	39.27	7.846	0.0044	5.86
44[a]Tomatoes	47.98	5.157	0.0054	11.53
48[a]Onions	36.72	8.336	0.0041	6.35
49[a]Carrots	27.86	7.188	0.0031	6.32
58 Lamb	405.96	13.028	0.0458	33.02
59 Pork	488.02	18.346	0.0551	17.21
60[a]Beef	152.55	4.659	0.0172	38.71
70 Milk	237.92	31.975	0.0268	29.93
76[a]Cotton seed	161.77	8.363	0.0182	36.50
Food considered	3,910.48		0.4410	
Other food	1,035.62		0.1178	
Total food	4,946.10		0.5588	21.70
Total nonfood	3,906.11		0.4413	
Total expenditure	8,852.21		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-11. Consumers' food basket and budget shares for Central Sierra rural areas (ENCA 22-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01[a]Rice	69.84	6.259	0.0140	11.40
03 White corn	216.31	29.992	0.0434	7.97
04 Sweet corn	72.46	10.708	0.0145	7.63
06 Wheat	308.20	30.728	0.0619	10.41
07[a]Barley	94.46	9.653	0.0189	11.18
13 Potatoes	600.05	148.686	0.1206	4.56
17 Sugar	269.89	11.357	0.0542	12.46
27[a]Soy beans	57.06	7.313	0.0114	29.02
33[a]Bananas	9.08	2.058	0.0018	5.41
44[a]Tomatoes	13.36	1.618	0.0026	10.21
48[a]Onions	17.85	4.020	0.0035	6.11
49[a]Carrots	10.68	2.631	0.0021	5.95
58 Lamb	124.13	4.544	0.0249	30.68
59 Pork	208.41	10.439	0.0418	28.32
60[a]Beef	94.01	2.674	0.0189	37.09
70 Milk	159.27	29.508	0.0320	24.52
76[a]Cotton seed	64.63	4.612	0.0129	28.42
Food considered	2,389.69		0.4794	
Other food	525.33		0.1066	
Total food	2,915.02		0.5860	16.55
Total nonfood	2,059.36		0.4140	
Total expenditure	4,974.38		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-12. Consumers' food basket and budget shares for South Coast large cities (ENCA 31-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	279.88	26.570	0.0248	11.22
06 Wheat	538.23	46.716	0.0477	13.32
13 Potatoes	174.76	30.014	0.0154	6.77
17 Sugar	598.59	20.235	0.0530	21.99
25[a] Broad beans	56.53	6.069	0.0050	11.75
27 Soy beans	185.10	24.004	0.0164	25.99
48 Onions	59.17	10.758	0.0052	8.11
59 Pork	535.78	17.858	0.0474	22.35
60 Beef	695.43	16.040	0.0616	43.97
62 Chicken	295.60	7.271	0.0261	41.76
70 Milk	623.97	105.003	0.0553	23.00
76[a] Cotton seed	185.56	9.260	0.0164	26.13
90 Fish	124.17	13.020	0.0110	21.07
Food considered	4,352.77		0.3853	
Other food	1,427.81		0.1270	
Total food	5,780.58		0.5123	24.94
Total nonfood	5,502.77		0.4877	
Total expenditure	11,283.35		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-13. Consumers' food basket and budget shares for South Coast towns (ENCA 31-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	245.96	24.059	0.0187	10.54
06 Wheat	601.37	46.051	0.0457	17.96
13 Potatoes	267.81	46.283	0.0203	6.52
17 Sugar	845.86	32.102	0.0643	20.90
25[a]Broad beans	30.16	2.770	0.0022	13.39
27 Soy beans	182.90	24.538	0.0139	25.38
48[a]Onions	54.59	9.975	0.0041	6.92
59 Pork	516.61	18.466	0.0393	23.45
60 Beef	879.34	21.927	0.0669	42.13
62[a]Chicken	239.88	5.569	0.0182	44.80
70 Milk	612.45	102.079	0.0466	22.75
76 Cotton seed	189.32	10.924	0.0144	25.41
90[a]Fish	113.41	9.715	0.0086	25.70
Food considered	4,779.66		0.3632	
Other food	1.727.15		0.1321	
Total food	6,506.81		0.4953	24.96
Total nonfood	6,629.11		0.5047	
Total expenditure	13,135.92		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-14. Consumers' food basket and budget shares for South Coast rural areas (ENCA 31-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	316.91	31.914	0.0425	10.14
06 Wheat	593.82	52.098	0.0798	11.25
13 Potatoes	240.39	43.038	0.0323	7.13
17 Sugar	572.29	24.070	0.0769	13.55
25 Broad beans	79.63	10.697	0.0107	10.23
27 Soy beans	203.89	29.977	0.0274	24.14
48 Onions	64.87	11.673	0.0087	7.69
59 Pork	386.83	13.676	0.0519	15.14
60 Beef	358.67	10.052	0.0482	39.79
62[a]Chicken	134.30	3.667	0.0180	38.20
70 Milk	274.11	47.251	0.0368	21.62
76 Cotton seed	203.89	11.561	0.0274	24.14
90 Fish	106.29	10.916	0.0142	25.07
Food considered	3,535.89		0.4748	
Other food	1,050.57		0.1416	
Total food	4,586.46		0.6164	19.00
Total nonfood	2,853.94		0.3836	
Total expenditure	7,440.40		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-15. Consumers' food basket and budget shares for South Sierra large cities (ENCA 32-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	95.16	10.094	0.0106	9.61
03[a]White corn	18.22	1.660	0.0020	13.41
06 Wheat	452.49	38.873	0.0507	13.82
07[a]Barley	44.87	.832	0.0050	13.14
08[a]Quinua	6.50	.689	0.0007	12.49
13 Potatoes	240.05	50.895	0.0268	6.24
16[a]Oca	.35	.051	0.0000[b]	6.85
17 Sugar	498.27	14.289	0.0558	15.99
23[a]Lima beans	.27	.036	0.0000[b]	14.42
27 Soy beans	75.42	10.153	0.0084	22.53
58 Lamb	440.86	12.871	0.0494	36.02
59 Pork	410.31	19.819	0.0459	19.67
60 Beef	399.22	10.647	0.0447	40.03
70 Milk	342.04	58.762	0.0383	20.43
Food considered	3,024.03		0.3383	
Other food	956.73		0.1078	
Total food	3,980.76		0.4461	22.51
Total nonfood	4,943.01		0.5539	
Total expenditure	8,923.77		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

[b]For purpose of estimation of price elasticities, budget shares approximated to 0.00001.

Table C-16. Consumers' food basket and budget shares for South Sierra towns (ENCA 32-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01[a] Rice	26.31	2.614	0.0065	10.54
03 White corn	80.38	14.414	0.0199	9.59
06 Wheat	237.35	28.006	0.0587	8.83
07 Barley	100.28	7.769	0.0248	6.56
08[a] Quinua	39.35	6.302	0.0097	8.24
13 Potatoes	498.46	117.108	0.1234	8.68
16[a] Oca	3.20	.908	0.0007	3.54
17 Sugar	300.53	8.369	0.0744	9.40
23 Lima beans	175.70	20.350	0.0434	13.52
27[a] Soy beans	21.94	3.024	0.0054	27.98
58 Lamb	566.12	20.978	0.1402	28.66
59 Pork	186.69	11.661	0.0462	10.19
60[a] Beef	2.82	.093	0.0007	31.78
70[a] Milk	42.40	8.614	0.0105	20.51
Food considered	2,281.53		0.5645	
Other food	496.96		0.1237	
Total food	2,778.49		0.6882	14.72
Total nonfood	1,258.85		0.3118	
Total expenditure	4,037.34		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-17. Consumers' food basket and budget shares for South Sierra rural areas (ENCA 32-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01[a]Rice	29.86	2.728	0.0067	11.25
03 White corn	259.04	30.871	0.0585	12.61
06 Wheat	165.86	16.137	0.0374	10.44
07 Barley	147.71	22.850	0.0333	7.48
08 Quinua	146.77	15.008	0.0331	10.58
13 Potatoes	1,151.54	229.479	0.2603	10.92
16 Oca	56.24	15.926	0.0127	3.97
17 Sugar	159.28	8.754	0.0360	9.23
23 Lima beans	117.30	16.776	0.0264	10.45
27[a]Soy beans	10.83	1.959	0.0024	22.70
58 Lamb	154.90	5.914	0.0350	29.95
59 Pork	97.54	5.727	0.0220	14.89
60 Beef	113.43	3.474	0.0256	35.75
70 Milk	87.39	18.528	0.0197	21.48
Food considered	2,697.69		0.6091	
Other food	329.74		0.0753	
Total food	3,027.43		0.6844	13.64
Total nonfood	1,395.80		0.3156	
Total expenditure	4,423.23		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-18. Consumers' food basket and budget shares for High Jungle towns (ENCA 41-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	265.05	27.171	0.0318	10.00
06 Wheat	303.77	20.838	0.0365	15.51
13 Potatoes	109.08	17.508	0.0131	7.31
14 Manioc	26.48	14.148	0.0031	2.18
17 Sugar	411.56	13.378	0.0495	16.50
21 Beans	119.73	11.279	0.0144	11.93
27[a]Soy beans	76.68	7.653	0.0092	36.93
33 Bananas	194.79	81.314	0.0234	3.04
59 Pork	540.84	23.406	0.0650	24.12
60 Beef	416.89	14.010	0.0501	32.76
62 Chicken	281.38	5.183	0.0338	59.20
70 Milk	230.94	28.309	0.0277	34.51
Food considered	2,977.19		0.3576	
Other food	1,029.43		0.1243	
Total food	4,006.62		0.4819	25.79
Total nonfood	4,307.20		0.5181	
Total expenditure	8,313.82		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-19. Consumers' food basket and budget shares for High Jungle rural areas (ENCA 41-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	243.60	23.577	0.0317	12.84
06 Wheat	288.63	26.476	0.0376	15.21
13 Potatoes	172.68	32.754	0.0225	6.95
14 Manioc	147.10	82.188	0.0191	2.03
17 Sugar	385.22	17.202	0.0502	19.82
21 Beans	126.20	10.235	0.0164	15.09
27 Soy beans	116.74	11.079	0.0152	43.18
33 Bananas	358.06	133.428	0.0466	3.84
59 Pork	364.10	16.361	0.0474	28.98
60 Beef	179.32	5.618	0.0233	33.68
62 Chicken	238.71	4.134	0.0311	58.93
70 Milk	165.54	34.214	0.0215	39.86
Food considered	2,785.90		0.3626	
Other food	1,151.55		0.1506	
Total food	3,937.45		0.5132	25.64
Total nonfood	3,734.18		0.4868	
Total expenditure	7,671.63		1.0000	

Table C-20. Consumers' food basket and budget shares for Low Jungle large cities (ENCA 42-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	264.60	28.034	0.0261	9.83
06 Wheat	466.17	26.780	0.0461	38.19
13[a]Potatoes	68.59	9.065	0.0067	8.45
14 Manioc	49.94	15.527	0.0049	5.36
17 Sugar	627.65	20.781	0.0621	18.49
31[a]Oranges	11.77	2.402	0.0011	5.29
33 Bananas	298.07	65.769	0.0295	5.42
59 Pork	579.39	20.335	0.0573	26.36
60 Beef	448.28	10.970	0.0443	43.28
62 Chicken	460.59	6.746	0.0456	73.29
66[a]Game	127.11	3.300	0.0125	42.61
70 Milk	243.31	33.470	0.0240	29.16
76 Cotton seed	124.93	14.339	0.0123	32.55
Food considered	3,770.40		0.3725	
Other food	880.28		0.0879	
Total food	4,650.28		0.4604	31.92
Total nonfood	5,450.17		0.5396	
Total expenditure	10,100.45		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-21. Consumers' food basket and budget shares for Low Jungle towns (ENCA 42-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	192.69	20.666	0.0276	9.35
06 Wheat	264.24	15.874	0.0379	17.18
13[a]Potatoes	37.57	5.661	0.0053	6.78
14 Manioc	140.24	78.609	0.0201	2.46
17 Sugar	393.83	8.538	0.0565	51.27
31 Oranges	31.68	17.732	0.0045	2.29
33 Bananas	192.78	66.186	0.0277	4.64
59 Pork	281.19	11.786	0.0404	19.99
60 Beef	262.26	8.380	0.0376	30.79
62 Chicken	229.37	3.893	0.0329	59.20
66[a]Game	9.34	.460	0.0013	21.62
70 Milk	258.44	28.994	0.0371	36.19
76[a]Cotton seed	87.47	2.707	0.0125	36.50
Food considered	2,381.10		0.3414	
Other food	694.45		0.1006	
Total food	3,075.55		0.4420	37.94
Total nonfood	3,882.95		0.5580	
Total expenditure	6,958.50		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-22. Consumers' food basket and budget shares for Low Jungle rural areas (ENCA 42-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	119.60	11.564	0.0313	10.55
06 Wheat	107.67	6.638	0.0282	24.76
13[a]Potatoes	6.62	.916	0.0017	8.39
14 Manioc	191.36	101.831	0.0502	2.80
17 Sugar	217.54	9.917	0.0570	24.99
31[a]Oranges	2.82	.959	0.0007	3.50
33 Bananas	428.79	108.513	0.1124	7.11
59 Pork	115.35	4.820	0.0302	26.66
60[a]Beef	24.83	.596	0.0065	41.82
62 Chicken	122.88	2.321	0.0322	56.95
66 Game	214.87	11.079	0.0563	27.24
70[a]Milk	49.97	6.099	0.0131	38.58
76[a]Cotton seed	43.93	3.524	0.0115	34.44
Food considered	1,646.23		0.4313	
Other food	315.19		0.0833	
Total food	1,961.42		0.5146	22.40
Total nonfood	1,849.95		0.4854	
Total expenditure	3,811.37		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-23. Consumers' food basket and budget shares for Metropolitan Lima, 1st income bracket (ENCA 50-1)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	232.60	26.177	0.0350	8.92
06 Wheat	479.00	41.065	0.0722	12.56
11[a]Sweet potatoes	22.17	7.834	0.0033	5.06
13 Potatoes	213.61	41.596	0.0322	6.01
17 Sugar	474.11	20.269	0.0715	14.97
27 Soy beans	161.40	22.634	0.0243	20.86
31[a]Oranges	23.93	4.360	0.0036	6.29
33[a]Bananas	34.79	6.218	0.0052	6.31
44[a]Tomatoes	48.88	6.230	0.0073	12.54
46[a]Squash	23.64	4.486	0.0035	6.10
48[a]Onions	53.62	9.344	0.0080	9.71
49[a]Carrots	23.70	4.167	0.0035	11.51
59 Pork	402.16	12.735	0.0606	20.39
60 Beef	215.86	4.750	0.0325	54.76
62 Chicken	162.11	3.218	0.0244	51.61
70 Milk	362.00	63.877	0.0546	25.83
76 Cotton seed	157.83	8.561	0.0238	21.06
90 Fish	113.08	12.318	0.0170	19.48
Food considered	3,204.49		0.4825	
Other food	1,063.34		0.1613	
Total food	4,267.83		0.6438	22.91
Total nonfood	2,361.31		0.3562	
Total expenditure	6,629.14		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-24. Consumers' food basket and budget shares for Metropolitan Lima, 2nd income bracket (ENCA 50-2)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	267.05	29.899	0.0311	8.96
06 Wheat	541.63	44.337	0.0631	14.34
11[a]Sweet potatoes	21.28	5.895	0.0024	5.56
13 Potatoes	220.22	43.388	0.0256	6.08
17 Sugar	561.70	23.391	0.0654	15.57
27 Soy beans	196.87	25.845	0.0229	21.26
31[a]Oranges	33.49	5.689	0.0039	6.66
33[a]Bananas	47.81	8.526	0.0055	6.23
44[a]Tomatoes	59.36	7.513	0.0069	9.78
46[a]Squash	34.48	5.886	0.0040	6.99
48 Onions	76.11	12.284	0.0088	18.09
49[a]Carrots	24.90	5.348	0.0029	6.88
59 Pork	489.75	15.064	0.0570	23.68
60 Beef	285.06	5.831	0.0332	54.93
62 Chicken	373.89	7.570	0.0435	52.26
70 Milk	515.97	82.191	0.0601	24.06
76 Cotton seed	200.65	9.970	0.0233	24.98
90 Fish	124.50	15.104	0.0145	19.22
Food considered	4,074.72		0.4741	
Other food	1,312.99		0.1537	
Total food	5,387.71		0.6278	24.99
Total nonfood	3,194.67		0.3722	
Total expenditure	8,582.38		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-25. Consumers' food basket and budget shares for Metropolitan Lima, 3rd income bracket (ENCA 50-3)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	259.71	29.482	0.0249	8.84
06 Wheat	553.29	42.371	0.0531	23.62
11[a]Sweet potatoes	22.01	6.503	0.0021	5.67
13 Potatoes	251.02	47.662	0.0241	6.98
17 Sugar	539.34	23.057	0.0518	15.97
27 Soy beans	189.83	26.019	0.0182	21.22
31[a]Oranges	36.18	6.433	0.0034	6.25
33 Bananas	72.72	12.934	0.0069	6.43
44[a]Tomatoes	60.45	7.726	0.0058	11.76
46[a]Squash	35.59	6.389	0.0034	6.30
48 Onions	65.25	11.717	0.0062	8.85
49[a]Carrots	25.17	4.817	0.0024	9.78
59 Pork	562.87	16.075	0.0541	35.49
60 Beef	446.87	8.797	0.0429	60.04
62 Chicken	324.27	6.450	0.0311	53.79
70 Milk	570.87	93.496	0.0548	23.18
76 Cotton seed	189.83	10.037	0.0182	21.22
90 Fish	114.83	14.031	0.0110	18.81
Food considered	4,320.10		0.4144	
Other food	1,416.65		0.1371	
Total food	5,736.75		0.5515	27.88
Total nonfood	4,664.77		0.4485	
Total expenditure	10,401.52		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-26. Consumers' food basket and budget shares for Metropolitan Lima, 4th income bracket (ENCA 50-4)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	314.54	35.124	0.0270	9.07
06 Wheat	561.38	44.120	0.0483	17.13
11[a]Sweet potatoes	20.18	6.081	0.0017	5.15
13 Potatoes	266.33	51.196	0.0229	6.98
17 Sugar	684.90	25.263	0.0589	20.17
27 Soy beans	223.28	29.636	0.0192	21.14
31[a]Oranges	46.51	8.741	0.0040	5.96
33 Bananas	63.31	11.563	0.0054	6.15
44[a]Tomatoes	57.85	7.491	0.0049	10.64
46[a]Squash	35.05	6.301	0.0030	6.39
48 Onions	71.95	12.618	0.0061	7.64
49[a]Carrots	28.25	5.684	0.0024	6.54
59 Pork	597.33	16.764	0.0513	30.39
60 Beef	469.40	10.088	0.0403	53.50
62 Chicken	411.16	8.151	0.0353	51.88
70 Milk	629.63	105.626	0.0541	26.46
76 Cotton seed	222.32	11.404	0.0191	21.18
90 Fish	207.97	19.806	0.0178	21.32
Food considered	4,911.34		0.4217	
Other food	1,800.28		0.1558	
Total food	6,711.62		0.5775	27.05
Total nonfood	4,910.75		0.4225	
Total expenditure	11,622.37		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-27. Consumers' food basket and budget shares for Metropolitan Lima, 5th income bracket (ENCA 50-5)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	290.59	32.167	0.0225	9.12
06 Wheat	527.28	43.753	0.0409	15.82
11[a] Sweet potatoes	19.01	5.398	0.0014	4.63
13 Potatoes	255.55	46.210	0.0198	6.84
17 Sugar	539.03	21.627	0.0418	14.19
27 Soy beans	203.71	28.350	0.0158	22.04
31[a] Oranges	47.11	7.668	0.0036	6.90
33 Bananas	73.67	12.713	0.0057	6.30
44[a] Tomatoes	78.85	9.492	0.0061	13.28
46[a] Squash	44.79	7.755	0.0034	6.52
48 Onions	85.41	12.901	0.0066	10.19
49[a] Carrots	31.62	6.400	0.0024	10.18
59 Pork	578.26	16.735	0.0449	30.89
60 Beef	598.27	12.586	0.0464	53.51
62 Chicken	436.40	8.721	0.0338	52.18
70 Milk	747.36	112.985	0.0580	26.05
76 Cotton seed	203.22	10.929	0.0157	22.03
90 Fish	185.45	16.396	0.0144	24.25
Food considered	4,945.58		0.3832	
Other food	1,710.24		0.1337	
Total food	6,655.83		0.5169	27.28
Total nonfood	6,219.65		0.4831	
Total expenditure	12,875.48		1.0000	

[a] Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-28. Consumers' food basket and budget shares for Metropolitan Lima, 6th income bracket (ENCA 50-6)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	285.87	31.868	0.0170	9.03
06 Wheat	592.17	42.280	0.0352	26.03
11[a] Sweet potatoes	23.38	6.522	0.0013	5.25
13 Potatoes	280.27	48.247	0.0166	6.87
17 Sugar	642.16	22.245	0.0381	26.43
27 Soy beans	223.97	30.520	0.0133	21.32
31 Oranges	61.94	10.139	0.0036	6.70
33 Bananas	96.19	16.337	0.0057	6.55
44 Tomatoes	83.49	10.689	0.0049	10.18
46[a] Squash	32.83	5.415	0.0019	6.66
48 Onions	86.58	14.774	0.0051	7.56
49 Carrots	141.42	11.386	0.0084	17.24
59 Pork	728.15	18.045	0.0433	39.44
60 Beef	737.11	13.201	0.0438	59.38
62 Chicken	577.91	11.527	0.0343	52.60
70 Milk	765.25	121.515	0.0455	23.95
76 Cotton seed	224.35	11.833	0.0133	21.44
90 Fish	227.78	19.151	0.0135	27.41
Food considered	5,810.82		0.3448	
Other food	1,879.36		0.1126	
Total food	7,690.18		0.4574	31.59
Total nonfood	9,123.12		0.5426	
Total expenditure	16,813.30		1.0000	

[a] Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-29. Consumers' food basket and budget shares for Metropolitan Lima, 7th income bracket (ENCA 50-7)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	307.78	33.881	0.0163	9.32
06 Wheat	621.93	42.415	0.0331	30.23
11[a] Sweet potatoes	24.73	6.591	0.0013	7.17
13 Potatoes	247.15	41.408	0.0131	6.97
17 Sugar	781.70	23.291	0.0416	21.40
27 Soy beans	218.78	30.544	0.0116	21.66
31 Oranges	76.14	11.563	0.0040	8.00
33 Bananas	84.15	14.847	0.0044	6.31
44 Tomatoes	84.65	10.300	0.0045	12.18
46[a] Squash	40.56	7.264	0.0021	6.10
48 Onions	85.79	13.703	0.0045	8.74
49[a] Carrots	34.24	6.365	0.0018	7.78
59 Pork	788.37	18.835	0.0419	43.93
60 Beef	1,045.02	17.509	0.0556	63.81
62 Chicken	568.66	10.905	0.0302	53.26
70 Milk	849.35	131.870	0.0452	24.70
76 Cotton seed	217.63	11.696	0.0115	21.74
90 Fish	216.09	16.615	0.0115	27.81
Food considered	6,292.72		0.3342	
Other food	2,240.26		0.1202	
Total food	8,532.98		0.4544	32.91
Total nonfood	10,246.83		0.5456	
Total expenditure	18,779.81		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-30. Consumers' food basket and budget shares for Metropolitan Lime, 8th income bracket (ENCA 50-8)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	278.03	30.561	0.0122	9.33
06 Wheat	510.93	38.469	0.0226	19.36
11[a] Sweet potatoes	24.27	6.373	0.0010	10.81
13 Potatoes	257.41	43.317	0.0113	6.89
17 Sugar	629.13	23.414	0.0278	37.90
27 Soy beans	171.38	23.386	0.0075	25.91
31 Oranges	81.11	12.106	0.0035	8.23
33 Bananas	109.62	18.330	0.0048	6.74
44 Tomatoes	93.41	10.660	0.0041	14.66
46[a] Squash	36.44	6.094	0.0016	6.61
48 Onions	85.45	13.421	0.0037	11.20
49[a] Carrots	32.86	6.387	0.0014	11.51
59 Pork	756.16	20.166	0.0334	38.95
60 Beef	854.70	15.252	0.0378	60.12
62 Chicken	570.81	10.985	0.0252	54.31
70 Milk	994.72	157.274	0.0440	24.78
76[a] Cotton seed	171.38	9.022	0.0075	25.91
90 Fish	226.85	14.690	0.0100	32.88
Food considered	5,884.66		0.2594	
Other food	1,972.38		0.0881	
Total food	7,857.04		0.3475	33.50
Total nonfood	14,749.66		0.6525	
Total expenditure	22,606.70		1.0000	

[a] Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-31. Consumers' food basket and budget shares for Metropolitan Lima, 9th income bracket (ENCA 50-9)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	271.79	26.717	0.0096	10.82
06 Wheat	487.08	34.970	0.0173	29.99
11[a]Sweet potatoes	21.55	5.369	0.0007	6.66
13 Potatoes	193.97	32.720	0.0069	7.43
17 Sugar	536.97	16.975	0.0191	26.42
27 Soy beans	167.10	23.629	0.0059	21.22
31[a]Oranges	56.57	8.463	0.0020	7.39
33 Bananas	73.69	12.098	0.0026	6.73
44[a]Tomatoes	75.04	8.763	0.0026	13.36
46[a]Squash	32.87	4.852	0.0011	7.49
48 Onions	75.23	11.482	0.0026	9.72
49[a]Carrots	25.93	4.595	0.0009	8.24
59 Pork	709.76	15.893	0.0252	48.93
60 Beef	1,246.90	19.277	0.0444	74.86
62 Chicken	582.87	10.939	0.0207	55.96
70 Milk	879.32	129.505	0.0313	27.22
76[a]Cotton seed	167.95	9.261	0.0059	21.44
90 Fish	216.52	12.560	0.0077	36.55
Food considered	5,821.11		0.2065	
Other food	1,748.44		0.0631	
Total food	7,569.55		0.2696	38.51
Total nonfood	20,504.40		0.7304	
Total expenditure	28,073.95		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-32. Consumers' food basket and budget shares for Metropolitan Lima, 10th income bracket (ENCA 50-10)

Products	Expenditure per capita soles per year	Consumption per capita kgs. per year	Budget shares	Price soles per kg.
01 Rice	281.04	22.523	0.0055	13.28
06 Wheat	1,068.99	34.575	0.0211	61.90
11[a]Sweet potatoes	12.71	3.645	0.0002	8.32
13 Potatoes	186.27	30.104	0.0036	8.65
17 Sugar	1,127.55	19.965	0.0223	52.87
27 Soy beans	155.72	22.567	0.0030	36.88
31 Oranges	84.75	10.710	0.0016	8.72
33[a]Bananas	58.62	9.007	0.0011	7.33
44 Tomatoes	112.67	11.321	0.0022	20.51
48 Onions	92.40	12.734	0.0018	17.69
49[a]Carrots	32.70	5.332	0.0006	21.01
59 Pork	1,404.23	17.284	0.0277	73.05
60 Beef	1,620.29	22.680	0.0320	84.40
62 Chicken	540.16	10.490	0.0106	57.67
69[a]Eggs	249.89	6.623	0.0049	38.55
70 Milk	1,088.68	160.399	0.0215	27.09
76[a]Cotton seed	155.57	8.702	0.0030	36.92
90[a]Fish	234.09	6.774	0.0046	54.69
Food considered	8,506.33		0.1673	
Other food	1,785.77		0.0364	
Total food	10,292.10		0.2037	52.03
Total nonfood	40,239.84		0.7963	
Total expenditure	50,531.94		1.0000	

[a]Products with per capita consumption under 10 kgs. per year and budget share under 0.0200.

Table C-33. Engel curves and income elasticities of demand for North Coast large cities (ENCA 11-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1764	-1.52	.8375	-552.7000	841.11000	6.42
06 Wheat	.2018	-0.73	.9199	-16.6900	13.13000	9.58
13 Potatoes	.2957	-0.01	.7342	0.7400	0.31000	4.70
14 Manioc	.4423	-0.77	.7370	-121.0200	94.10800	4.74
17 Sugar	.3500	-0.81	.7436	-53.7500	44.50000	4.82
27 Soy beans	.3645	-1.60	.9689	-2655.7000	4250.10000	15.78
33 Bananas	.8563	-0.09	.7756	-7.5120	1.56490	5.26
59 Pork	.2212	-0.95	.8237	-90.6070	87.03700	6.12
60 Beef	.9796	0.44	.8578	-2.0509	.05207	6.95
62 Chicken	1.3101	-0.64	.9028	-232.1700	149.67000	8.62
70 Milk	1.0887	-0.01	.8303	-6.0604	1.14580	6.26
76 Cotton seed	.4370	-0.05	.7771	-473.0300	497.65000	5.28
90 Milk	.5536	-0.01	.6617	-2.2591	.58969	3.96

Table C-34. Engle curves and income elasticities of demand for North Coast towns (ENCA 11-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.4325	-1.73	.8930	-2193.8000	3796.3000	8.17
06 Wheat	.2204	-0.93	.7424	-42.8050	40.7820	4.80
13 Potatoes	.7046	-0.29	.6646	-10.8290	4.0296	3.98
14 Manioc	.4323	-0.57	.7135	-32.7010	19.5120	4.46
17 Sugar	.6464	-1.73	.8555	-3386.1000	5859.0000	6.88
27 Soy beans	.4578	-1.09	.9227	-202.2800	221.4800	9.77
33 Bananas	.4405	-0.40	.4348	-12.0840	5.6501	2.48
59 Pork	.2049	-0.90	.6541	-52.9380	48.5970	3.89
60 Beef	1.0218	-0.61	.9139	-77.3110	48.1740	9.22
62 Chicken	1.0998	-0.01	.8471	-9.0063	1.1883	6.66
70 Milk	1.0855	-0.01	.7977	-5.9093	1.1412	5.62
76 Cotton seed	.4949	-1.23	.8921	-1129.8000	1390.7000	8.13
90 Fish	.1809	-1.73	.8980	-12512.0000	21646.0000	8.39

Table C-35. Engel curves and income elasticities of demand for North Coast rural areas (ENCA 11-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.4285	-2.31	.6780	-14034.00000	32421.00000	4.104
06 Wheat	.6784	-0.01	.9384	-2.75780	.71680	11.040
13 Potatoes	.8212	0.10	.8205	-2.78640	.47403	6.050
14 Manioc	.4207	0.10	.3242	-.27516	.22731	1.960
17 Sugar	.4050	-1.71	.9851	-1652.60000	2827.00000	23.010
27 Soy beans	.6352	-1.06	.9016	-147.54000	157.38000	8.560
33 Bananas	.8220	-1.03	.8082	-369.11000	381.16000	5.810
59 Pork	.8920	0.65	.8987	-.44646	.01989	8.420
60 Beef	1.1389	0.40	.8181	-3.18880	.07442	6.000
62 Chicken	1.2389	0.10	.8637	-7.13050	.55112	7.120
70 Milk	1.4231	-0.44	.8923	-39.35900	18.43000	8.230
76 Cotton seed	.7617	1.66	.9753	13.04500	.00004	17.750
90 Fish	.8500	-0.02	.8606	-5.18840	.96152	7.030

Table C-36. Engel curves and income elasticities of demand for North Sierra towns (ENCA 12-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	-.2222	0.71	.1088	13.69200	-.00387	-0.99
03 White corn	1.1469	0.20	.2664	-5.76380	.31594	1.71
04 Sweet corn	-.8653	-0.21	.0638	17.05700	-4.51140	-0.74
06 Wheat	.3881	-0.35	.6176	-3.94730	2.22560	3.59
07 Barley	.3111	-0.61	.0021	-61.43400	35.73600	0.13
13 Potatoes	.4532	1.00	.4306	33.26500	.00427	2.46
14 Manioc	.4552	0.67	.3076	1.71290	.00506	1.89
17 Sugar	.3451	-1.55	.5323	-2124.40000	3293.80000	3.02
19 Dried peas	-.7199	0.46	.2549	3.48180	-.02094	-1.65
27 Soy beans	.6338	0.42	.2681	-.18681	.04259	1.71
33 Bananas	1.3166	0.35	.5577	-4.57120	.10239	3.18
58 Lamb	.5720	0.60	.2562	1.24880	.01314	1.66
59 Pork	.4931	-0.01	.4735	-1.22610	.52148	2.68
60 Beef	1.6212	0.34	.7660	-6.42230	.15687	5.12
70 Milk	1.0232	0.51	.6201	-2.61740	.07449	3.61
76 Cotton seed	-.3028	0.10	.0294	5.66440	-.17524	-0.49

Table C-37. Engel curves and income elasticities of demand for North Sierra rural areas (ENCA 12-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.8272	-0.80	.9852	-91.74600	74.38300	23.09
03 White corn	.1937	-1.66	.8755	-354.43000	589.36000	7.50
04 Sweet corn	.3471	-0.01	.1659	-.50572	.36793	1.26
06 Wheat	.7251	-0.75	.9602	-30.88600	24.15000	13.89
07 Barley	.8079	-0.01	.5333	-4.57140	.85786	3.02
13 Potatoes	.5978	-0.22	.6591	-2.18060	1.34140	3.93
14 Manioc	.5241	-0.15	.4165	-3.42970	1.20290	2.39
17 Sugar	1.2671	-0.33	.9193	-16.81700	6.63530	9.55
19 Dried peas	.9670	-0.01	.8646	-6.26020	1.03050	7.15
27 Soy beans	1.9209	-0.01	.9462	-15.22700	2.05580	11.86
33 Bananas	.5802	0.83	.8326	2.30060	.00577	6.31
58 Lamb	1.8005	0.10	.8476	-10.66400	.83993	6.67
59 Pork	.9072	-0.60	.9832	-38.27900	23.95400	21.65
60 Beef	1.9395	-0.01	.7798	-17.03500	2.10270	5.32
70 Milk	1.3354	-0.01	.9124	-8.19300	1.40560	9.13
76 Cotton seed	1.1335	-0.47	.8969	-60.08600	29.30500	8.34

Table C-38. Engel curves and income elasticities of demand for Central Coast large cities (ENCA 21-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.53610	0.50	.1817	4.12600	.03359	2.58
03 White corn	.11160	-0.69	.0008	-104.39000	69.53800	0.16
06 Wheat	-.00342	-0.27	.0000	2.37870	-.01590	-0.03
11 Sweet potatoes	.81002	0.00	.0487	-7.41630	.81002	1.24
13 Potatoes	.07336	0.40	.0019	6.05640	.00688	0.24
17 Sugar	.16410	0.19	.0105	3.30620	.05567	0.56
27 Soy beans	.36220	0.30	.0382	2.22350	.06513	1.09
33 Bananas	1.90420	0.00	.2881	-17.31800	1.90420	3.48
44 Tomatoes	.56210	0.38	.1631	.36067	.04417	2.42
48 Onions	.84260	0.52	.3467	-1.10650	.02441	3.99
58 Lamb	-.46900	-0.44	.0047	31.94900	-15.26500	-0.38
59 Pork	.14540	0.68	.0291	7.75120	.00169	0.95
60 Beef	1.62530	0.18	.3157	-9.90020	.48111	3.72
62 Chicken	.61350	0.34	.0882	-.99401	.06134	1.70
70 Milk	.68750	0.39	.1523	.89268	.10126	2.32
76 Cotton seed	.35990	0.29	.0380	.80868	.05199	1.09
90 Fish	.30650	0.24	.0127	1.04120	.07404	0.62

Table C-39. Engel curves and income elasticities of demand for Central Coast towns (ENCA 21-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1819	-0.01	.3713	1.7445	.19306	2.17
03 White corn	.8162	-0.46	.8401	-91.9310	43.17700	6.48
06 Wheat	.1098	-0.01	.2801	2.8032	.11614	1.76
11 Sweet potatoes	.7216	-0.01	.4367	-5.2325	.77882	2.49
13 Potatoes	.2435	-0.37	.3384	-2.9388	1.91300	2.02
17 Sugar	.3098	0.10	.6444	1.3602	.16714	3.81
27 Soy beans	.5555	-0.61	.8342	-33.1880	21.19500	6.34
33 Bananas	.8633	-1.19	.8316	-3083.1000	3669.90000	6.29
44 Tomatoes	.2900	-0.90	.6635	-193.4500	175.03000	3.97
48 Onions	.4871	-1.29	.8688	-2995.9000	3865.70000	2.28
58 Lamb	1.0435	0.68	.8478	-1.7096	.00512	6.68
59 Pork	.1919	-1.52	.8630	-2641.2000	4015.60000	7.10
60 Beef	.8277	-0.01	.6831	-5.3281	.88568	4.15
62 Chicken	.8941	-0.32	.7834	-25.2780	9.03170	5.38
70 Milk	.7534	0.10	.8139	-1.4566	.46006	5.92
76 Cotton seed	.5472	-0.64	.8313	-70.4800	46.02300	6.28
90 Fish	.4561	-1.52	.7368	-6991.2000	10628.00000	4.73

Table C-40. Engel curves and income elasticities of demand for Central Coast rural areas (ENCA 21-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.7740	-1.46	.9317	-1878.60000	2743.80000	10.45
03 White corn	-.6806	0.10	.2137	7.21750	-.34525	-1.47
06 Wheat	.3724	-0.67	.8494	-15.00100	11.01300	6.72
11 Sweet potatoes	-.0915	-0.01	.0111	3.93130	-.09560	-0.30
13 Potatoes	.5007	-0.01	.8333	-.99010	.52892	6.32
17 Sugar	.6466	-0.68	.8023	-45.07800	31.62400	5.70
27 Soy beans	.9402	-0.86	.9436	-156.48000	135.57000	11.56
33 Bananas	1.2513	0.42	.7520	-3.64430	.05351	4.93
44 Tomatoes	.6507	0.10	.5978	-2.35030	.32598	3.45
48 Onions	.7969	-1.02	.9832	-846.19000	864.10000	21.62
58 Lamb	.0585	0.80	.0049	.51875	6.E-105	0.20
59 Pork	.7816	-1.61	.9556	-11985.00000	19297.00000	13.12
60 Beef	1.5171	-0.01	.8100	-12.87400	1.63700	5.84
62 Chicken	1.5378	0.00	.7585	-12.24200	1.53780	5.01
70 Milk	1.0187	-0.01	.8866	-5.11110	1.06890	7.91
76 Cotton seed	.8825	-1.40	.9306	-8437.00000	11813.00000	10.35
90 Fish	.7347	0.44	.5619	-1.33200	.04595	3.20

Table C-41. Engel curves and income elasticities of demand for Central Sierra large cities (ENCA 22-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	-.8923	0.20	.1034	9.08510	-.24339	-1.83
03 White corn	-.8345	0.04	.0629	7.55780	-.62284	-1.40
04 Sweet corn	2.6186	-0.29	.1156	-64.46400	19.67200	1.95
06 Wheat	.1443	-0.01	.1119	2.67220	.15228	1.91
07 Barley	-.1326	-0.18	.0007	1.52050	-.50892	-0.14
13 Potatoes	.1569	0.48	.0129	13.06100	.01582	0.62
17 Sugar	-.2915	0.49	.0704	8.93960	-.01219	-1.48
27 Soy beans	-.7319	0.41	.1862	11.88600	-.05641	-2.58
33 Bananas	.1402	0.47	.0091	3.04420	-.00518	0.52
44 Tomatoes	.6486	0.49	.4069	.44429	.02200	4.46
48 Onions	.3453	0.10	.2049	.45453	.17717	2.73
49 Carrots	.2511	0.62	.0673	4.33450	.00355	1.45
58 Lamb	2.4997	-1.67	.0289	-6.E+060	1.E+070	0.93
59 Pork	.2799	0.01	.1209	.32056	.26208	2.00
60 Beef	1.5533	0.40	.7097	-7.57550	.11233	8.42
70 Milk	.7698	0.38	.3361	-.04171	.09893	3.83
76 Cotton seed	-.6902	0.43	.1863	7.19530	-.03119	-2.58

Table C-42. Engel curves and income elasticities of demand for Central Sierra towns (ENCA 22-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	1.1190	-0.52	.9545	-59.25200	31.84300	12.96
03 White corn	-.0564	1.10	.0125	38.18900	-8.6E-05	-0.32
04 Sweet corn	.1772	0.04	.0151	.16829	.13280	0.35
06 Wheat	.2927	-1.13	.9479	-89.35400	101.96000	12.06
07 Barley	-.1348	0.79	.0348	8.68630	-0006.40000	-0.54
13 Potatoes	.3375	-1.51	.7864	-113.88000	172.96000	5.43
17 Sugar	.4542	-1.16	.9191	-408.03000	474.30000	9.53
27 Soy beans	1.0824	-0.01	.8068	-7.22090	1.15220	5.78
33 Bananas	1.1573	-0.01	.8124	-8.77880	1.24150	5.89
44 Tomatoes	1.0165	-0.01	.7751	-7.83670	1.09450	5.25
48 Onions	.5991	-0.01	.5876	-3.18350	.64110	3.38
49 Carrots	.5142	1.34	.7603	6.62580	5.E-050	5.04
58 Lamb	1.1954	0.39	.8811	-3.98190	.09763	7.70
59 Pork	.5311	-0.47	.9367	-19.12000	9.88330	10.88
60 Beef	.9476	-0.01	.5815	-7.45200	1.02240	3.33
70 Milk	1.4338	-0.01	.8538	-9.83690	1.51590	6.84
76 Cotton seed	.3532	1.65	.8641	15.19000	3.5E-06	7.13

Table C-43. Engel curves and income elasticities of demand for Central Sierra rural areas (ENCA 22-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	1.3154	0.28	.9344	-4.87640	.203460	10.67
03 White corn	.0218	-1.93	.1994	-149.71000	289.950000	1.41
04 Sweet corn	.8052	-0.01	.7187	-4.66820	.856300	4.52
06 Wheat	.4847	-0.43	.9718	-7.83620	4.264300	16.61
07 Barley	-.1184	-0.01	.1287	3.46670	-.125740	-1.09
13 Potatoes	1.1194	-0.75	.8898	-20.11400	16.091000	8.04
17 Sugar	1.0057	-0.01	.8360	-6.27290	1.068800	6.39
27 Soy beans	.9929	1.69	.9959	.25801	1.8E-050	44.26
33 Bananas	1.4773	0.47	.9419	-3.62100	.036220	11.39
44 Tomatoes	1.4513	0.26	.9716	-5.31450	.179920	16.54
48 Onions	.9429	0.10	.9428	-4.64250	.466670	11.48
49 Carrots	1.1561	-0.03	.8955	-9.81070	1.444600	8.28
58 Lamb	1.4958	-0.01	.9070	-11.82800	1.604900	8.83
59 Pork	1.0570	0.10	.9144	-4.99170	.570040	9.24
60 Beef	1.4505	0.47	.9512	-3.80100	.042450	12.48
70 Milk	1.1218	0.81	.9845	-4.10750	.020370	22.57
76 Cotton seed	.6154	0.10	.9763	-2.35130	.308670	4.73

Table C-44. Engel curves and income elasticities of demand for South Coast large cities (31-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1076	-1.71	.5792	-282.32000	4828.60000	3.32
06 Wheat	.0506	-1.71	.5599	-45.57500	780.34000	3.19
13 Potatoes	.0730	-1.60	.2906	-73.08200	1170.30000	1.81
17 Sugar	.0940	0.10	.2321	2.73340	.04908	1.56
25 Broad beans	.0694	-1.67	.1068	-17540.00000	29292.00000	0.98
27 Soy beans	.1970	-1.52	.7830	-1905.30000	2897.00000	5.37
48 Onions	.3882	-1.60	.9080	-20173.00000	32278.00000	8.89
59 Pork	.1547	-1.48	.8246	-1733.50000	2566.60000	6.13
60 Beef	.8509	-0.01	.7028	-5.36350	.90908	4.35
62 Chicken	1.0014	0.06	.8346	-6.02760	.63993	6.35
70 Milk	.8439	0.10	.6763	-2.23410	.52404	4.09
76 Cotton seed	.1971	-1.52	.7829	-8106.90000	12323.00000	5.37
90 Fish	.2045	-0.01	.2345	.55058	.21913	1.57

Table C-45. Engel curves and income elasticities of demand for South Coast towns (ENCA 31-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.2261	-0.01	.2002	.86272	.24117	1.42
06 Wheat	.0564	-1.70	.6303	-533.63000	908.17000	3.69
13 Potatoes	.3366	0.10	.3846	1.60380	.18909	2.24
17 Sugar	.7225	0.10	.8412	-2.14990	.39229	6.51
25 Broad beans	-.0077	0.10	.0000	.76344	-.00330	-0.02
27 Soy beans	.8154	1.05	.8986	3.99290	.00102	8.42
48 Onions	.6580	0.10	.6222	-2.48330	.31785	3.63
59 Pork	.0630	-1.74	.4087	-3401.90000	5920.40000	2.35
60 Beef	.2536	-1.70	.8218	-8470.40000	14401.00000	6.07
62 Chicken	1.7132	-0.01	.8488	-15.41600	1.85280	6.70
70 Milk	.4901	-1.70	.9855	-1062.60000	1807.40000	23.30
76 Cotton seed	1.0274	0.10	.6139	-5.39620	.50273	3.57
90 Fish	1.0372	0.51	.7413	-2.34990	.02682	4.79

Table C-46. Engel curves and income elasticities of demand for South Coast rural areas (ENCA 31-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.9527	-0.68	.8747	-56.1490	39.18300	7.47
06 Wheat	.3112	-1.60	.9751	-552.8200	885.50000	17.69
13 Potatoes	1.0458	-0.87	.9174	-108.0400	95.00300	9.43
17 Sugar	.4454	-1.39	.9062	-1013.6000	1409.90000	8.79
25 Broad beans	.4221	-0.50	.5483	-21.5230	11.59000	3.12
27 Soy beans	1.1684	-0.01	.8853	-7.1769	1.23400	7.86
48 Onions	.7233	-0.92	.9252	-294.0400	271.50000	9.95
59 Pork	.3588	0.36	.8503	2.0387	.03640	6.74
60 Beef	.8930	-0.01	.8991	-5.8796	.95442	8.44
62 Chicken	1.1544	0.10	.6209	-6.6067	.54016	3.62
70 Milk	.9716	-0.01	.8478	-4.9686	1.02260	6.68
76 Cotton seed	1.1682	-0.01	.8853	-8.2015	1.24610	7.86
90 Fish	.8308	-0.01	.6799	-5.1747	.88690	4.12

Table C-47. Engel curves and income elasticities of demand for South Sierra large cities (32-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	b
01 Rice	.2678	-0.01	.4134	-2.29210	.52588	2.37
03 White corn	.3879	0.10	.2337	2.51170	-.15395	-1.56
06 Wheat	2.7E-06	-1.06	.8605	-39.88000	43.25700	7.03
07 Barley	.3770	0.61	.6211	-1.57170	.00311	3.62
08 Quinua	.9985	0.10	.0674	-2.50870	.12022	0.76
13 Potatoes	.3118	0.10	.3102	2.31960	.16760	1.90
16 Oca	592.9200	-2.24	.0048	-7.E+070	1.6E+08	0.20
17 Sugar	1.E-05	-1.77	.5730	-8003.10000	14167.00000	3.28
23 Lima beans	.4171	0.03	.0474	-.92005	-.12162	-0.63
27 Soy beans	.5341	0.10	.3756	-1.26750	.25366	2.19
58 Lamb	.0049	-0.50	.8596	-29.69700	15.74700	7.00
59 Pork	.0086	-0.08	.8147	-.12920	.44226	5.93
60 Beef	1.9658	0.56	.8130	-.63300	.01851	5.90
70 Milk	13.7960	0.58	.8485	.95357	.04609	6.69

Table C-48. Engel curves and income elasticities of demand for South Sierra towns (ENCA 32-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.4860	0.27	.1205	-1.44220	.06248	1.05
03 White corn	.6933	-0.01	.5567	-2.79210	.73080	3.17
06 Wheat	.4301	-0.78	.7728	-27.86200	22.69400	5.22
07 Barley	1.3737	0.19	.4505	-7.49000	.48678	2.56
08 Quinua	.6223	0.27	.2797	-1.42390	.09819	1.76
13 Potatoes	.6760	0.10	.7437	.10677	.47529	4.82
16 Oca	.0120	-0.66	.0000	-9.13680	3.86290	0.02
17 Sugar	1.1493	0.29	.8794	-3.92760	.20143	7.64
23 Lima beans	.6854	-0.01	.3933	-2.65060	.72137	2.28
27 Soy beans	1.7288	0.10	.7034	-10.23900	.82098	4.36
58 Lamb	1.9606	0.25	.8621	-11.82400	.53357	7.07
59 Pork	.6461	0.58	.7331	.80270	.02015	4.69
60 Beef	.0025	-2.23	.0817	-8.E+070	1.8E+08	0.84
70 Milk	1.3214	0.52	.8342	-4.42120	.05868	6.35

Table C-49. Engel curves and income elasticities of demand for South Sierra rural areas (ENCA 32-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	1.2500	0.03	.8194	-8.67760	1.00590	6.02
03 White corn	.3719	-0.01	.5668	.31772	.39072	3.24
06 Wheat	.4382	-0.04	.7700	-1.20530	.54900	5.18
07 Barley	.0799	-1.80	.6699	-543.71000	979.68000	4.03
08 Quinua	.5644	-1.09	.9775	-272.39000	297.90000	18.63
13 Potatoes	.7548	-1.36	.9942	-28.03000	39.12100	37.09
16 Oca	.4702	0.01	.6013	-.91696	.44495	3.47
17 Sugar	.9279	0.46	.9737	-1.58070	.05438	17.20
23 Lima beans	.4187	0.10	.4614	-.52017	.22316	2.62
27 Soy beans	1.3688	0.50	.8114	-3.12960	.02626	5.87
58 Lamb	1.2382	-0.01	.9121	-8.95680	1.32200	9.11
59 Pork	.7174	-0.87	.9402	-270.34000	236.17000	11.22
60 Beef	1.4110	0.00	.7023	-10.78100	1.41060	4.34
70 Milk	.6913	0.28	.5905	-.55251	.14598	3.40

Table C-50. Engel curves and income elasticities of demand for High Jungle towns (ENCA 41-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.6023	-0.01	.6934	-2.17740	.63813	4.25
06 Wheat	.6598	0.47	.6065	1.16250	.03992	3.51
13 Potatoes	1.3757	0.15	.8372	-7.15520	.54130	6.41
14 Manioc	.2979	-1.54	.9572	-3205.00000	4936.70000	13.37
17 Sugar	.2977	0.82	.2499	6.15690	.00143	1.63
21 Beans	-.1706	-0.01	.5854	3.91190	-.18247	-3.36
27 Soy beans	1.7466	0.10	.8334	-10.95600	.87086	6.33
33 Bananas	-.0499	-0.79	.2438	3.87660	-2.09660	-1.61
59 Pork	.6231	-0.66	.8623	-44.41200	30.28400	7.08
60 Beef	.8472	0.68	.9432	.08789	.01136	11.52
62 Chicken	.8587	0.49	.7354	-1.37710	.02265	4.72
70 Milk	1.3517	0.47	.9150	-6.46110	.09347	9.28

Table C-51. Engel curves and income elasticities of demand for High Jungle rural areas (ENCA 41-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.5321	-0.77	.9638	-59.8760	47.07500	14.59
06 Wheat	.6165	-0.06	.6724	-2.8805	.86257	4.05
13 Potatoes	1.0943	-0.01	.7695	-6.5035	1.15630	5.17
14 Manioc	-.1326	-0.01	.1377	5.4972	-.13875	-1.13
17 Sugar	.7303	-0.14	.7143	-6.4727	1.73320	4.47
21 Beans	.0828	-1.84	.8167	-9233.9000	16991.00000	5.97
27 Soy beans	.9998	-0.01	.7845	-6.7015	1.06680	5.40
33 Bananas	-.2751	-0.01	.5732	7.1114	-.28684	-3.28
59 Pork	.8959	0.01	.8966	-4.9372	.84274	8.33
60 Beef	1.6714	0.04	.8459	-11.9540	1.25260	6.63
62 Chicken	1.0300	-0.54	.9173	-104.8100	57.64600	9.42
70 Milk	.7228	-0.01	.2793	-3.0218	.76058	1.76

Table C-52. Engel curves and income elasticities of demand for Low Jungle large cities (ENCA 42-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.0509	-1.77	.5142	-1907.30000	3377.00000	2.91
06 Wheat	.1110	-1.72	.8477	-2804.20000	4824.30000	6.67
13 Potatoes	.6962	0.10	.7885	-2.67620	.33906	5.46
14 Manioc	-.3704	0.05	.3454	5.82820	-.26293	-2.06
17 Sugar	.0716	-1.72	.7315	-2697.30000	4640.30000	4.67
31 Oranges	-.2160	0.49	.0522	2.11560	-.00367	-0.66
33 Bananas	-.1051	-0.01	.2072	5.09690	-.11080	-1.45
59 Pork	.1390	-1.73	.6777	-6100.30000	10554.00000	4.10
60 Beef	.7876	-0.47	.9874	-41.56700	20.48900	25.00
62 Chicken	.7324	0.10	.6260	-3.23040	.34342	3.66
66 Game	.3149	-0.86	.2604	-374.84000	323.12000	1.68
70 Milk	.4728	0.10	.5924	.41339	.26505	3.41
76 Cotton seed	-.3580	-0.01	.4963	5.98860	-.38334	-2.81

Table C-53. Engel curves and income elasticities of demand for Low Jungle towns (ENCA 42-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.6876	0.33	.3036	-.88784	.09966	2.95
06 Wheat	1.0948	0.17	.6463	-4.89520	.39105	6.05
13 Potatoes	1.7606	-0.54	.2631	-151.39000	81.34000	2.67
14 Manioc	-1.3670	0.15	.5658	15.97200	-.71672	-5.11
17 Sugar	.5740	0.22	.2241	-1.33430	.13030	2.40
31 Oranges	4.4661	-1.03	.1230	-2853.30000	2932.00000	1.67
33 Bananas	.4025	0.26	.0763	2.09730	.12541	1.29
59 Pork	1.0200	0.08	.5494	-5.56740	.60819	4.94
60 Beef	1.6869	-0.17	.4571	-24.22700	5.32510	4.10
62 Chicken	1.6331	-0.35	.4400	-60.05100	21.67600	3.96
66 Game	.0092	-2.50	.0174	1.4E+08	-3.5E+08	-0.59
70 Milk	1.7019	0.00	.5715	-13.07400	1.70190	5.17
76 Cotton seed	.0520	0.00	.0009	-1.39900	.05196	0.13

Table C-54. Engel curves and income elasticities of demand for Low Jungle rural areas (ENCA 42-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	1.0879	-0.20	.9013	-12.2300	3.50930	8.55
06 Wheat	1.3183	0.10	.7467	-7.0673	.69424	4.86
13 Potatoes	1.0305	0.00	.4860	-8.8253	1.03050	2.75
14 Manioc	-.4502	-0.01	.6141	8.0138	-.46749	-3.57
17 Sugar	.7148	0.10	.8043	-2.3931	.38927	5.73
31 Oranges	1.7327	-0.26	.8190	-51.4820	14.96800	6.12
33 Bananas	.1634	-1.99	.9461	-116.1000	232.05000	11.85
59 Pork	1.2482	0.10	.7180	-6.6782	.63455	4.51
60 Beef	1.4588	0.25	.6916	-5.5002	.16762	4.24
62 Chicken	.9446	0.37	.7796	-2.3571	.05912	5.32
66 Game	.4448	-0.01	.3954	-1.2778	.47190	2.29
70 Milk	1.5188	0.28	.9566	-6.3694	.25196	13.28
76 Cotton seed	1.5798	0.04	.8965	-10.7010	1.19350	8.32

Table C-55. Engel curves and income elasticities of demand for Metropolitan Lima, 1st income bracket (ENCA 50-1)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.5981	-1.57	.9371	-2537.60000	3985.10000	10.92
06 Wheat	.4023	-1.45	.8408	-476.16000	691.43000	6.50
11 Sweet potatoes	1.6099	0.21	.4565	-8.11580	.39979	2.59
13 Potatoes	.4544	-0.31	.4839	-4.54260	2.23860	2.74
17 Sugar	.5109	-1.12	.9361	-312.77000	351.29000	10.83
27 Soy beans	.8040	-0.01	.8346	-4.11730	.85131	6.35
31 Oranges	.2281	0.10	.0406	-.01225	.10903	0.58
33 Bananas	1.0479	0.10	.6912	-5.38230	.52544	4.23
44 Tomatoes	.9059	0.10	.8390	-4.34760	.45095	6.46
46 Squash	.2025	-0.88	.2396	-153.79000	136.12000	1.59
48 Onions	.9152	-0.40	.9538	-29.46400	12.75400	12.85
49 Carrots	.3966	-0.01	.3778	-2.18100	.42720	2.20
59 Pork	.5362	-1.57	.9496	-6696.10000	10514.00000	12.28
60 Beef	.5535	0.56	.2187	.08146	.00919	1.50
62 Chicken	1.4334	0.10	.7731	-8.32080	.67278	5.22
70 Milk	.9825	-0.41	.9677	-13.76300	6.64040	15.49
76 Cotton seed	.7952	-0.01	.8512	-5.04730	.85024	6.76
90 Fish	.9024	-0.05	.6643	-6.39610	1.23300	3.98

Table C-56. Engel curves and income elasticities of demand for Metropolitan Lima, 2nd income bracket (ENCA 50-2)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.4242	-1.50	.8059	-1539.20000	2309.90000	5.76
06 Wheat	.1306	-0.73	.3614	-7.56080	6.46510	2.13
11 Sweet potatoes	.7682	-0.27	.2796	-16.91500	5.40710	1.76
13 Potatoes	.3849	-1.08	.6045	-108.41000	118.07000	3.50
17 Sugar	.3560	-0.35	.4455	-5.96570	2.87620	2.54
27 Soy beans	.3580	1.26	.4931	30.67800	.00022	2.79
31 Oranges	.9877	0.70	.4598	-1.46460	.00578	2.61
33 Bananas	.8251	-0.68	.7482	-131.26000	90.21700	4.88
44 Tomatoes	.7725	-0.52	.6259	-55.72600	29.89700	3.66
46 Squash	.8043	-0.24	.5680	-15.27300	4.53720	3.24
48 Onions	.8008	-1.00	.7537	-564.23000	565.22000	4.95
49 Carrots	.6006	-0.49	.5449	-43.46300	22.12800	3.10
59 Pork	.2374	-0.01	.4059	.47364	.25309	2.34
60 Beef	1.0507	-0.01	.5612	-8.13780	1.13080	3.20
62 Chicken	1.1716	-0.01	.8112	-8.84790	1.25600	5.86
70 Milk	.8794	-0.42	.9264	-12.84400	6.37660	10.03
76 Cotton seed	.3581	1.26	.4933	8.68350	6.7E-05	2.79
90 Fish	.7333	-0.36	.4634	-17.89100	7.33520	2.63

Table C-57. Engel curves and income elasticities of demand for Metropolitan Lima, 3rd income bracket (ENCA 50-3)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1520	-1.65	.3195	-1886.8000	3114.20000	1.94
06 Wheat	.2255	-1.55	.7529	-889.5600	1379.80000	4.94
11 Sweet potatoes	.5597	-0.23	.3041	-10.2510	3.06890	1.87
13 Potatoes	.5447	-0.47	.6087	-13.1210	7.09740	3.53
17 Sugar	.0775	-0.01	.0212	2.3273	.08248	0.42
27 Soy beans	.6599	-1.55	.8961	-5130.4000	7953.10000	8.31
31 Oranges	1.2046	0.29	.6624	-4.4155	.14443	3.96
33 Bananas	.5302	-0.88	.5590	-246.3300	217.72000	3.19
44 Tomatoes	.6076	-1.26	.8536	-4548.3000	5731.90000	6.83
46 Squash	.4969	-0.01	.2588	-2.8960	.53515	1.67
48 Onions	.4552	-1.00	.5665	-454.0100	454.97000	3.23
49 Carrots	-.4584	-1.06	.5478	-1552.8000	1646.90000	3.11
59 Pork	.4827	-1.44	.9058	-4454.7000	6415.80000	8.77
60 Beef	1.0434	-0.01	.6011	-7.8299	1.12040	3.47
62 Chicken	.7127	-1.54	.7149	-44556.0000	68617.00000	4.47
70 Milk	.7261	-0.01	.8232	-2.3234	.76190	6.10
76 Cotton seed	.6591	-1.55	.8961	-22458.0000	34811.00000	8.31
90 Fish	.4176	-1.14	.2905	-789.0700	900.51000	1.81

Table C-58. Engel curves and income elasticities of demand for Metropolitan Lima, 4th income bracket (ENCA 50-4)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.2080	-1.50	.7970	-918.7400	1379.10000	5.60
06 Wheat	.2139	-1.50	.6691	-648.0800	973.12000	4.02
11 Sweet potatoes	1.5979	-0.71	.5891	-459.1000	327.07000	3.39
13 Potatoes	.5254	-0.01	.3898	-1.1431	.55507	2.26
17 Sugar	.9210	-1.30	.8275	-2066.8000	2687.90000	6.20
27 Soy beans	.7922	-0.01	.7218	-4.2142	.84138	4.56
31 Oranges	1.1543	-0.01	.7595	-8.9354	1.23960	5.03
33 Bananas	.6742	-0.86	.7256	-308.2300	266.04000	4.60
44 Tomatoes	.0979	-0.96	.0521	-119.3500	115.45000	0.66
46 Squash	.2130	-1.64	.2923	-29349.0000	48133.00000	1.82
48 Onions	.6685	-1.50	.8436	-12879.0000	19320.00000	6.57
49 Carrots	.5590	-0.55	.3678	-64.6260	36.38100	2.16
59 Pork	.5947	-1.42	.9110	-4788.3000	6800.40000	9.05
60 Beef	.8200	0.10	.6470	-3.6635	.40592	3.83
62 Chicken	.3806	-1.60	.5430	-29308.0000	46893.00000	3.08
70 Milk	.6006	-0.01	.6533	-1.0651	.62975	3.88
76 Cotton seed	.7899	-0.01	.7211	-5.1917	.84699	4.55
90 Fish	.5158	-0.93	.3569	-227.5600	212.60000	2.11

Table C-59. Engel curves and income elasticities of demand for Metropolitan Lima, 5th income bracket (ENCA 50-5)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.3830	-1.53	.7815	-2597.4000	3975.10000	5.35
06 Wheat	.3109	-0.77	.8208	-31.5940	25.29200	6.05
11 Sweet potatoes	.0085	1.40	.0001	8.1502	1.6E-07	0.03
13 Potatoes	.2281	-1.58	.5220	-1079.6000	1706.70000	2.96
17 Sugar	.6661	-1.53	.8177	-8602.1000	13162.00000	5.99
27 Soy beans	.6336	-1.36	.6963	-1871.3000	2546.00000	4.28
31 Oranges	.5350	-0.92	.2418	-553.3000	509.94000	1.60
33 Bananas	.4789	-0.01	.4321	-2.1553	.51349	2.47
44 Tomatoes	.4325	-0.01	.5686	-1.8730	.46463	3.25
46 Squash	.4899	-0.49	.6114	-35.2020	18.07300	3.55
48 Onions	.3256	-1.58	.5723	-11022.0000	17416.00000	3.27
49 Carrots	.0835	0.10	.0410	1.4727	.03897	0.59
59 Pork	.3839	-1.58	.7615	-9639.3000	15231.00000	5.05
60 Beef	.7841	-0.01	.7329	-5.0786	.84035	4.69
62 Chicken	.4309	-0.01	.2732	-2.0047	.46338	1.73
70 Milk	.5078	-1.53	.7674	-490.4700	751.41000	5.14
76 Cotton seed	.6408	-1.33	.6930	-5723.5000	7613.30000	4.25
90 Fish	.6827	-0.01	.2648	-3.9323	.73018	1.70

Table C-60. Engel curves and income elasticities of demand for Metropolitan Lima, 6th income bracket (ENCA 50-6)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.4546	-0.01	.6186	-1.04250	.48428	3.60
06 Wheat	.0724	-1.61	.4029	-832.90000	1342.00000	2.32
11 Sweet potatoes	-.2035	-0.01	.0931	3.88000	-.22041	-0.91
13 Potatoes	.1524	-0.99	.3238	-55.47200	55.90000	1.96
17 Sugar	.3402	-1.61	.9436	-10402.00000	16748.00000	11.57
27 Soy beans	.7504	-1.61	.7610	-11478.00000	18481.00000	5.05
31 Oranges	.4088	0.10	.1827	-.59910	.19379	1.34
33 Bananas	.6223	-1.61	.9052	-30151.00000	48544.00000	8.74
44 Tomatoes	.3750	-0.01	.7341	-1.33770	.40384	4.70
46 Squash	.5733	-0.01	.7758	-3.92660	.62076	5.26
48 Onions	.3243	-0.21	.4035	-3.84770	1.43360	2.33
49 Carrots	1.2445	-0.83	.6838	-705.69000	586.73000	4.16
59 Pork	.2463	-1.61	.7857	-11133.00000	17926.00000	5.42
60 Beef	.8467	-0.34	.6238	-26.06400	9.79940	3.64
62 Chicken	.2845	-1.61	.5970	-24946.00000	40165.00000	3.44
70 Milk	.5092	0.10	.6784	1.11180	.30896	4.11
76 Cotton seed	.7525	-1.61	.7565	-52973.00000	85288.00000	4.99
90 Fish	.3173	-0.01	.2231	-.21859	.33975	1.52

Table C-61. Engel curves and income elasticities of demand for Metropolitan Lima, 7th income bracket (ENCA 50-7)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.5727	0.10	.6752	-.81702	.30422	4.08
06 Wheat	.1932	-0.68	.3912	-17.14800	12.60000	2.27
11 Sweet potatoes	.8091	0.80	.4944	-.17152	.00143	2.80
13 Potatoes	.4149	-0.84	.7941	-78.97900	67.32100	5.55
17 Sugar	.6329	0.10	.7475	-1.70550	.32284	4.87
27 Soy beans	.5273	-0.01	.6235	-1.84320	.56219	3.64
31 Oranges	.8272	-0.01	.8834	-5.96040	.89103	7.79
33 Bananas	.9229	-0.78	.6759	-314.47000	246.27000	4.09
44 Tomatoes	.6706	-0.01	.7915	-4.37380	.72256	5.51
46 Squash	.6160	1.36	.6898	4.57000	1.6E-05	4.22
48 Onions	.5558	-0.54	.7686	-47.61300	26.61400	5.16
49 Carrots	.2329	-1.46	.4801	-17060.00000	24908.00000	2.72
59 Pork	.3327	-1.53	.7595	-9254.40000	14160.00000	5.03
60 Beef	.7265	0.10	.6243	-2.71780	.36145	3.65
62 Chicken	1.1928	-0.52	.8575	-106.43000	56.39400	6.94
70 Milk	.1439	0.10	.1624	4.80470	.08689	1.25
76 Cotton seed	.5223	-0.01	.6246	-2.77400	.56221	3.65
90 Fish	.6088	1.68	.7717	28.05000	4.E-060	5.20

Table C-62. Engel curves and income elasticities of demand for Metropolitan Lima, 8th income bracket (ENCA 50-8)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1355	-1.59	.2420	-3344.20000	5318.30000	1.60
06 Wheat	.1017	-1.56	.3621	-1456.60000	2273.30000	2.13
11 Sweet potatoes	.2926	-0.01	.0859	-1.27090	.31768	0.87
13 Potatoes	.1225	-1.51	.5632	-1109.50000	1676.40000	3.21
17 Sugar	-.1086	-0.01	.1404	4.22240	-.11635	-1.14
27 Soy beans	.2422	-1.59	.4106	-88092.00000	14008.00000	2.36
31 Oranges	-.4959	0.10	.2100	6.72780	-.23313	-1.46
33 Bananas	.3025	-0.01	.2181	-.26032	.32499	1.49
44 Tomatoes	.4224	-1.45	.6385	-19646.00000	28487.00000	3.76
46 Squash	.1439	-1.54	.1464	-30611.00000	47142.00000	1.17
48 Onions	.4183	-0.49	.6451	-31.14500	16.10800	3.81
49 Carrots	.2398	0.01	.0954	-.385580	.22106	0.92
59 Pork	.2089	-1.50	.4815	-5700.00000	8551.00000	2.73
60 Beef	.1985	-0.49	.1377	-13.56100	7.42990	1.13
62 Chicken	.6080	-0.50	.3883	-53.57400	27.67200	2.25
70 Milk	.2781	-1.50	.6789	-341.87000	513.80000	4.11
76 Cotton seed	.2422	-1.59	.4106	-40055.00000	63688.00000	2.36
90 Fish	-.0088	-0.01	.0004	2.68100	-.00944	-0.06

Table C-63. Engel curves and income elasticities of demand for Metropolitan Lima, 9th income bracket (ENCA 50-9)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	-.0430	-0.01	.0089	3.67650	-.04613	-0.27
06 Wheat	.0685	-1.55	.3320	-1401.60000	2173.50000	1.99
11 Sweet potatoes	-.6208	-0.01	.2806	7.99360	-.67642	-1.77
13 Potatoes	.1273	-1.48	.2183	-1786.10000	2644.40000	1.50
17 Sugar	.3216	-1.43	.6505	-8811.70000	12602.00000	3.86
27 Soy beans	.1231	-0.15	.0197	.66818	.35201	0.40
31 Oranges	.5319	-0.01	.2350	-3.47700	.57629	1.57
33 Bananas	.2219	-1.50	.5175	-18169.00000	27254.00000	2.93
44 Tomatoes	.3493	0.10	.4794	-.19884	.15746	2.71
46 Squash	.1965	-0.01	.0591	-.43051	.21403	0.71
48 Onions	.2068	-1.02	.3230	-573.92000	586.33000	1.95
49 Carrots	.5791	-0.49	.4495	-79.94800	39.98800	2.56
59 Pork	.2716	-1.13	.5057	-1098.20000	1241.90000	2.86
60 Beef	.2850	-1.48	.6612	-8682.50000	12851.00000	3.95
62 Chicken	.2728	-0.01	.2218	-.46596	.29506	1.51
70 Milk	.4861	-0.71	.7415	-28.75900	21.40500	4.79
76 Cotton seed	.1884	-0.08	.0452	-.44117	.35556	0.62
90 Fish	-.2274	1.52	.4592	42.32100	-1.9E-06	-2.61

Table C-64. Engel curves and income elasticities of demand for Metropolitan Lima, 10th income bracket (ENCA 50-10)

Products	E_i	$\hat{\lambda}$	R^2	$\hat{a}$	$\hat{b}$	$t_{\hat{b}}$
01 Rice	.1255	-0.01	.0509	1.66630	.13553	0.66
06 Wheat	.3063	-0.01	.4583	.09787	.32961	2.60
11 Sweet potatoes	.5166	0.66	.3186	-.02393	.00085	1.93
13 Potatoes	.3509	-1.70	.4885	-54307.00000	92324.00000	2.76
17 Sugar	.2601	-1.70	.4226	-88649.00000	1.5E+05	2.42
27 Soy beans	.2098	-0.01	.1217	.72953	.22660	1.05
31 Oranges	17.8620	-1.70	.7342	-1.7E+07	2.8E+07	4.70
33 Bananas	.2216	-0.01	.0819	-.27114	.24137	0.85
44 Tomatoes	.3416	0.94	.4581	6.15620	.00013	2.60
48 Onions	.2212	-1.70	.2294	-1.5E+05	2.6E+05	1.54
49 Carrots	.4326	-1.70	.6323	-1.E+060	2.E+060	3.71
59 Pork	.0612	-1.70	.1595	-27736.00000	47152.00000	1.23
60 Beef	.5016	-1.70	.7000	-1.E+050	2.E+050	4.32
62 Chicken	.2887	-0.01	.3027	-.86550	.31426	1.86
69 Eggs	.3434	-1.70	.2923	-9.E 050	1.5E+06	1.82
70 Milk	.1068	0.01	.1069	4.09300	.10082	0.98
76 Cotton seed	.2067	-0.01	.1182	-.18770	.22542	1.04
90 Fish	-.0789	1.70	.0919	21.21900	-2.E-080	-0.90

Table C-65. Substitutability matrix for products in food basket of North Coast (ENCA sector 11) $(s_{ij})_{11}$

Products	01	06	13	14	17	27	33	59	60	62	70	76	90
01 Rice	1.	.3	.3	.3	0	0	.2	-.1	-.2	-.2	0	0	-.1
06 Wheat	.3	1.	.3	.2	0	0	.2	-.1	-.1	-.1	0	0	0
13 Potatoes	.3	.3	1.	.3	0	-.1	.3	-.1	-.2	-.1	0	-.1	0
14 Manioc	.3	.2	.3	1.	0	-.1	.3	-.1	-.1	-.1	0	-.1	0
17 Sugar	0	0	0	0	1.	0	0	0	0	0	-.2	0	0
27 Soy beans	0	0	-.1	-.1	0	1.	-.1	-.1	-.1	-.1	0	.3	-.1
33 Bananas	.2	.2	.3	.3	0	-.1	1.	0	0	0	0	-.1	0
59 Pork	-.1	-.1	-.1	-.1	0	-.1	0	1.	.4	.3	0	-.1	.2
60 Beef	-.2	-.1	-.2	-.1	0	-.1	0	.4	1.	.4	0	-.1	.2
62 Chicken	-.2	-.1	-.1	-.1	0	-.1	0	.3	.4	1.	0	-.1	.2
70 Milk	0	0	0	0	-.2	0	0	0	0	0	1.	0	0
76 Cotton seed	0	0	-.1	-.1	0	.3	-.1	-.1	-.1	-.1	0	1.	-.1
90 Fish	-.1	0	0	0	0	-.1	0	.2	.2	.2	0	-.1	1.

Table C-66. Substitutability matrix for products in food basket of North Sierra (ENCA sector 12) $(S_{ij})_{12}$

Products	01	03	04	06	07	13	14	17	19	27	33	58	59	60	70	76
01 Rice	1.	.3	.3	.3	.3	.2	.2	0	0	0	.1	-.1	-.1	-.1	0	0
03 White corn	.3	1.	.4	.3	.3	.3	.2	0	0	0	.1	0	0	0	0	0
04 Sweet corn	.3	.4	1.	.3	.3	.3	.2	0	0	0	.1	0	0	0	0	0
06 Wheat	.3	.3	.3	1.	.3	.2	.2	0	0	0	.1	-.1	-.1	-.1	0	0
07 Barley	.3	.3	.3	.3	1.	.2	.2	0	0	0	.1	-.1	-.1	-.1	0	0
13 Potatoes	.2	.3	.3	.2	.2	1.	.3	0	0	-.1	.2	-.1	-.1	-.1	0	-.1
14 Manioc	.2	.2	.2	.2	.2	.3	1.	0	0	0	.3	-.1	-.1	-.1	0	0
17 Sugar	0	0	0	0	0	0	0	1.	0	0	0	0	0	0	-.2	0
19 Dried peas	0	0	0	0	0	0	0	0	1.	0	0	0	0	0	0	0
27 Soy beans	0	0	0	0	0	-.1	0	0	0	1.	-.1	-.1	-.1	-.1	0	.3
33 Bananas	.1	.1	.1	.1	.1	.2	.3	0	0	-.1	1.	0	0	0	0	-.1
58 Lamb	-.1	0	0	-.1	-.1	-.1	-.1	0	0	-.1	0	1.	.3	.4	0	-.1
59 Pork	-.1	0	0	-.1	-.1	-.1	-.1	0	0	-.1	0	.3	1.	.4	0	-.1
60 Beef	-.1	0	0	-.1	-.1	-.1	-.1	0	0	-.1	0	.4	.4	1.	0	-.1
70 Milk	0	0	0	0	0	0	0	-.2	0	0	0	0	0	0	1.	0
76 Cotton seed	0	0	0	0	0	-.1	0	0	0	.3	-.1	-.1	-.1	-.1	0	1.

Table C-67. Substitutability matrix for products in food basket of Central Coast (ENCA sector 21) $(S_{ij})_{21}$

Products	01	03	06	11	13	17	27	33	44	48	58	59	60	62	70	76	90
01 Rice	1.	.3	.3	.2	.3	0	0	.2	-.1	-.1	-.1	-.1	-.1	-.1	0	0	-.1
03 White corn	.3	1.	.3	.2	.2	0	0	.1	0	0	-.1	-.1	-.1	-.1	0	0	0
06 Wheat	.3	.3	1.	.2	.3	0	0	.2	0	0	-.1	-.1	-.1	-.1	0	0	0
11 Sweet potatoes	.2	.2	.2	1.	.3	0	-.1	.1	0	0	-.1	-.1	-.1	-.1	0	-.1	-.1
13 Potatoes	.3	.2	.3	.3	1.	0	-.1	.2	0	0	-.1	-.1	-.1	-.1	0	-.1	0
17 Sugar	0	0	0	0	0	1.	0	0	0	0	0	0	0	0	-.2	0	0
27 Soy beans	0	0	0	-.1	-.1	0	1.	-.1	0	0	-.1	-.1	-.1	-.1	0	.3	-.1
33 Bananas	.2	.1	.2	.1	.2	0	-.1	1.	0	0	-.1	-.1	-.1	-.1	0	-.1	0
44 Tomatoes	-.1	0	0	0	0	0	0	0	1.	-.1	0	0	0	0	0	0	0
48 Onions	-.1	0	0	0	0	0	0	0	-.1	1.	0	0	0	0	0	0	0
58 Lamb	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	1.	.3	.4	.3	0	-.1	.2
59 Pork	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	.3	1.	.4	.3	0	-.1	.2
60 Beef	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	.4	.4	1.	.4	0	-.1	.2
62 Chicken	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	.3	.3	.4	1.	0	-.1	.2
70 Milk	0	0	0	0	0	-.2	0	0	0	0	0	0	0	0	1.	0	0
76 Cotton seed	0	0	0	-.1	-.1	0	.3	-.1	0	0	-.1	-.1	-.1	-.1	0	1.	-.1
90 Fish	-.1	0	0	-.1	0	0	-.1	0	0	0	.2	.2	.2	.2	0	-.1	1.

Table C-68. Substitutability matrix for products in food basket of Central Sierra (ENCA sector 22) $(S_{ij})_{22}$

Products	01	03	04	06	07	13	17	27	33	44	48	49	58	59	60	70	76
01 Rice	1.	.3	.3	.4	.3	.2	0	0	.1	-.1	-.1	0	-.1	-.1	-.1	0	0
03 White corn	.3	1.	.4	.3	.3	.3	0	0	.2	0	0	0	-.1	-.1	-.1	0	0
04 Sweet corn	.3	.4	1.	.3	.3	.2	0	0	.1	0	0	0	-.1	-.1	-.1	0	0
06 Wheat	.4	.3	.3	1.	.3	.2	0	0	.1	0	0	0	-.1	-.1	-.1	0	0
07 Barley	.3	.3	.3	.3	1.	.2	0	0	0	0	0	0	-.1	-.1	-.1	0	0
13 Potatoes	.2	.3	.2	.2	.2	1.	0	-.1	.2	0	0	0	-.1	-.1	-.1	0	-.1
17 Sugar	0	0	0	0	0	0	1.	0	0	0	0	0	0	0	0	-.2	0
27 Soy beans	0	0	0	0	0	-.1	0	1.	-.1	0	0	0	-.1	-.1	-.1	0	.3
33 Bananas	.1	.2	.1	.1	0	.2	0	-.1	1.	0	0	0	-.1	-.1	-.1	0	-.1
44 Tomatoes	-.1	0	0	0	0	0	0	0	0	1.	-.1	-.1	0	0	0	0	0
48 Onions	-.1	0	0	0	0	0	0	0	0	-.1	1.	0	0	0	0	0	0
49 Carrots	0	0	0	0	0	0	0	0	0	-.1	0	1.	0	0	0	0	0
58 Lamb	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	0	1.	.2	.3	0	-.1
59 Pork	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	0	.2	1.	.4	0	-.1
60 Beef	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	0	0	0	.3	.4	1.	0	-.1
70 Milk	0	0	0	0	0	0	-.2	0	0	0	0	0	0	0	0	1.	0
76 Cotton seed	0	0	0	0	0	-.1	0	.3	-.1	0	0	0	-.1	-.1	-.1	0	1.

Table C-69. Substitutability matrix for products in food basket of South Coast (ENCA sector 31) $(S_{ij})_{31}$

Products	01	06	13	17	25	27	48	59	60	62	70	76	90
01 Rice	1.	.3	.2	0	-.1	0	-.1	-.1	-.1	-.1	0	0	-.1
06 Wheat	.3	1.	.2	0	-.1	0	0	-.1	-.1	-.1	0	0	0
13 Potatoes	.2	.2	1.	0	0	-.1	0	-.1	-.1	-.1	0	-.1	-.1
17 Sugar	0	0	0	1.	0	0	0	0	0	0	-.2	0	0
25 Broad beans	-.1	-.1	0	0	1.	0	0	0	0	0	0	0	0
27 Soy beans	0	0	-.1	0	0	1.	0	-.1	-.1	-.1	0	.3	-.1
48 Onions	-.1	0	0	0	0	0	1.	0	0	0	0	0	0
59 Pork	-.1	-.1	-.1	0	0	-.1	0	1.	.3	.3	0	-.1	.2
60 Beef	-.1	-.1	-.1	0	0	-.1	0	.3	1.	.3	0	-.1	.3
62 Chicken	-.1	-.1	-.1	0	0	-.1	0	.3	.3	1.	0	-.1	0
70 Milk	0	0	0	-.2	0	0	0	0	0	0	1.	0	0
76 Cotton seed	0	0	-.1	0	0	.3	0	-.1	-.1	-.1	0	1.	-.1
90 Fish	-.1	0	-.1	0	0	-.1	0	.2	.3	0	0	-.1	1.

Table C-70. Substitutability matrix for products in food basket of South Sierra (ENCA sector 32) $(S_{ij})_{32}$

Products	01	03	06	07	08	13	16	17	23	27	58	59	60	70
01 Rice	1.	.1	.3	.3	.3	.2	.2	0	.2	0	-.1	-.1	-.1	0
03 White corn	.1	1.	.2	.2	.2	.1	.1	0	.1	0	-.1	-.1	-.1	0
06 Wheat	.3	.2	1.	.3	.3	.1	.1	0	.1	0	-.1	-.1	-.1	0
07 Barley	.3	.2	.3	1.	.3	.1	.1	0	.1	0	-.1	-.1	-.1	0
08 Quinua	.3	.2	.3	.3	1.	.1	.1	0	.1	0	-.1	-.1	-.1	0
13 Potatoes	.2	.1	.1	.1	.1	1.	.2	0	.2	-.1	-.1	-.1	-.1	0
16 Oca	.2	.1	.1	.1	.1	.2	1.	0	.2	-.1	-.1	-.1	-.1	0
17 Sugar	0	0	0	0	0	0	0	1.	0	0	0	0	0	-.2
23 Lima beans	.2	.1	.1	.1	.1	.2	.2	0	1.	0	-.1	-.1	-.1	0
27 Soy beans	0	0	0	0	0	-.1	-.1	0	0	1.	-.1	-.1	-.1	-.1
58 Lamb	-.1	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	1.	.3	.3	0
59 Pork	-.1	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	.3	1.	.3	0
60 Beef	-.1	-.1	-.1	-.1	-.1	-.1	-.1	0	-.1	-.1	.3	.3	1.	0
70 Milk	0	0	0	0	0	0	0	-.2	0	-.1	0	0	0	1.

Table C-71. Substitutability matrix for products in food basket of High Jungle (ENCA sector 41) $(S_{ij})_{41}$

Products	01	06	13	14	17	21	27	33	59	60	62	70
01 Rice	1.	.3	.2	.2	0	-.2	0	.2	-.1	-.1	-.1	0
06 Wheat	.3	1.	.2	.2	0	-.2	0	.2	-.1	-.1	-.1	0
13 Potatoes	.2	.2	1.	.3	0	-.1	0	.3	-.1	-.1	-.1	0
14 Manioc	.2	.2	.3	1.	0	-.1	0	.3	-.1	-.1	-.1	0
17 Sugar	0	0	0	0	1.	0	0	0	0	0	0	-.2
21 Beans	-.2	-.2	-.1	-.1	0	1.	0	0	0	0	0	0
27 Soy beans	0	0	0	0	0	0	1.	-.1	-.1	-.1	0	0
33 Bananas	.2	.2	.3	.3	0	0	-.1	1.	0	0	0	0
59 Pork	-.1	-.1	-.1	-.1	0	0	-.1	0	1.	.3	.2	0
60 Beef	-.1	-.1	-.1	-.1	0	0	-.1	0	.3	1.	.3	0
62 Chicken	-.1	-.1	-.1	-.1	0	0	0	0	.2	.3	1.	0
70 Milk	0	0	0	0	-.2	0	0	0	0	0	0	1.

Table C-72. Substitutability matrix for products in food basket of Low Jungle (ENCA sector 42) $(S_{ij})_{42}$

Products	01	06	13	14	17	31	33	59	60	62	66	70	76
01 Rice	1.	.3	.2	.2	0	0	.2	-.1	-.1	-.1	-.1	0	0
06 Wheat	.3	1.	.2	.2	0	0	.2	-.1	-.1	-.1	-.1	0	0
13 Potatoes	.2	.2	1.	.2	0	0	.2	-.1	-.1	-.1	-.1	0	-.1
14 Manioc	.2	.2	.2	1.	0	0	.3	-.1	-.1	-.1	-.1	0	-.1
17 Sugar	0	0	0	0	1.	0	0	0	0	0	0	-.2	0
31 Oranges	0	0	0	0	0	1.	.1	0	0	0	0	0	0
33 Bananas	.2	.2	.2	.3	0	.1	1.	-.1	-.1	-.1	-.1	0	-.1
59 Pork	-.1	-.1	-.1	-.1	0	0	-.1	1.	.3	.2	.2	0	-.1
60 Beef	-.1	-.1	-.1	-.1	0	0	-.1	.3	1.	.2	.2	0	-.1
62 Chicken	-.1	-.1	-.1	-.1	0	0	-.1	.2	.2	1.	.1	0	-.1
66 Game	-.1	-.1	-.1	-.1	0	0	-.1	.2	.2	.1	1.	0	-.1
70 Milk	0	0	0	0	-.2	0	0	0	0	0	0	1.	0
76 Cotton seed	0	0	-.1	-.1	0	0	-.1	-.1	-.1	-.1	-.1	0	1.

Table C-73. Substitutability matrix for products in food basket of Metropolitan Lima (ENCA sector 50) $(S_{ij})_{50}$

Products	01	06	11	13	17	27	31	33	44	46	48	49	59	60	62	69	70	76	90
01 Rice	1.	.4	.1	.2	0	0	0	.1	-.1	0	-.1	0	-.1	-.1	-.1	-.1	0	0	0
06 Wheat	.4	1.	.1	.2	0	0	0	.1	0	0	0	0	-.1	-.1	-.1	-.1	0	0	0
11 Sweet potatoes	.1	.1	1.	.2	0	-.2	0	.1	0	0	0	0	-.1	-.1	-.1	0	0	-.2	-.1
13 Potatoes	.2	.2	.2	1.	0	-.2	0	.1	0	0	0	0	-.1	-.1	-.1	0	0	-.2	0
17 Sugar	0	0	0	0	1.	0	0	0	0	0	0	0	0	0	0	0	-.2	0	0
27 Soy beans	0	0	-.2	-.2	0	1.	0	0	0	0	0	0	-.2	-.2	-.2	-.2	0	.2	-.1
31 Oranges	0	0	0	0	0	0	1.	.1	0	0	0	0	0	0	0	0	0	0	0
33 Bananas	.1	.1	.1	.1	0	0	.1	1.	0	0	0	0	0	0	0	0	0	0	0
44 Tomatoes	-.1	0	0	0	0	0	0	0	1.	0	-.1	0	0	0	0	0	0	0	0
46 Squash	0	0	0	0	0	0	0	0	0	1.	0	0	0	0	0	0	0	0	0
48 Onions	-.1	0	0	0	0	0	0	0	-.1	0	1.	0	0	0	0	0	0	0	0
49 Carrots	0	0	0	0	0	0	0	0	0	0	0	1.	0	0	0	0	0	0	0
59 Pork	-.1	-.1	-.1	-.1	0	-.2	0	0	0	0	0	0	1.	.4	.2	0	0	-.2	.1
60 Beef	-.1	-.1	-.1	-.1	0	-.2	0	0	0	0	0	0	.4	1.	.3	-.1	0	-.2	.2
62 Chicken	-.1	-.1	-.1	-.1	0	-.2	0	0	0	0	0	0	.2	.3	1.	0	0	-.2	.1
69 Eggs	-.1	-.1	0	0	0	-.2	0	0	0	0	0	0	0	-.1	0	1.	0	-.2	0
70 Milk	0	0	0	0	-.2	0	0	0	0	0	0	0	0	0	0	0	1.	0	0
76 Cotton seed	0	0	-.2	-.2	0	.2	0	0	0	0	0	0	-.2	-.2	-.2	-.2	0	1.	-.1
90 Fish	0	0	-.1	0	0	-.1	0	0	0	0	0	0	.1	.2	.1	0	0	-.1	1.

In the following tables, these code numbers are used for products whose elasticities have been estimated.

1: Rice ("Arroz")

3: White corn ("Maiz amilaceo")

4: Sweet corn ("Choclo")

6: Wheat ("Trigo")

7: Barley ("Cebada")

8: "Quinua"

11: Sweet potato ("Camote")

13: Potato ("Papas")

14: Manioc ("Yuca")

16: "Oca"

17: Sugar ("Azucar")

19: Peas ("Arveja")

21: Beans ("Frijol")

23: Lima beans ("Haba")

25: Broad beans ("Pallar")

27: Soy beans ("Soya")

31: Oranges ("Naranja")

33: Bananas ("Plátano")

44: Tomatoes ("Tomate")

46: Squash ("Zapallo")

48: Onions ("Cebolla")

49: Carrots ("Zanahoria")

58: Lamb ("Carne de Ovino")

59: Pork ("Carne de Cerdo")

60: Beef ("Carne de Vacuno")

62: Chicken ("Carne de Pollo")

66: Game ("Carne de Monte")

69: Eggs ("Huevos de Gallina")

70: Milk ("Leche")

76: Cotton seed ("Pepa de Algodón")

90: Fish ("Pescado")

Table C-74. A complete set of price elasticities for products in food basket of North Coast large cities (ENCA 11-1)

SECTOR - 11 - . STRATUM - 1 -

	1 62	6 70	13 76	14 90	17	27	33	59	60
1	-0.018 -0.141	-0.019 -0.003	-0.013 0.023	0.002 0.043	-0.008	0.006	-0.003	0.201	-0.207
6	-0.017 -0.085	-0.033 -0.004	-0.009 0.015	-0.001 0.046	-0.009	0.002	0.001	0.046	-0.113
13	-0.037 -0.302	-0.029 -0.006	0.001 0.003	-0.005 0.112	-0.013	-0.005	-0.004	0.223	-0.171
14	0.006 0.469	-0.017 -0.009	-0.023 -0.078	0.026 -0.047	-0.019	-0.042	0.010	-0.838	0.214
17	-0.012 -0.003	-0.014 -0.058	-0.005 -0.006	-0.001 -0.004	-0.139	-0.006	-0.001	-0.015	-0.011
27	0.003 0.141	-0.002 -0.007	-0.005 0.152	-0.007 -0.129	-0.016	-0.379	-0.016	-0.106	0.085
33	-0.044 -0.155	-0.022 -0.017	-0.019 -0.109	0.004 0.022	-0.037	-0.064	-0.145	0.116	-0.203
59	0.157 1.610	0.041 -0.004	0.073 -0.079	-0.060 -0.481	-0.010	-0.042	0.019	-3.400	2.003
60	-0.163 -1.604	-0.119 -0.019	-0.055 0.087	0.011 0.500	-0.043	0.017	-0.022	1.593	-0.951

Table C-74. (continued)

	SECTOR - 11 - , STRATUM - 1 -								
	1 62	6 70	13 76	14 90	17	27	33	59	60
62	-0.244 -0.694	-0.189 -0.026	-0.190 0.281	0.059 0.707	-0.057	0.089	-0.039	2.853	-3.577
70	-0.038 -0.010	-0.043 -0.502	-0.014 -0.018	-0.003 -0.014	-0.111	-0.018	-0.004	-0.046	-0.033
76	0.032 0.382	0.022 -0.009	-0.000 -0.660	-0.013 -0.284	-0.019	0.149	-0.030	-0.192	0.279
90	0.079 1.101	0.102 -0.011	0.095 -0.342	-0.010 -1.654	-0.024	-0.156	0.010	-1.343	1.720

Table C-75. A complete set of price elasticities for products in food basket of North Coast towns (ENCA 11-2)

SECTOR - 11 - . STRATUM - 2 -

	1 62	6 70	13 76	14 90	17	27	33	59	60
1	-0.362 -0.031	0.005 -0.008	0.042 0.003	0.050 -0.034	-0.019	0.002	-0.024	0.003	0.030
6	0.016 -0.010	-0.255 -0.004	0.039 0.004	0.017 -0.003	-0.010	0.003	0.000	-0.024	0.052
13	0.148 0.013	0.108 -0.014	-0.303 -0.050	-0.031 0.045	-0.031	-0.047	0.123	-0.024	-0.495
14	0.525 -0.090	0.141 -0.008	-0.081 -0.080	-0.421 0.102	-0.019	-0.072	0.307	-0.144	-0.501
17	-0.025 -0.005	-0.025 -0.070	-0.005 -0.010	-0.002 -0.008	-0.294	-0.010	-0.003	-0.029	-0.024
27	0.004 -0.022	-0.003 -0.009	-0.026 0.026	-0.016 -0.007	-0.020	-0.143	-0.000	-0.035	-0.110
33	-0.174 0.057	-0.007 -0.009	0.238 0.004	0.215 -0.102	-0.019	-0.000	-1.168	0.030	0.586
59	0.014 0.039	-0.020 -0.004	0.000 -0.010	-0.012 0.019	-0.009	-0.009	0.006	-0.332	0.156
60	-0.009 0.099	-0.005 -0.020	-0.089 -0.042	-0.034 0.038	-0.044	-0.042	0.049	0.064	-0.773

Table C-75. (continued)

SECTOR - 11 - , STRATUM - 2 -

	1 62	6 70	13 76	14 90	17	27	33	59	60
62	-0.117 -1.050	-0.061 -0.022	0.004 -0.038	-0.026 0.049	-0.048	-0.038	0.017	0.061	0.400
70	-0.042 -0.009	-0.041 -0.478	-0.009 -0.017	-0.004 -0.014	-0.133	-0.017	-0.006	-0.049	-0.040
76	0.005 -0.022	-0.003 -0.010	-0.027 -0.167	-0.018 -0.007	-0.022	0.024	0.001	-0.037	-0.108
90	-0.104 0.079	-0.006 -0.004	0.047 -0.004	0.035 -0.456	-0.008	-0.004	-0.046	0.067	0.260

Table C-76. A complete set of price elasticities for products in food basket of North Coast rural areas (ENCA 11-3)

SECTOR — 11 — , STRATUM — 3 —

	1 62	6 70	13 76	14 90	17	27	33	59	60
1	-0.331 -0.032	0.042 -0.002	0.027 -0.003	0.037 -0.024	-0.032	-0.005	0.008	0.010	-0.038
6	0.038 -0.018	-0.600 -0.004	0.071 -0.001	0.027 0.005	-0.050	-0.003	0.025	-0.045	0.012
13	0.077 0.019	0.198 -0.004	-0.639 -0.061	0.038 0.024	-0.060	-0.058	0.111	-0.056	-0.245
14	0.445 -0.039	0.258 -0.002	0.126 -0.112	-0.835 0.076	-0.031	-0.090	0.282	-0.308	-0.105
17	-0.023 -0.002	-0.014 -0.031	-0.004 -0.008	-0.002 -0.004	-0.203	-0.008	-0.002	-0.013	-0.008
27	-0.026 -0.016	-0.003 -0.003	-0.032 0.068	-0.019 -0.021	-0.047	-0.283	-0.014	-0.060	-0.051
33	0.031 0.034	0.141 -0.004	0.226 -0.055	0.183 -0.055	-0.061	-0.052	-1.259	0.060	0.153
59	-0.021 0.072	-0.053 -0.005	-0.019 -0.038	-0.035 0.046	-0.066	-0.039	0.009	-0.732	0.168
60	-0.110 0.176	-0.011 -0.006	-0.104 -0.048	-0.018 0.041	-0.084	-0.048	0.027	0.195	-0.922

Table C-76. (continued)

SECTOR - 11 - , STRATUM - 3 -

	1 62	6 70	13 76	14 90	17	27	33	59	60
62	-0.229 -1.436	-0.103 -0.007	0.018 -0.057	-0.022 0.096	-0.091	-0.053	0.019	0.283	0.592
70	-0.081 -0.007	-0.051 -0.578	-0.016 -0.028	-0.007 -0.016	-0.246	-0.029	-0.008	-0.045	-0.028
76	-0.031 -0.018	-0.006 -0.004	-0.034 -0.348	-0.023 -0.023	-0.056	0.059	-0.015	-0.061	-0.051
90	-0.122 0.074	0.004 -0.005	0.023 -0.042	0.021 -0.758	-0.063	-0.040	-0.027	0.141	0.113

Table C-77. A complete set of price elasticities for products in food basket of North Sierra towns (ENCA 12-2)

SECTOR — 12 — , STRATUM — 2 —

	1 27	3 33	4 58	6 59	7 60	13 70	14 76	17	19
1	-3.650 -0.209	5.436 0.562	1.976 -1.545	6.296 -2.036	-1.881 -3.088	0.080 0.004	-1.082 -0.688	0.013	0.002
3	25.241 1.410	-38.999 -3.710	-12.395 10.301	-40.833 13.549	12.511 20.448	-0.167 -0.019	7.170 4.592	-0.067	-0.008
4	41.365 2.408	-55.763 -6.088	-29.808 17.243	-65.825 22.686	20.614 33.973	0.323 0.014	11.795 7.743	0.050	0.006
6	2.429 0.128	-3.407 -0.356	-1.224 0.959	-4.303 1.264	1.208 1.942	-0.056 -0.006	0.693 0.424	-0.023	-0.003
7	-42.405 -2.360	60.636 6.237	22.198 -17.330	70.063 -22.849	-21.221 -34.384	0.825 -0.005	-11.896 -7.753	-0.018	-0.002
13	0.051 -0.017	-0.027 0.002	0.012 -0.014	-0.132 -0.019	0.032 0.015	-0.270 -0.007	0.043 -0.023	-0.026	-0.003
14	-8.823 -0.477	12.551 1.518	4.585 -3.666	14.511 -4.837	-4.296 -7.245	0.397 -0.007	-2.931 -1.637	-0.027	-0.003
17	-0.011 -0.004	-0.001 -0.000	-0.001 -0.012	-0.021 -0.019	-0.000 -0.002	-0.009 -0.040	-0.001 -0.011	-0.158	-0.002
19	0.023 0.008	0.002 0.001	0.001 0.025	0.044 0.040	0.001 0.005	0.019 0.012	0.002 0.023	0.042	0.365

Table C-77. (continued)

SECTOR - 12 - , STRATUM - 2 -

	1 27	3 33	4 58	6 59	7 60	13 70	14 76	17	19
27	-0.394 -0.078	0.538 0.039	0.201 -0.202	0.564 -0.270	-0.185 -0.350	-0.041 -0.010	-0.104 -0.207	-0.037	-0.004
33	4.662 0.175	-6.678 -2.049	-2.438 1.926	-7.730 2.520	2.315 3.885	-0.006 -0.022	1.558 0.848	-0.077	-0.009
58	-0.947 -0.067	1.328 0.140	0.491 -0.868	1.462 -0.460	-0.460 -0.569	-0.013 -0.009	-0.270 -0.207	-0.033	-0.004
59	-0.823 -0.058	1.151 0.121	0.425 -0.299	1.273 -0.818	-0.399 -0.527	-0.010 -0.008	-0.234 -0.181	-0.029	-0.003
60	-2.739 -0.189	3.820 0.402	1.408 -0.879	4.251 -1.248	-1.328 -3.332	-0.025 -0.027	-0.778 -0.611	-0.095	-0.011
70	-0.033 -0.012	-0.003 -0.001	-0.002 -0.036	-0.062 -0.057	-0.001 -0.007	-0.026 -0.455	-0.003 -0.033	-0.133	-0.007
76	-0.725 -0.108	1.053 0.113	0.391 -0.323	1.207 -0.427	-0.363 -0.679	-0.002 0.005	-0.210 0.307	0.018	0.002

Table C-78. A complete set of price elasticities for products in food basket of North Sierra rural areas (ENCA 12-3)

SECTOR - 12 - . STRATUM - 3 -

	1 27	3 33	4 58	6 59	7 60	13 70	14 76	17	19
1	-1.002 -0.003	0.102 0.008	0.126 -0.030	0.133 -0.063	0.113 -0.025	-0.030 -0.009	0.038 -0.007	-0.023	-0.009
3	0.088 0.009	-0.803 0.000	0.169 0.022	0.104 0.021	0.082 0.019	0.110 -0.002	0.023 0.008	-0.005	-0.002
4	0.349 0.033	0.680 -0.003	-2.906 0.084	0.450 0.095	0.309 0.073	0.452 -0.004	0.082 0.033	-0.010	-0.004
6	0.057 -0.002	0.035 0.007	0.064 -0.019	-0.688 -0.041	0.062 -0.016	-0.037 -0.008	0.024 -0.005	-0.020	-0.008
7	0.198 -0.004	0.188 0.008	0.200 -0.040	0.264 -0.086	-1.354 -0.033	-0.010 -0.009	0.054 -0.008	-0.022	-0.009
13	-0.004 -0.021	0.049 0.024	0.069 -0.021	-0.027 -0.049	0.002 -0.018	-0.491 -0.007	0.054 -0.026	-0.016	-0.006
14	0.113 0.025	0.076 0.257	0.081 -0.038	0.175 -0.088	0.088 -0.032	0.348 -0.006	-1.432 0.023	-0.014	-0.006
17	-0.027 -0.000	-0.065 -0.008	-0.014 -0.002	-0.073 -0.045	-0.016 -0.000	-0.077 -0.092	-0.013 -0.006	-0.591	-0.014
19	-0.021 -0.000	-0.049 -0.006	-0.011 -0.001	-0.056 -0.034	-0.012 -0.000	-0.059 -0.011	-0.010 -0.005	-0.027	-0.494

Table C-78. (continued)

SECTOR - 12 - , STRATUM - 3 -

	1 27	3 33	4 58	6 59	7 60	13 70	14 76	17	19
27	-0.051 -0.762	-0.045 -0.068	0.028 -0.058	-0.125 -0.177	-0.032 -0.048	-0.315 -0.022	0.019 0.150	-0.053	-0.021
33	0.036 -0.057	-0.027 -1.171	-0.009 0.030	0.069 0.007	0.021 0.027	0.219 -0.008	0.382 -0.053	-0.019	-0.007
58	-0.118 -0.040	0.003 0.011	0.069 -1.273	-0.232 0.227	-0.084 0.396	-0.247 -0.020	-0.058 -0.046	-0.050	-0.019
59	-0.038 -0.016	-0.022 -0.001	0.012 0.057	-0.073 -0.580	-0.030 0.127	-0.092 -0.010	-0.024 -0.022	-0.025	-0.010
60	-0.130 -0.044	0.006 0.013	0.077 0.508	-0.255 0.750	-0.092 -1.950	-0.270 -0.022	-0.063 -0.050	-0.053	-0.021
70	-0.028 -0.000	-0.068 -0.008	-0.015 -0.002	-0.077 -0.047	-0.016 -0.000	-0.081 -0.509	-0.013 -0.007	-0.210	-0.014
76	-0.032 0.127	-0.014 -0.046	0.029 -0.043	-0.077 -0.138	-0.021 -0.036	-0.239 -0.013	0.018 -0.404	-0.031	-0.012

Table C-79. A complete set of price elasticities for products in food basket of Central Coast large cities (ENCA 21-1)

SECTOR - 21 - , STRATUM - 1 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
1	-0.171 -0.014	0.008 -0.007	-0.016 -0.031	-0.001 -0.081	0.002 -0.049	-0.025 -0.015	-0.015 -0.015	0.013 -0.019	-0.014
3	0.167 0.012	0.579 0.035	-0.178 -0.024	-0.085 -0.408	-0.080 -0.136	-0.005 -0.003	-0.015 -0.016	-0.054 0.106	0.011
6	0.006 0.000	-0.008 0.002	0.030 -0.000	-0.003 -0.015	-0.007 -0.005	0.000 0.000	-0.000 -0.000	-0.002 0.004	0.000
11	-0.027 -0.004	-0.064 0.029	-0.079 -0.038	0.405 -0.334	-0.114 -0.124	-0.038 -0.022	-0.047 -0.047	-0.029 -0.140	-0.005
13	0.021 0.001	-0.009 0.002	-0.019 -0.007	-0.015 -0.048	0.037 -0.019	-0.003 -0.002	-0.006 -0.006	-0.004 0.012	0.001
17	-0.005 -0.001	-0.000 -0.002	-0.007 -0.007	-0.000 -0.002	-0.003 -0.006	-0.059 -0.035	-0.003 -0.003	-0.000 -0.004	-0.001
27	-0.017 -0.002	-0.002 -0.004	-0.016 -0.021	-0.004 -0.055	-0.010 -0.033	-0.017 -0.010	-0.099 0.015	-0.009 -0.017	-0.003
33	0.071 0.001	-0.031 -0.020	-0.102 -0.127	-0.023 -0.425	-0.054 -0.226	-0.088 -0.052	-0.093 -0.093	-0.359 0.026	-0.003
44	-0.066 -0.028	0.002 -0.008	-0.022 -0.026	-0.001 -0.030	-0.006 -0.029	-0.026 -0.015	-0.013 -0.013	0.004 -0.015	-0.180

Table C-79. (continued)

SECTOR - 21 - , STRATUM - 1 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
48	-0.087 -0.257	0.002 -0.012	-0.033 -0.039	-0.001 -0.039	-0.010 -0.041	-0.039 -0.023	-0.018 -0.018	0.005 -0.022	-0.033
58	0.017 0.002	0.007 -1.021	0.025 0.091	0.010 0.916	0.013 0.205	0.022 0.013	0.011 0.011	0.003 0.065	0.003
59	-0.012 -0.001	-0.001 0.017	-0.007 -0.379	-0.001 0.228	-0.004 0.051	-0.007 -0.004	-0.006 -0.006	-0.004 0.017	-0.001
60	-0.100 -0.011	-0.018 0.174	-0.080 0.125	-0.019 -1.237	-0.046 0.125	-0.075 -0.044	-0.055 -0.056	-0.031 0.001	-0.013
62	-0.041 -0.004	-0.006 0.035	-0.030 0.025	-0.006 0.188	-0.017 -0.564	-0.028 -0.017	-0.022 -0.022	-0.013 0.015	-0.005
70	-0.019 -0.003	-0.001 -0.010	-0.029 -0.028	-0.001 -0.007	-0.012 -0.024	-0.069 -0.326	-0.014 -0.014	-0.000 -0.016	-0.004
76	-0.017 -0.002	-0.002 -0.004	-0.016 -0.021	-0.004 -0.056	-0.010 -0.033	-0.017 -0.010	0.015 -0.097	-0.009 -0.017	-0.003
90	-0.017 -0.002	0.007 0.018	-0.007 0.020	-0.012 0.072	0.004 0.042	-0.014 -0.008	-0.013 -0.013	0.010 -0.340	-0.002

Table C-80. A complete set of price elasticities for products in food basket of Central Coast towns (ENCA 21-2)

SECTOR - 21 - , STRATUM - 2 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
1	-0.223 -0.017	0.099 0.001	0.023 -0.006	0.002 -0.003	0.024 -0.000	-0.009 -0.005	0.002 0.002	0.013 -0.038	-0.015
3	0.064 0.002	-0.554 -0.029	0.056 -0.051	0.028 -0.057	0.016 -0.042	-0.042 -0.023	-0.019 -0.019	-0.003 -0.006	0.001
6	0.017 0.001	0.066 -0.001	-0.205 -0.006	0.008 0.000	0.023 -0.001	-0.006 -0.003	0.003 0.003	0.013 -0.003	0.001
11	0.035 0.000	0.681 -0.168	0.223 -0.079	0.265 -0.579	-0.069 -0.304	-0.037 -0.021	-0.157 -0.155	-0.136 -0.099	-0.001
13	0.032 0.002	0.047 -0.021	0.047 -0.020	-0.004 -0.055	-0.145 -0.034	-0.013 -0.007	-0.022 -0.022	-0.003 0.015	0.001
17	-0.007 -0.002	-0.006 -0.002	-0.012 -0.013	-0.000 -0.009	-0.005 -0.005	-0.135 -0.045	-0.005 -0.005	-0.001 -0.004	-0.002
27	-0.007 -0.002	-0.022 -0.024	-0.012 -0.035	-0.010 -0.057	-0.026 -0.037	-0.029 -0.016	-0.195 0.037	-0.014 -0.010	-0.003
33	0.051 0.001	-0.022 -0.079	0.079 -0.073	-0.035 -0.205	-0.024 -0.126	-0.045 -0.025	-0.063 -0.062	-0.157 0.069	-0.000
44	-0.065 -0.022	0.022 -0.002	-0.003 -0.011	0.000 -0.008	0.002 -0.004	-0.015 -0.008	-0.003 -0.003	0.003 -0.013	-0.110

Table C-80. (continued)

SECTOR - 21 - , STRATUM - 2 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
48	-0.077 -0.209	0.021 -0.003	-0.010 -0.019	0.000 -0.014	0.000 -0.007	-0.025 -0.014	-0.006 -0.006	0.003 -0.017	-0.022
58	-0.021 -0.005	-0.065 -1.064	-0.043 0.051	-0.014 0.346	-0.039 0.105	-0.054 -0.030	-0.040 -0.040	-0.025 0.077	-0.005
59	-0.003 -0.001	-0.016 0.032	-0.009 -0.305	-0.002 0.130	-0.007 0.039	-0.010 -0.005	-0.009 -0.008	-0.005 0.022	-0.001
60	-0.018 -0.004	-0.035 0.111	-0.030 0.084	-0.015 -0.740	-0.030 0.105	-0.043 -0.024	-0.028 -0.028	-0.020 0.033	-0.004
62	-0.019 -0.004	-0.048 0.060	-0.035 0.027	-0.014 0.181	-0.033 -0.747	-0.046 -0.025	-0.032 -0.033	-0.022 0.052	-0.005
70	-0.018 -0.004	-0.014 -0.006	-0.030 -0.031	-0.001 -0.023	-0.012 -0.012	-0.088 -0.349	-0.011 -0.011	-0.002 -0.010	-0.004
76	-0.007 -0.002	-0.021 -0.024	-0.012 -0.035	-0.010 -0.057	-0.025 -0.037	-0.028 -0.016	0.037 -0.191	-0.014 -0.010	-0.003
90	-0.068 -0.007	0.001 0.084	-0.021 0.047	-0.007 0.121	0.013 0.106	-0.024 -0.013	-0.010 -0.010	0.023 -0.607	-0.006

Table C-81. A complete set of price elasticities for products in food basket of Central Coast rural areas (ENCA 21-3)

SECTOR - 21 - , STRATUM - 3 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
1	-0.720 -0.046	0.054 -0.015	0.056 -0.006	0.032 0.015	0.086 0.018	-0.040 -0.017	0.015 0.013	0.052 -0.077	-0.045
3	0.216 0.015	0.264 0.026	0.319 -0.052	-0.084 -0.062	-0.049 -0.075	0.036 0.015	-0.020 -0.018	-0.063 0.067	0.015
6	0.048 0.002	0.047 -0.013	-0.522 -0.002	0.029 0.009	0.059 0.009	-0.019 -0.008	0.015 0.013	0.038 -0.006	0.001
11	0.213 0.013	-0.165 0.025	0.313 -0.126	0.230 -0.108	0.028 -0.133	0.005 0.002	-0.078 -0.069	-0.083 -0.009	0.013
13	0.165 0.009	-0.046 -0.010	0.178 -0.065	0.005 -0.039	-0.437 -0.052	-0.026 -0.011	-0.049 -0.047	-0.003 0.016	0.008
17	-0.016 -0.003	-0.012 -0.006	-0.038 -0.024	-0.005 -0.004	-0.011 -0.005	-0.306 -0.066	-0.008 -0.009	-0.001 -0.008	-0.003
27	0.018 -0.002	-0.034 -0.019	0.002 -0.088	-0.031 -0.045	-0.055 -0.062	-0.049 -0.021	-0.402 0.072	-0.030 -0.016	-0.002
33	0.645 0.036	-0.300 0.000	0.794 -0.425	-0.201 -0.310	-0.041 -0.400	-0.065 -0.028	-0.243 -0.226	-0.470 0.187	0.033
44	-0.234 -0.038	0.009 -0.009	-0.007 -0.017	0.007 0.002	0.020 0.002	-0.034 -0.014	-0.001 -0.002	0.016 -0.029	-0.200

Table C-81. (continued)

SECTOR - 21 - , STRATUM - 3 -

	1 48	3 58	6 59	11 60	13 62	17 70	27 76	33 90	44
48	-0.253 -0.266	0.008 -0.010	-0.013 -0.022	0.007 0.002	0.019 0.002	-0.042 -0.018	-0.002 -0.003	0.017 -0.032	-0.040
58	-0.034 -0.002	0.026 -1.294	-0.074 0.310	0.018 0.650	-0.014 0.319	-0.003 -0.001	-0.025 -0.021	0.004 0.097	-0.002
59	-0.004 -0.003	-0.032 0.044	-0.032 -0.608	-0.022 0.123	-0.031 0.042	-0.041 -0.017	-0.032 -0.032	-0.021 0.038	-0.003
60	-0.005 -0.005	-0.066 0.251	-0.055 0.259	-0.045 -1.592	-0.059 0.305	-0.079 -0.033	-0.060 -0.060	-0.042 0.063	-0.006
62	-0.008 -0.005	-0.064 0.086	-0.063 0.035	-0.043 0.236	-0.061 -1.142	-0.080 -0.034	-0.063 -0.063	-0.042 0.073	-0.006
70	-0.025 -0.005	-0.019 -0.010	-0.060 -0.037	-0.008 -0.006	-0.017 -0.007	-0.142 -0.443	-0.013 -0.014	-0.001 -0.012	-0.005
76	0.017 -0.002	-0.032 -0.017	0.002 -0.086	-0.028 -0.045	-0.053 -0.061	-0.046 -0.019	0.075 -0.374	-0.029 -0.015	-0.002
90	-0.165 -0.012	0.030 0.044	-0.047 0.124	-0.010 0.101	0.014 0.148	-0.038 -0.016	-0.015 -0.016	0.033 -0.757	-0.012

Table C-82. A complete set of price elasticities for products in food basket of Central Sierra large cities (ENCA 22-1)

SECTOR - 22 - , STRATUM - 1 -

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
1	-1.233 -0.109	-0.196 -0.079	0.183 -0.003	0.335 0.091	-0.078 0.157	0.117 0.798	0.057 0.019	0.040 0.043	0.626
3	-0.746 -0.065	-0.958 -0.047	0.284 -0.001	0.326 0.094	-0.059 0.161	0.188 0.894	0.053 0.018	-0.000 0.004	0.571
4	1.140 0.094	0.476 0.069	-0.519 -0.002	-0.439 -0.161	0.237 -0.328	-0.193 -1.273	-0.167 -0.056	-0.109 -0.111	-0.907
6	0.082 0.007	0.021 0.005	-0.013 -0.000	-0.040 -0.010	0.013 -0.019	-0.011 -0.077	-0.009 -0.003	-0.006 -0.006	-0.057
7	-0.381 -0.034	-0.076 -0.025	0.176 -0.001	0.215 0.039	-0.976 0.058	0.072 0.416	0.008 0.003	0.016 0.018	0.586
13	0.038 0.003	0.020 0.002	-0.007 -0.000	-0.020 -0.008	0.007 -0.018	-0.025 -0.059	-0.010 -0.003	0.001 0.001	-0.056
17	0.009 0.002	0.002 0.001	-0.000 0.001	0.018 -0.000	0.001 0.015	0.011 0.004	0.172 -0.001	0.008 0.008	0.001
27	0.040 0.006	-0.001 0.004	-0.007 0.002	0.036 0.008	0.006 0.043	0.038 -0.060	0.047 0.016	0.533 -0.139	0.055
33	2.597 0.235	0.624 0.170	-0.566 0.012	-0.777 -0.278	0.525 -0.371	-0.461 -3.120	-0.009 -0.003	0.199 0.185	0.916

Table C-82. (continued)

SECTOR - 22 - , STRATUM - 1 -

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
44	-0.268 -0.394	-0.045 -0.044	0.037 -0.023	0.015 0.019	-0.019 -0.010	-0.007 0.145	-0.041 -0.014	-0.014 -0.013	0.120
48	-0.342 -0.079	-0.056 -0.265	0.049 -0.005	0.052 0.025	-0.023 0.012	0.009 0.201	-0.022 -0.007	-0.005 -0.004	0.162
49	-0.042 -0.056	-0.007 -0.007	0.005 -0.084	-0.008 0.003	-0.003 -0.010	-0.007 0.018	-0.016 -0.005	-0.006 -0.006	0.016
58	0.274 0.016	0.076 0.012	-0.092 -0.006	-0.275 -2.182	0.020 -0.070	-0.153 0.776	-0.160 -0.053	-0.033 -0.036	-0.263
59	0.031 0.002	0.009 0.001	-0.010 -0.001	-0.031 0.005	0.003 -0.303	-0.017 0.136	-0.018 -0.006	-0.005 -0.005	-0.032
60	0.187 0.011	0.057 0.009	-0.054 -0.004	-0.168 0.066	0.019 0.040	-0.090 -0.926	-0.099 -0.033	-0.061 -0.061	-0.228
70	-0.023 -0.005	-0.006 -0.003	0.001 -0.002	-0.048 0.001	-0.004 -0.039	-0.028 -0.012	-0.062 -0.389	-0.020 -0.020	-0.004
76	0.041 0.006	0.000 0.004	-0.008 0.002	0.033 0.007	0.007 0.040	0.035 -0.064	0.044 0.015	-0.140 0.518	0.051

Table C-83. A complete set of price elasticities for products in food basket of Central Sierra towns (ENCA 22-2)

SECTOR – 22 – , STRATUM – 2 –

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
1	-1.218 -0.091	0.058 -0.073	0.147 -0.009	-0.463 0.417	0.259 0.157	-0.287 0.077	-0.060 -0.008	0.039 0.015	0.135
3	0.077 0.006	-0.177 0.005	0.026 0.001	0.091 -0.039	-0.008 -0.016	0.077 -0.008	0.003 0.000	0.004 0.001	0.003
4	0.810 0.059	0.140 0.046	-0.839 0.004	0.949 -0.667	-0.241 -0.327	0.358 -0.152	-0.010 -0.001	-0.060 -0.049	-0.162
6	-0.120 -0.009	0.021 -0.008	0.051 -0.001	-0.462 0.154	0.093 0.062	-0.100 0.029	-0.016 -0.002	0.015 0.007	0.049
7	0.390 0.029	-0.011 0.023	-0.062 0.002	0.477 -0.345	-0.220 -0.160	0.209 -0.075	0.007 0.001	-0.034 -0.022	-0.099
13	-0.085 -0.007	0.020 -0.006	0.023 -0.001	-0.121 0.065	0.045 0.018	-0.239 0.009	-0.018 -0.003	-0.000 -0.009	0.035
17	-0.004 -0.001	-0.009 -0.001	-0.001 -0.001	-0.025 -0.008	-0.006 -0.018	-0.021 -0.004	-0.210 -0.045	-0.004 -0.007	-0.001
27	0.043 0.001	-0.018 -0.000	-0.015 -0.002	0.004 -0.109	-0.042 -0.095	-0.041 -0.042	-0.058 -0.008	-0.512 0.061	-0.040
33	0.578 0.040	-0.009 0.030	-0.132 0.000	0.655 -0.780	-0.318 -0.420	0.393 -0.192	-0.062 -0.009	-0.161 -0.085	-0.462

Table C-83. (continued)

SECTOR - 22 - . STRATUM - 2 -

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
44	-0.316 -0.348	-0.000 -0.041	0.035 -0.026	-0.158 0.092	0.055 0.010	-0.106 0.013	-0.055 -0.008	0.004 -0.007	0.033
48	-0.323 -0.052	0.009 -0.143	0.038 -0.005	-0.139 0.104	0.064 0.029	-0.089 0.017	-0.032 -0.005	0.008 -0.001	0.035
49	-0.041 -0.042	-0.008 -0.006	0.003 -0.201	-0.040 0.004	0.001 -0.015	-0.030 -0.002	-0.028 -0.004	-0.003 -0.007	0.003
58	0.170 0.010	-0.041 0.007	-0.055 -0.002	0.159 -0.817	-0.118 -0.114	0.031 0.053	-0.064 -0.009	-0.043 -0.057	-0.075
59	0.065 0.004	-0.017 0.002	-0.022 -0.001	0.057 -0.064	-0.048 -0.389	0.007 0.086	-0.029 -0.004	-0.021 -0.024	-0.031
60	0.087 0.004	-0.029 0.003	-0.034 -0.002	0.067 0.153	-0.072 0.251	-0.005 -1.003	-0.051 -0.007	-0.040 -0.041	-0.048
70	-0.012 -0.004	-0.029 -0.004	-0.005 -0.003	-0.079 -0.026	-0.020 -0.058	-0.065 -0.013	-0.186 -0.619	-0.012 -0.021	-0.003
76	0.030 0.001	-0.006 0.001	-0.010 -0.001	0.021 -0.105	-0.023 -0.064	-0.026 -0.029	-0.019 -0.003	0.071 -0.107	-0.017

Table C-84. A complete set of price elasticities for products in food basket of Central Sierra rural areas (ENCA 22-3)

SECTOR - 22 - , STRATUM - 3 -

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
1	-1.770 -0.107	0.126 -0.106	0.182 -0.011	0.541 -0.020	0.151 -0.033	0.094 -0.016	-0.035 -0.018	-0.000 -0.007	0.022
3	0.059 0.004	-0.693 0.003	0.143 0.000	0.046 0.023	0.074 0.032	0.195 0.017	-0.001 -0.000	0.015 0.009	0.058
4	0.183 0.011	0.395 0.010	-1.414 0.000	0.168 -0.025	0.123 -0.035	0.031 -0.020	-0.022 -0.011	-0.004 -0.007	-0.000
6	0.134 0.008	0.013 0.007	0.044 0.000	-0.569 -0.010	0.048 -0.014	-0.010 -0.008	-0.013 -0.007	-0.002 -0.004	0.013
7	0.132 0.008	0.175 0.008	0.108 0.001	0.193 -0.006	-0.637 -0.008	0.170 -0.004	0.003 0.002	0.004 0.003	-0.060
13	0.014 0.000	0.022 -0.001	-0.001 -0.001	-0.045 -0.065	0.003 -0.090	-0.547 -0.049	-0.030 -0.016	-0.035 -0.028	0.010
17	-0.005 -0.001	-0.043 -0.002	-0.009 -0.001	-0.047 -0.006	-0.020 -0.020	-0.053 -0.005	-0.460 -0.084	-0.006 -0.009	-0.000
27	0.004 -0.000	0.014 -0.001	-0.008 -0.001	-0.044 -0.075	-0.014 -0.103	-0.360 -0.055	-0.027 -0.014	-0.051 -0.012	-0.015
33	0.167 0.009	1.337 0.007	-0.012 -0.000	0.384 -0.313	-0.660 -0.424	0.598 -0.228	-0.040 -0.021	-0.102 -0.085	-1.752

Table C-84. (continued)

SECTOR - 22 - , STRATUM - 3 -

	1 44	3 48	4 49	6 58	7 59	13 60	17 70	27 76	33
44	-0.578 -0.465	-0.003 -0.077	0.050 -0.046	0.127 -0.013	0.028 -0.031	-0.024 -0.010	-0.039 -0.020	-0.006 -0.012	0.007
48	-0.419 -0.056	0.002 -0.310	0.037 -0.006	0.097 -0.009	0.023 -0.020	-0.012 -0.007	-0.025 -0.013	-0.004 -0.007	0.005
49	-0.074 -0.057	-0.043 -0.011	-0.002 -0.497	-0.031 -0.008	-0.016 -0.023	-0.055 -0.006	-0.031 -0.016	-0.006 -0.010	0.000
58	-0.014 -0.001	-0.023 -0.003	-0.025 -0.001	-0.088 -0.398	-0.035 -0.071	-0.362 0.031	-0.040 -0.021	-0.040 -0.033	-0.023
59	-0.008 -0.001	-0.012 -0.002	-0.016 -0.001	-0.057 -0.031	-0.026 -0.343	-0.253 0.052	-0.028 -0.015	-0.029 -0.024	-0.017
60	-0.014 -0.001	-0.024 -0.003	-0.024 -0.001	-0.087 0.042	-0.034 0.098	-0.352 -0.561	-0.039 -0.020	-0.039 -0.032	-0.022
70	-0.005 -0.001	-0.048 -0.002	-0.010 -0.001	-0.053 -0.007	-0.022 -0.022	-0.060 -0.006	-0.148 -0.459	-0.006 -0.010	-0.001
76	0.002 -0.000	0.006 -0.001	-0.005 -0.001	-0.027 -0.042	-0.010 -0.058	-0.200 -0.032	-0.017 -0.009	-0.007 -0.062	-0.010

Table C-85. A complete set of price elasticities for products in food basket of South Coast large cities (ENCA 31-1)

	SECTOR – 31 – , STRATUM – 1 –								
	1 62	6 70	13 76	17 90	25	27	48	59	60
1	0.018 -0.011	-0.011 -0.003	-0.027 -0.004	-0.005 0.010	0.000	-0.004	-0.002	-0.010	-0.037
6	-0.004 -0.010	0.010 -0.002	-0.017 -0.002	-0.003 -0.036	0.000	-0.002	0.000	0.002	0.021
13	-0.043 -0.080	-0.052 -0.002	0.368 0.001	-0.004 0.109	-0.004	0.001	0.003	-0.039	-0.317
17	-0.002 -0.001	-0.004 -0.044	-0.001 -0.001	-0.011 -0.001	-0.000	-0.001	-0.000	-0.004	-0.003
25	0.001 -0.007	0.001 -0.002	-0.013 -0.002	-0.004 -0.013	-0.013	-0.002	-0.001	-0.002	-0.000
27	-0.008 -0.030	-0.013 -0.006	-0.001 -0.009	-0.010 -0.001	-0.001	0.003	-0.001	-0.017	-0.066
48	-0.016 -0.002	-0.016 -0.012	0.003 -0.005	-0.020 -0.008	-0.002	-0.005	-0.214	-0.015	-0.002
59	-0.007 -0.272	-0.003 -0.005	-0.014 -0.005	-0.008 -0.101	-0.001	-0.005	-0.000	0.641	-0.346
60	-0.033 -0.678	-0.022 -0.027	-0.091 -0.028	-0.043 -0.438	-0.004	-0.028	-0.003	-0.299	1.007

Table C-85. (continued)

SECTOR - 31 - , STRATUM - 1 -

	1 62	6 70	13 76	17 90	25	27	48	59	60
62	-0.033 1.549	-0.064 -0.032	-0.061 -0.032	-0.051 0.098	-0.006	-0.032	-0.004	-0.534	-1.609
70	-0.020 -0.011	-0.039 -0.410	-0.013 -0.012	-0.082 -0.008	-0.004	-0.012	-0.004	-0.037	-0.030
76	-0.008 -0.030	-0.013 -0.006	-0.001 0.003	-0.010 -0.001	-0.001	-0.009	-0.001	-0.017	-0.066
90	0.021 0.254	-0.162 -0.007	0.150 -0.001	-0.010 2.449	-0.006	-0.001	-0.003	-0.438	-2.411

Table C-86. A complete set of price elasticities for products in food basket of South Coast towns (ENCA 31-2)

SECTOR - 31 - , STRATUM - 2 -

	1 62	6 70	13 76	17 90	25	27	48	59	60
1	-0.085 -0.024	0.009 -0.008	0.006 -0.003	-0.009 -0.014	-0.003	-0.003	-0.008	-0.010	-0.022
6	0.007 -0.008	-0.029 -0.002	0.003 -0.000	-0.002 0.004	-0.001	-0.001	0.001	-0.004	-0.012
13	0.004 -0.030	-0.005 -0.012	-0.096 -0.023	-0.014 -0.016	0.000	-0.020	-0.000	-0.017	-0.032
17	-0.012 -0.002	-0.032 -0.070	-0.012 -0.005	-0.346 -0.003	-0.002	-0.006	-0.002	-0.027	-0.042
25	-0.024 -0.016	-0.016 0.000	0.008 -0.000	0.000 -0.001	0.069	-0.001	-0.002	-0.002	-0.011
27	-0.016 -0.054	-0.036 -0.029	-0.038 0.110	-0.033 -0.027	-0.002	-0.390	-0.002	-0.043	-0.072
48	-0.046 -0.012	-0.021 -0.023	-0.007 -0.005	-0.027 -0.008	-0.003	-0.006	-0.286	-0.026	-0.042
59	-0.002 0.065	-0.005 -0.002	-0.003 -0.006	-0.003 0.017	-0.000	-0.005	-0.000	-0.143	0.037
60	-0.007 0.047	-0.018 -0.009	-0.008 -0.007	-0.010 0.037	-0.001	-0.007	-0.001	0.014	-0.229

Table C-86. (continued)

SECTOR - 31 - , STRATUM - 2 -

	1 62	6 70	13 76	17 90	25	27	48	59	60
62	-0.053 -0.934	-0.095 -0.060	-0.062 -0.053	-0.070 -0.090	-0.006	-0.054	-0.007	0.076	0.077
70	-0.008 -0.001	-0.022 -0.200	-0.008 -0.003	-0.082 -0.002	-0.001	-0.004	-0.001	-0.019	-0.029
76	-0.019 -0.055	-0.045 -0.036	-0.047 -0.483	-0.042 -0.032	-0.002	0.103	-0.003	-0.054	-0.083
90	-0.047 -0.179	-0.021 -0.036	-0.051 -0.054	-0.043 -0.595	-0.003	-0.048	-0.006	0.040	0.234

Table C-87. A complete set of price elasticities for products in food basket of South Coast rural areas (ENCA 31-3)

SECTOR – 31 – , STRATUM – 3 –

	1 62	6 70	13 76	17 90	25	27	48	59	60
1	-0.537 -0.031	0.031 -0.018	0.052 -0.013	-0.057 -0.036	-0.030	-0.013	-0.034	-0.053	-0.028
6	0.044 -0.007	-0.235 -0.006	0.029 -0.002	-0.019 0.009	-0.011	-0.002	0.001	-0.023	-0.028
13	0.064 -0.038	0.012 -0.020	-0.532 -0.060	-0.063 -0.041	-0.000	-0.060	-0.001	-0.063	-0.040
17	-0.010 -0.003	-0.030 -0.046	-0.007 -0.005	-0.211 -0.004	-0.004	-0.005	-0.002	-0.019	-0.012
25	-0.096 -0.010	-0.092 -0.008	0.020 -0.005	-0.025 -0.005	-0.064	-0.005	-0.007	-0.024	-0.019
27	-0.029 -0.041	-0.074 -0.022	-0.075 0.145	-0.070 -0.038	-0.010	-0.599	-0.007	-0.071	-0.051
48	-0.157 -0.012	-0.023 -0.014	0.007 -0.009	-0.043 -0.014	-0.012	-0.009	-0.244	-0.034	-0.020
59	-0.019 0.055	-0.039 -0.007	-0.017 -0.016	-0.021 0.023	-0.004	-0.016	-0.003	-0.288	0.062
60	-0.022 0.116	-0.093 -0.017	-0.022 -0.021	-0.053 0.110	-0.009	-0.021	-0.005	0.039	-0.720

Table C-87. (continued)

SECTOR - 31 - , STRATUM - 3 -

	1 62	6 70	13 76	17 90	25	27	48	59	60
62	-0.081 -0.743	-0.098 -0.022	-0.073 -0.062	-0.069 -0.113	-0.014	-0.062	-0.010	0.117	0.297
70	-0.022 -0.007	-0.065 -0.425	-0.015 -0.011	-0.137 -0.008	-0.008	-0.011	-0.005	-0.041	-0.026
76	-0.029 -0.041	-0.074 -0.022	-0.075 -0.599	-0.070 -0.038	-0.010	0.145	-0.007	-0.071	-0.051
90	-0.103 -0.137	0.007 -0.016	-0.087 -0.064	-0.050 -0.574	-0.008	-0.064	-0.009	0.058	0.378

Table C-88. A complete set of price elasticities for products in food basket of South Sierra large cities (ENCA 32-1)

SECTOR - 32 - , STRATUM - 1 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
1	-0.329 -0.006	-0.010 -0.057	0.048 -0.039	0.055 -0.063	0.015 -0.007	0.038	-0.000	-0.025	0.005
3	-0.042 -0.022	0.971 -0.142	0.022 -0.034	-0.036 -0.204	-0.144 0.037	0.003	-0.081	0.023	-0.068
6	0.014 -0.002	-0.000 -0.013	-0.074 -0.010	0.012 -0.015	0.003 -0.001	-0.002	-0.001	-0.006	-0.001
7	0.111 -0.017	-0.017 -0.116	0.079 -0.077	-0.456 -0.130	0.004 -0.007	-0.013	-0.016	-0.047	-0.011
8	0.235 -0.067	-0.412 -0.433	0.240 -0.163	0.029 -0.580	1.230 0.071	-0.032	-0.190	-0.008	-0.161
13	0.017 -0.008	-0.001 -0.028	-0.011 -0.021	0.001 -0.029	-0.001 0.002	-0.127	-0.000	-0.014	0.003
16	-0.041 0.746	-1.613 -4.256	-0.563 -1.429	-0.777 -5.814	-1.332 -0.885	-0.041	19.707	-0.100	-3.602
17	-0.001 -0.002	-0.000 -0.004	-0.006 -0.005	-0.000 -0.002	0.000 -0.036	-0.003	-0.000	-0.047	0.000
23	0.562 -0.599	-1.367 -3.241	-0.317 -1.120	-0.548 -4.411	-1.127 0.716	0.934	-3.602	0.089	14.165

Table C-88. (continued)

SECTOR - 32 - , STRATUM - 1 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
27	-0.008 0.066	-0.007 -0.085	-0.031 -0.047	-0.008 -0.102	-0.006 -0.093	-0.033	0.009	-0.036	-0.007
58	-0.013 -0.015	-0.008 -0.471	-0.037 0.067	-0.010 0.118	-0.006 0.001	-0.023	-0.009	-0.028	-0.007
59	-0.007 -0.007	-0.003 0.087	-0.018 -0.327	-0.005 0.106	-0.002 -0.000	-0.012	-0.003	-0.013	-0.002
60	-0.019 -0.022	-0.012 0.117	-0.053 0.083	-0.014 -0.615	-0.009 0.002	-0.032	-0.013	-0.041	-0.010
70	-0.006 -0.023	-0.001 -0.013	-0.039 -0.027	-0.001 0.001	0.001 -0.444	-0.014	-0.002	-0.093	0.002

Table C-89. A complete set of price elasticities for products in food basket of South Sierra towns (ENCA 32-2)

SECTOR - 32 - , STRATUM - 2 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
1	-1.791 0.002	-0.119 -0.539	0.438 -0.046	0.592 0.031	0.164 -0.002	0.687	-0.002	-0.015	0.230
3	-0.040 -0.010	-0.404 -0.147	0.049 -0.040	0.100 -0.004	0.023 -0.003	-0.017	-0.002	-0.022	-0.009
6	0.049 -0.000	0.022 -0.045	-0.390 -0.023	0.056 -0.006	0.039 -0.002	-0.010	0.000	-0.014	-0.003
7	0.149 0.004	0.067 -0.128	0.076 -0.073	-1.183 -0.020	0.121 -0.005	-0.008	0.002	-0.043	-0.002
8	0.109 -0.024	0.049 -0.156	0.224 -0.037	0.327 -0.001	-0.743 -0.003	-0.137	-0.005	-0.021	-0.054
13	0.035 -0.014	-0.002 -0.186	-0.019 -0.041	0.016 -0.000	-0.011 -0.003	-0.324	0.003	-0.022	0.055
16	-0.014 0.017	-0.038 -0.744	0.051 -0.031	0.101 0.057	-0.058 0.000	0.541	0.010	0.000	0.100
17	-0.006 0.001	-0.015 -0.007	-0.053 -0.036	-0.009 -0.001	-0.008 -0.059	-0.095	-0.001	-0.553	-0.033
23	0.033 0.003	-0.004 -0.214	-0.019 -0.043	0.016 0.002	-0.013 -0.002	0.157	0.001	-0.022	-0.415

Table C-89. (continued)

SECTOR - 32 - , STRATUM - 2 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
27	-0.005 0.709	-0.059 -1.271	-0.078 -0.139	0.008 0.058	-0.054 0.014	-0.448	0.001	-0.025	-0.024
58	-0.035 -0.050	-0.046 -0.902	-0.109 0.098	-0.037 0.136	-0.024 -0.008	-0.322	-0.005	-0.064	-0.122
59	-0.007 -0.010	-0.016 0.480	-0.042 -0.799	-0.021 0.102	-0.008 -0.003	-0.106	-0.001	-0.021	-0.038
60	0.290 0.458	-0.090 27.569	-0.463 6.766	-0.669 -34.101	-0.013 0.013	0.033	0.057	0.019	0.130
70	-0.006 0.009	-0.018 -0.022	-0.061 -0.043	-0.010 -0.000	-0.009 -0.261	-0.112	-0.001	-0.433	-0.037

Table C-90. A complete set of price elasticities for products in food basket of South Sierra rural areas (ENCA 32-3)

SECTOR - 32 - , STRATUM - 3 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
1	-3.668 0.060	-0.212 -0.064	0.542 -0.043	0.458 -0.051	0.562 -0.016	0.938	0.289	-0.024	0.305
3	-0.018 0.001	-0.334 -0.017	0.026 -0.013	0.018 -0.013	0.029 -0.005	-0.011	0.007	-0.007	0.004
6	0.103 -0.000	0.036 -0.019	-0.553 -0.015	0.059 -0.015	0.081 -0.006	-0.050	-0.000	-0.008	-0.005
7	0.100 0.002	0.049 -0.017	0.080 -0.003	-0.395 -0.013	0.084 -0.001	0.047	-0.002	-0.002	-0.001
8	0.118 -0.001	0.039 -0.022	0.087 -0.019	0.069 -0.018	-0.661 -0.007	-0.074	-0.000	-0.011	-0.006
13	0.028 -0.022	-0.025 -0.010	-0.019 -0.025	-0.016 -0.010	-0.016 -0.010	-0.587	0.031	-0.015	0.019
16	0.158 -0.009	0.028 -0.058	-0.002 -0.017	-0.018 -0.044	0.003 -0.006	0.719	-1.294	-0.009	0.128
17	-0.002 -0.001	-0.044 -0.012	-0.027 -0.013	-0.030 -0.007	-0.022 -0.066	-0.151	-0.009	-0.427	-0.019
23	0.083 0.016	0.007 -0.034	-0.006 -0.015	-0.012 -0.027	-0.003 -0.005	0.279	0.062	-0.008	-0.712

Table C-90. (continued)

SECTOR - 32 - . STRATUM - 3 -

	1 27	3 58	6 59	7 60	8 70	13	16	17	23
27	0.166 1.858	-0.024 -0.339	-0.040 -0.058	-0.020 -0.257	-0.036 -0.014	-2.531	-0.060	-0.025	0.154
58	-0.012 -0.023	-0.079 -0.749	-0.050 0.095	-0.055 0.127	-0.043 -0.016	-0.203	-0.031	-0.024	-0.047
59	-0.009 -0.005	-0.054 0.170	-0.036 -0.451	-0.026 0.145	-0.034 -0.009	-0.281	-0.013	-0.014	-0.026
60	-0.014 -0.024	-0.052 0.168	-0.058 0.109	-0.061 -0.839	-0.051 -0.018	-0.269	-0.034	-0.027	-0.054
70	-0.002 -0.000	-0.033 -0.009	-0.020 -0.010	-0.022 -0.005	-0.016 -0.255	-0.113	-0.007	-0.113	-0.014

Table C-91. A complete set of price elasticities for products in food basket of High Jungle towns (ENCA 41-2)

SECTOR - 41 - , STRATUM - 2 -

	1 60	6 62	13 70	14	17	21	27	33	59
1	-0.403 -0.033	0.079 -0.028	0.014 -0.005	0.021	-0.025	-0.031	0.000	0.010	-0.044
6	0.067 -0.029	-0.431 -0.026	0.010 -0.006	0.025	-0.028	-0.037	0.001	0.009	-0.042
13	0.010 -0.062	0.001 -0.058	-0.901 -0.012	0.114	-0.058	-0.053	0.010	0.083	-0.089
14	0.224 -0.309	0.307 -0.228	0.496 -0.003	-0.673	-0.013	0.094	-0.012	0.191	-0.295
17	-0.007 -0.009	-0.007 -0.006	-0.001 -0.047	-0.001	-0.117	-0.005	-0.000	-0.007	-0.013
21	-0.043 0.004	-0.064 0.000	-0.028 0.002	0.022	0.007	0.206	0.001	0.014	0.005
27	-0.035 -0.204	-0.036 0.032	0.009 -0.016	-0.008	-0.074	-0.026	-0.629	-0.097	-0.205
33	0.035 0.026	0.040 0.029	0.065 0.000	0.026	0.002	0.007	-0.022	-0.200	0.028
59	-0.022 0.074	-0.022 0.024	-0.008 -0.006	-0.015	-0.026	-0.010	-0.019	-0.006	-0.424

Table C-91. (continued)

SECTOR - 41 - . STRATUM - 2 -

	1 60	6 62	13 70	14	17	21	27	33	59
60	-0.029 -0.631	-0.028 0.106	-0.009 -0.008	-0.021	-0.036	-0.014	-0.029	-0.009	0.082
62	-0.034 0.156	-0.035 -0.671	-0.016 -0.008	-0.023	-0.036	-0.015	0.017	-0.001	0.032
70	-0.030 -0.039	-0.033 -0.026	-0.006 -0.609	-0.004	-0.135	-0.021	-0.002	-0.032	-0.060

Table C-92. A complete set of price elasticities for products in food basket of High Jungle rural areas (ENCA 41-3)

SECTOR - 41 - , STRATUM - 3 -

	1 60	6 62	13 70	14	17	21	27	33	59
1	-0.411 -0.025	0.126 -0.030	0.071 -0.007	-0.006	-0.017	-0.026	-0.007	-0.024	-0.040
6	0.103 -0.023	-0.453 -0.029	0.076 -0.008	-0.003	-0.020	-0.034	-0.007	-0.022	-0.039
13	0.083 -0.056	0.108 -0.067	-0.720 -0.015	0.035	-0.035	-0.023	-0.015	-0.024	-0.087
14	0.010 -0.028	0.022 -0.022	0.068 0.002	0.108	0.004	0.017	-0.002	-0.052	-0.028
17	-0.017 -0.003	-0.019 -0.011	-0.007 -0.053	-0.015	-0.345	-0.011	-0.006	-0.039	-0.019
21	-0.037 -0.015	-0.059 -0.015	-0.008 -0.001	0.015	-0.003	0.086	-0.002	-0.006	-0.018
27	-0.029 -0.091	-0.033 0.024	-0.021 -0.014	-0.024	-0.032	-0.018	-0.352	-0.051	-0.106
33	0.009 0.011	0.016 0.014	0.019 0.004	-0.019	0.009	0.004	0.003	0.117	0.019
59	-0.038 0.136	-0.041 0.051	-0.037 -0.012	-0.031	-0.029	-0.020	-0.032	-0.036	-0.580

Table C-92. (continued)

SECTOR - 41 - , STRATUM - 3 -

	1 60	6 62	13 70	14	17	21	27	33	59
60	-0.070 -1.228	-0.076 0.262	-0.068 -0.023	-0.058	-0.053	-0.036	-0.070	-0.068	0.239
62	-0.047 0.211	-0.051 -0.771	-0.047 -0.014	-0.036	-0.033	-0.023	0.011	-0.040	0.071
70	-0.017 -0.003	-0.019 -0.011	-0.007 -0.270	-0.015	-0.124	-0.011	-0.005	-0.038	-0.019

Table C-93. A complete set of price elasticities for products in food basket of Low Jungle large cities (ENCA 42-1)

SECTOR - 42 - , STRATUM - 1 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
1	0.117 -0.026	-0.011 -0.002	-0.005 -0.001	-0.031 -0.008	-0.004	0.002	-0.045	-0.008	-0.028
6	-0.008 -0.011	-0.024 -0.003	0.003 -0.002	-0.005 -0.004	-0.007	0.000	-0.011	-0.009	-0.011
13	-0.036 -0.087	-0.006 -0.022	-0.095 -0.013	-0.042 -0.005	-0.042	0.002	-0.084	-0.058	-0.085
14	-0.152 -0.127	-0.024 0.007	-0.050 0.007	1.119 0.061	0.022	0.023	-0.434	-0.001	-0.145
17	-0.002 -0.002	-0.003 -0.001	-0.000 -0.012	-0.000 -0.001	-0.029	-0.000	-0.002	-0.004	-0.002
31	0.058 0.046	0.025 -0.000	0.021 0.004	0.104 -0.015	0.013	0.199	-0.343	0.016	0.051
33	-0.035 -0.025	-0.007 0.003	-0.014 0.002	-0.073 0.015	0.006	-0.013	0.256	0.002	-0.030
59	-0.006 0.025	-0.008 0.012	-0.003 -0.003	-0.003 -0.003	-0.008	-0.000	-0.006	-0.167	0.055
60	-0.035 0.023	-0.042 0.029	-0.013 -0.014	-0.022 -0.027	-0.047	0.000	-0.046	0.034	-0.487

Table C-93. (continued)

SECTOR - 42 - , STRATUM - 1 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
62	-0.033 -0.397	-0.040 -0.001	-0.013 -0.013	-0.019 -0.023	-0.044	0.000	-0.041	-0.003	0.025
66	-0.012 0.014	-0.022 -0.368	-0.009 -0.006	-0.001 0.001	-0.019	-0.001	-0.006	0.046	0.123
70	-0.012 -0.014	-0.021 -0.005	-0.002 -0.218	-0.003 -0.007	-0.056	-0.001	-0.015	-0.025	-0.013
76	-0.006 -0.036	0.007 0.009	0.004 0.007	0.024 0.254	0.021	-0.001	0.043	0.015	-0.046

Table C-94. A complete set of price elasticities for products in food basket of Low Jungle towns (ENCA 42-2)

SECTOR - 42 - , STRATUM - 2 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
1	-0.512 -0.031	0.164 -0.012	0.034 -0.004	-0.030 -0.011	-0.028	-0.002	0.023	-0.032	-0.027
6	0.108 -0.023	-0.831 -0.024	0.056 -0.006	0.042 -0.009	-0.044	-0.002	0.029	-0.030	-0.009
13	0.149 -0.157	0.378 -0.016	-0.789 -0.010	-0.371 -0.066	-0.071	-0.010	0.087	-0.144	-0.172
14	0.015 -0.068	0.172 0.048	-0.081 0.008	0.953 0.053	0.055	0.010	-0.081	-0.040	-0.117
17	-0.010 -0.003	-0.010 -0.001	-0.000 -0.074	-0.019 -0.007	-0.240	0.003	-0.013	-0.011	-0.003
31	-0.118 -0.004	-0.147 0.000	-0.026 -0.025	-0.073 -0.043	-0.180	-2.432	0.096	-0.072	-0.004
33	0.031 -0.027	0.066 -0.007	0.024 -0.002	-0.095 -0.017	-0.016	0.034	-0.212	-0.025	-0.026
59	-0.031 0.097	-0.025 0.057	-0.015 -0.006	-0.068 -0.034	-0.041	0.008	-0.034	-0.791	0.193
60	-0.047 0.120	-0.031 0.086	-0.024 -0.009	-0.124 -0.059	-0.068	0.012	-0.055	0.180	-1.123

Table C-94. (continued)

SECTOR - 42 - , STRATUM - 2 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
62	-0.052 -0.956	-0.047 0.014	-0.025 -0.009	-0.102 -0.053	-0.066	0.012	-0.057	0.095	0.139
66	-0.235 0.398	-0.658 -4.545	-0.055 0.000	0.713 0.146	0.000	0.022	-0.138	1.821	2.539
70	-0.031 -0.010	-0.029 -0.002	-0.001 -0.753	-0.058 -0.021	-0.176	0.009	-0.038	-0.034	-0.010
76	-0.006 -0.088	0.014 0.015	-0.019 -0.000	0.057 0.206	-0.002	0.005	-0.028	-0.071	-0.116

Table C-95. A complete set of price elasticities for products in food basket of Low Jungle rural areas (ENCA 42-3)

SECTOR - 42 - , STRATUM - 3 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
1	-0.872 -0.028	0.126 -0.059	0.062 -0.003	0.013 0.016	-0.040	-0.003	-0.060	-0.009	-0.018
6	0.133 -0.032	-1.045 -0.071	0.076 -0.004	0.020 0.020	-0.048	-0.004	-0.075	-0.009	-0.022
13	1.142 -0.339	1.262 -0.296	-1.094 -0.003	-0.927 -0.324	-0.038	-0.024	0.327	-0.455	-0.061
14	0.056 -0.002	0.061 0.014	-0.029 0.001	0.207 -0.003	0.016	-0.000	0.050	-0.015	0.006
17	-0.010 -0.012	-0.007 -0.031	-0.001 -0.047	-0.044 -0.002	-0.339	-0.000	-0.074	-0.008	-0.001
31	-0.156 0.019	-0.154 -0.032	-0.060 -0.005	-0.122 0.061	-0.063	-1.649	0.716	0.026	0.025
33	0.012 -0.008	0.014 -0.012	0.006 -0.001	-0.008 -0.008	-0.006	0.006	-0.117	-0.007	-0.003
59	-0.015 0.049	-0.007 0.014	-0.026 -0.004	-0.111 -0.041	-0.046	0.001	-0.148	-0.801	0.128
60	-0.098 0.223	-0.097 0.155	-0.017 -0.005	-0.053 -0.063	-0.053	0.003	-0.205	0.588	-1.553

Table C-95. (continued)

SECTOR - 42 - , STRATUM - 3 -

	1 62	6 66	13 70	14 76	17	31	33	59	60
62	-0.022 -0.512	-0.018 -0.036	-0.018 -0.003	-0.073 -0.033	-0.035	0.001	-0.116	0.055	0.048
66	-0.013 -0.004	-0.011 -0.257	-0.008 -0.001	-0.032 -0.016	-0.016	0.001	-0.056	0.032	0.025
70	-0.022 -0.026	-0.015 -0.066	-0.001 -0.571	-0.093 -0.004	-0.249	-0.000	-0.157	-0.017	-0.003
76	0.028 -0.113	0.041 -0.142	-0.049 -0.005	-0.115 -0.476	-0.058	0.004	-0.234	-0.117	-0.037

Table C-96. A complete set of price elasticities for products in food basket of Metropolitan Lima, 1st income bracket (ENCA 50-1)

SECTOR – 50 – . STRATUM – 1 –

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-1.428 -0.002	1.361 -0.088	-0.016 -0.002	0.162 -0.057	-0.032 -0.027	-0.019 -0.037	0.006 -0.017	-0.165 -0.018	-0.086 -0.029
6	0.667 -0.001	-0.583 0.039	-0.045 -0.001	0.348 -0.097	-0.021 -0.040	-0.047 -0.086	0.018 -0.011	-0.388 -0.043	0.038 -0.075
11	-0.208 -0.005	-1.075 -0.017	0.034 -0.005	-0.221 -0.039	-0.086 -0.044	0.008 0.020	-0.022 -0.045	0.341 0.006	-0.016 0.051
13	0.182 -0.001	0.776 0.010	-0.019 -0.001	-0.560 -0.110	-0.024 -0.055	-0.104 -0.099	0.009 -0.013	-0.222 -0.103	0.010 -0.049
17	-0.013 -0.002	-0.029 -0.002	-0.000 -0.001	-0.013 -0.023	-0.230 -0.012	-0.007 -0.004	-0.002 -0.067	-0.001 -0.007	-0.002 -0.005
27	-0.035 -0.003	-0.169 -0.004	0.004 -0.002	-0.149 -0.067	-0.043 -0.043	-0.092 -0.041	-0.004 -0.022	0.036 -0.016	-0.004 -0.006
31	0.072 -0.001	0.366 0.004	-0.016 -0.001	0.091 -0.024	-0.012 -0.003	-0.016 -0.016	-0.130 -0.006	-0.455 -0.015	0.004 -0.031
33	-1.129 -0.003	-5.432 -0.071	0.218 -0.003	-1.393 0.156	-0.056 -0.056	0.164 0.192	-0.318 -0.029	6.425 0.146	-0.069 0.396
44	-0.422 -0.003	0.342 -0.064	-0.005 -0.003	0.028 -0.049	-0.048 -0.025	-0.016 -0.015	-0.001 -0.025	-0.049 -0.016	-0.360 -0.015

Table C-96. (continued)

SECTOR - 50 - , STRATUM - 1 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.005 -0.102	-0.012 -0.001	-0.000 -0.001	-0.005 -0.009	-0.011 -0.005	-0.003 -0.001	-0.001 -0.006	-0.001 -0.003	-0.001 -0.002
48	-0.394 -0.003	0.314 -0.373	-0.005 -0.003	0.024 -0.049	-0.049 -0.025	-0.016 -0.015	-0.001 -0.025	-0.045 -0.016	-0.058 -0.015
49	-0.010 -0.001	-0.023 -0.002	-0.000 -0.199	-0.010 -0.018	-0.021 -0.009	-0.006 -0.003	-0.001 -0.011	-0.001 -0.006	-0.002 -0.004
59	-0.031 -0.002	-0.125 -0.003	0.001 -0.002	-0.061 -0.155	-0.029 0.019	-0.021 -0.007	-0.003 -0.015	0.016 -0.021	-0.003 -0.001
60	-0.027 -0.002	-0.100 -0.003	-0.001 -0.002	-0.058 0.034	-0.029 -0.233	-0.026 0.025	-0.002 -0.015	-0.006 -0.026	-0.003 0.019
62	-0.082 -0.005	-0.330 -0.009	0.003 -0.004	-0.162 -0.071	-0.076 0.005	-0.056 -0.320	-0.007 -0.040	0.039 -0.056	-0.008 0.000
70	-0.024 -0.003	-0.057 -0.004	-0.001 -0.003	-0.024 -0.044	-0.121 -0.023	-0.014 -0.007	-0.003 -0.450	-0.002 -0.014	-0.004 -0.009
76	-0.033 -0.003	-0.160 -0.004	0.003 -0.002	-0.150 -0.068	-0.042 -0.043	-0.016 -0.042	-0.004 -0.022	0.033 -0.090	-0.004 -0.007
90	-0.069 -0.003	-0.356 -0.007	0.012 -0.003	-0.107 -0.027	-0.048 0.024	-0.011 0.013	-0.009 -0.025	0.122 -0.012	-0.006 -0.231

Table C-97. A complete set of price elasticities for products in food basket of Metropolitan Lima, 2nd income bracket (ENCA 50-2)

SECTOR - 50 - , STRATUM - 2 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.231 -0.001	0.051 -0.021	0.067 -0.001	-0.050 -0.025	-0.023 -0.060	-0.012 -0.030	-0.002 -0.014	0.008 -0.012	-0.018 0.015
6	0.034 -0.000	-0.099 0.002	0.034 -0.000	-0.026 -0.038	-0.007 -0.028	-0.004 -0.013	-0.001 -0.004	0.004 -0.005	0.002 0.008
11	0.860 -0.002	0.852 0.070	-13.894 -0.002	1.398 -0.296	-0.041 7.858	-0.116 4.101	-0.046 -0.026	0.567 -0.119	0.062 -1.873
13	-0.059 -0.001	-0.079 -0.006	0.132 -0.001	0.465 -0.024	-0.021 -0.461	-0.013 -0.288	0.000 -0.013	-0.017 -0.013	-0.005 0.079
17	-0.009 -0.001	-0.021 -0.002	-0.001 -0.001	-0.007 -0.018	-0.149 -0.006	-0.007 -0.006	-0.001 -0.060	-0.001 -0.007	-0.002 -0.003
27	-0.014 -0.001	-0.027 -0.002	-0.011 -0.001	-0.014 -0.026	-0.019 -0.096	0.018 -0.073	-0.001 -0.012	0.001 -0.029	-0.002 0.008
31	-0.030 -0.002	-0.063 -0.006	-0.029 -0.002	-0.012 -0.051	-0.053 -0.009	-0.019 -0.015	-0.548 -0.033	0.074 -0.020	-0.005 -0.010
33	0.034 -0.002	-0.003 0.000	0.247 -0.002	-0.091 -0.032	-0.044 -0.073	-0.008 -0.044	0.053 -0.028	-0.701 -0.008	0.001 0.004
44	-0.093 -0.002	-0.020 -0.044	0.022 -0.002	-0.030 -0.040	-0.042 -0.030	-0.016 -0.022	-0.002 -0.026	0.001 -0.016	-0.290 -0.001

Table C-97. (continued)

SECTOR - 5C - , STRATUM - 2 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.020 -0.404	-0.047 -0.004	-0.001 -0.002	-0.017 -0.040	-0.043 -0.013	-0.015 -0.014	-0.002 -0.027	-0.003 -0.015	-0.003 -0.007
48	-0.065 -0.002	-0.025 -0.321	0.019 -0.002	-0.029 -0.041	-0.043 -0.029	-0.016 -0.021	-0.002 -0.027	0.000 -0.016	-0.035 -0.002
49	-0.015 -0.001	-0.035 -0.003	-0.001 -0.302	-0.012 -0.030	-0.032 -0.009	-0.011 -0.011	-0.001 -0.020	-0.002 -0.011	-0.003 -0.006
59	-0.008 -0.001	-0.015 -0.001	-0.011 -0.000	-0.007 -2.981	-0.013 2.349	-0.008 0.623	-0.001 -0.008	0.000 -0.008	-0.001 -0.110
60	-0.076 -0.003	-0.112 -0.010	0.567 -0.002	-0.372 3.987	-0.056 -11.203	-0.082 5.834	-0.001 -0.035	-0.013 -0.083	-0.008 0.783
62	-0.045 -0.003	-0.084 -0.008	0.225 -0.002	-0.190 0.764	-0.063 4.448	-0.057 -5.715	-0.002 -0.039	-0.008 -0.058	-0.006 -0.145
70	-0.022 -0.002	-0.052 -0.005	-0.001 -0.002	-0.018 -0.044	-0.100 -0.014	-0.017 -0.016	-0.002 -0.417	-0.003 -0.017	-0.004 -0.008
76	-0.014 -0.001	-0.027 -0.002	-0.011 -0.001	-0.014 -0.027	-0.019 -0.095	-0.029 -0.073	-0.001 -0.012	0.001 0.016	-0.002 0.008
90	0.023 -0.002	-0.002 -0.000	-0.310 -0.001	0.131 -0.462	-0.039 1.805	0.004 -0.415	-0.002 -0.025	0.002 0.004	-0.000 -1.329

Table C-98. A complete set of price elasticities for products in food basket of Metropolitan Lima, 3rd income bracket (ENCA 50-3)

SECTOR - 50 - , STRATUM - 3 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.101 -0.000	0.093 -0.010	-0.005 -0.000	-0.002 -0.021	-0.008 -0.032	-0.007 -0.016	-0.001 -0.005	0.007 -0.007	-0.011 0.003
6	0.042 -0.001	-0.214 0.003	0.007 -0.000	0.013 -0.011	-0.011 -0.000	-0.001 -0.007	-0.001 -0.008	0.005 -0.001	0.004 -0.002
11	-0.071 -0.001	0.149 -0.008	0.404 -0.001	-0.067 -0.191	-0.028 -0.337	-0.073 -0.146	-0.006 -0.020	0.069 -0.073	-0.008 -0.041
13	-0.012 -0.001	0.011 -0.003	-0.006 -0.001	-0.109 -0.068	-0.027 -0.091	-0.034 -0.050	-0.002 -0.019	0.010 -0.034	-0.002 -0.002
17	-0.002 -0.000	-0.004 -0.000	-0.000 -0.000	-0.001 -0.003	-0.007 -0.002	-0.001 -0.002	-0.000 -0.038	-0.000 -0.001	-0.000 -0.001
27	-0.022 -0.002	-0.025 -0.004	-0.009 -0.001	-0.048 -0.083	-0.033 -0.108	-0.084 -0.061	-0.001 -0.023	0.002 -0.021	-0.003 -0.008
31	-0.032 -0.003	-0.064 -0.006	-0.005 -0.002	-0.028 -0.054	-0.060 -0.032	-0.017 -0.028	-0.653 -0.042	0.086 -0.017	-0.005 -0.010
33	0.016 -0.001	0.020 0.000	0.021 -0.001	0.037 0.007	-0.026 0.035	0.008 0.015	0.045 -0.019	-0.584 0.008	0.001 -0.010
44	-0.057 -0.002	0.016 -0.029	-0.003 -0.001	-0.011 -0.032	-0.030 -0.025	-0.010 -0.018	-0.001 -0.021	0.000 -0.010	-0.255 -0.003

Table C-98. (continued)

SECTOR - 50 - , STRATUM - 3 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.011 -0.250	-0.023 -0.002	-0.001 -0.001	-0.009 -0.020	-0.025 -0.010	-0.006 -0.010	-0.001 -0.017	-0.003 -0.006	-0.002 -0.004
48	-0.047 -0.001	0.016 -0.184	-0.003 -0.001	-0.008 -0.024	-0.023 -0.020	-0.007 -0.014	-0.001 -0.016	0.001 -0.007	-0.026 -0.002
49	-0.011 -0.001	-0.022 -0.002	-0.001 -0.230	-0.008 -0.019	-0.023 -0.009	-0.006 -0.009	-0.001 -0.016	-0.002 -0.006	-0.002 -0.004
59	-0.018 -0.001	-0.024 -0.003	-0.007 -0.001	-0.029 -0.231	-0.024 0.037	-0.025 -0.018	-0.001 -0.017	0.001 -0.025	-0.003 -0.003
60	-0.041 -0.003	-0.044 -0.007	-0.018 -0.002	-0.063 0.016	-0.052 -0.513	-0.053 -0.001	-0.002 -0.036	0.002 -0.053	-0.006 0.031
62	-0.026 -0.002	-0.038 -0.004	-0.010 -0.001	-0.043 -0.044	-0.035 0.013	-0.037 -0.283	-0.001 -0.025	0.002 -0.037	-0.004 -0.001
70	-0.017 -0.002	-0.034 -0.003	-0.001 -0.001	-0.013 -0.030	-0.069 -0.015	-0.009 -0.015	-0.001 -0.355	-0.004 -0.009	-0.003 -0.006
76	-0.022 -0.002	-0.025 -0.004	-0.009 -0.001	-0.048 -0.083	-0.033 -0.108	-0.021 -0.061	-0.001 -0.023	0.002 -0.084	-0.003 -0.008
90	-0.000 -0.001	-0.021 -0.001	-0.008 -0.001	-0.001 -0.011	-0.021 0.146	-0.008 0.007	-0.000 -0.015	-0.006 -0.008	-0.001 -0.389

Table C-99. A complete set of price elasticities for products in food basket of Metropolitan Lima, 4th income bracket (ENCA 50-4)

SECTOR - 50 - , STRATUM - 4 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.074 -0.001	-0.038 -0.092	0.012 -0.000	0.002 0.022	-0.007 0.036	0.004 0.003	0.000 -0.008	-0.005 0.004	-0.009 -0.014
6	-0.021 -0.001	-0.083 -0.022	0.003 -0.000	0.006 -0.012	-0.007 -0.008	-0.002 -0.010	-0.001 -0.008	0.004 -0.002	-0.003 -0.003
11	0.151 -0.004	0.019 0.243	0.389 -0.003	-0.121 -0.523	-0.051 -0.588	-0.241 -0.218	-0.009 -0.060	0.067 -0.238	0.015 -0.099
13	-0.007 -0.001	-0.003 0.006	-0.007 -0.001	-0.112 -0.070	-0.017 -0.072	-0.040 -0.040	-0.002 -0.020	0.009 -0.040	-0.002 -0.001
17	-0.022 -0.002	-0.040 -0.004	-0.000 -0.002	-0.016 -0.033	-0.428 -0.022	-0.011 -0.026	-0.002 -0.096	-0.003 -0.011	-0.004 -0.012
27	-0.011 -0.002	-0.034 0.008	-0.020 -0.001	-0.054 -0.099	-0.025 -0.097	-0.188 -0.060	-0.002 -0.030	0.001 -0.002	-0.003 -0.013
31	-0.025 -0.003	-0.055 -0.001	-0.003 -0.002	-0.026 -0.046	-0.037 -0.032	-0.015 -0.035	-0.628 -0.044	0.065 -0.015	-0.005 -0.014
33	-0.039 -0.002	0.011 -0.032	0.023 -0.001	0.036 0.007	-0.021 0.023	0.006 -0.004	0.050 -0.026	-0.547 0.006	-0.006 -0.021
44	-0.047 -0.000	-0.023 -0.043	0.008 -0.000	0.002 0.015	-0.003 0.024	0.003 0.003	0.000 -0.004	-0.003 0.003	-0.004 -0.008

Table C-99. (continued)

SECTOR – 50 – , STRATUM – 4 –

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.005 -0.107	-0.009 -0.001	-0.000 -0.000	-0.004 -0.008	-0.007 -0.005	-0.002 -0.006	-0.000 -0.008	-0.001 -0.002	-0.001 -0.003
48	-0.421 -0.002	-0.198 -0.276	0.069 -0.001	0.018 0.147	-0.021 0.225	0.028 0.032	0.001 -0.025	-0.029 0.028	-0.037 -0.072
49	-0.014 -0.001	-0.024 -0.002	-0.000 -0.280	-0.009 -0.020	-0.018 -0.013	-0.006 -0.016	-0.001 -0.021	-0.002 -0.006	-0.003 -0.007
59	0.001 -0.002	-0.030 0.018	-0.016 -0.001	-0.033 -0.381	-0.019 0.087	-0.033 -0.010	-0.001 -0.023	0.001 -0.033	-0.001 0.000
60	0.008 -0.002	-0.039 0.033	-0.023 -0.001	-0.048 0.100	-0.026 -0.627	-0.047 0.043	-0.002 -0.031	0.002 -0.047	-0.001 0.053
62	-0.002 -0.001	-0.022 0.007	-0.008 -0.001	-0.023 -0.004	-0.012 0.067	-0.025 -0.243	-0.001 -0.014	0.001 -0.025	-0.001 0.002
70	-0.015 -0.002	-0.026 -0.002	-0.000 -0.001	-0.010 -0.022	-0.086 -0.014	-0.007 -0.017	-0.001 -0.256	-0.002 -0.007	-0.003 -0.008
76	-0.010 -0.002	-0.034 0.008	-0.020 -0.001	-0.054 -0.100	-0.025 -0.097	-0.002 -0.060	-0.002 -0.030	0.001 -0.187	-0.003 -0.013
90	-0.029 -0.001	-0.022 -0.024	-0.008 -0.001	-0.002 0.004	-0.016 0.133	-0.008 0.000	-0.001 -0.020	-0.006 -0.008	-0.004 -0.399

Table C-100. A complete set of price elasticities for products in food basket of Metropolitan Lima, 5th income bracket (ENCA 50-5)

SECTOR - 50 - , STRATUM - 5 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.483 -0.001	0.055 -0.031	0.036 -0.001	0.048 0.011	-0.011 0.070	0.027 0.008	-0.001 -0.017	-0.001 0.027	-0.032 -0.005
6	0.032 -0.001	-0.854 0.001	0.082 -0.001	0.107 0.058	-0.009 0.201	0.067 0.045	0.000 -0.013	-0.017 0.068	0.001 -0.012
11	0.590 -0.000	2.400 0.036	0.581 -0.000	-0.599 -0.523	-0.000 -1.452	-0.412 -0.412	-0.015 -0.000	0.241 -0.415	0.038 -0.064
13	0.058 -0.001	0.225 0.002	-0.043 -0.001	-0.073 -0.062	-0.006 -0.147	-0.049 -0.050	-0.002 -0.010	0.021 -0.049	0.003 0.004
17	-0.012 -0.002	-0.023 -0.004	-0.001 -0.002	-0.012 -0.024	-0.295 -0.019	-0.007 -0.018	-0.002 -0.086	-0.003 -0.007	-0.003 -0.006
27	0.032 -0.002	0.160 -0.001	-0.037 -0.001	-0.069 -0.098	-0.018 -0.195	-0.120 -0.080	-0.003 -0.027	0.017 -0.044	-0.000 -0.012
31	-0.010 -0.001	-0.007 -0.003	-0.007 -0.001	-0.017 -0.027	-0.015 -0.032	-0.011 -0.020	-0.298 -0.023	0.069 -0.011	-0.003 -0.004
33	-0.007 -0.001	-0.127 -0.003	0.059 -0.001	0.066 0.054	-0.013 0.152	0.049 0.048	0.044 -0.021	-0.707 0.049	-0.002 -0.015
44	-0.120 -0.001	0.001 -0.023	0.008 -0.001	0.005 -0.010	-0.012 0.007	0.003 -0.007	-0.001 -0.019	-0.002 0.003	-0.167 -0.004

Table C-100. (continued)

SECTOR - 50 - , STRATUM - 5 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.009 -0.246	-0.017 -0.003	-0.001 -0.001	-0.009 -0.018	-0.014 -0.014	-0.005 -0.013	-0.001 -0.021	-0.002 -0.005	-0.002 -0.005
48	-0.104 -0.001	0.003 -0.118	0.007 -0.001	0.006 -0.007	-0.009 0.008	0.003 -0.005	-0.001 -0.014	-0.001 0.003	-0.021 -0.003
49	-0.002 -0.000	-0.003 -0.000	-0.000 -0.042	-0.001 -0.003	-0.002 -0.002	-0.001 -0.002	-0.000 -0.004	-0.000 -0.001	-0.000 -0.001
59	0.005 -0.001	0.050 -0.001	-0.017 -0.001	-0.031 -0.206	-0.011 0.009	-0.031 -0.023	-0.002 -0.017	0.007 -0.031	-0.001 -0.002
60	0.025 -0.002	0.158 -0.002	-0.045 -0.002	-0.074 -0.009	-0.022 -0.488	-0.069 -0.025	-0.003 -0.034	0.017 -0.069	-0.001 0.027
62	0.004 -0.001	0.050 -0.002	-0.018 -0.001	-0.033 -0.033	-0.012 -0.017	-0.034 -0.195	-0.002 -0.019	0.008 -0.034	-0.001 0.001
70	-0.009 -0.001	-0.018 -0.003	-0.001 -0.001	-0.009 -0.018	-0.055 -0.014	-0.005 -0.013	-0.001 -0.235	-0.002 -0.005	-0.002 -0.005
76	0.033 -0.002	0.162 -0.001	-0.038 -0.001	-0.070 -0.099	-0.018 -0.197	-0.045 -0.081	-0.003 -0.028	0.017 -0.122	-0.000 -0.012
90	-0.014 -0.002	-0.048 -0.004	-0.007 -0.002	-0.004 -0.021	-0.019 0.093	-0.014 -0.006	-0.002 -0.030	-0.007 -0.014	-0.003 -0.435

Table C-101. A complete set of price elasticities for products in food basket of Metropolitan Lima, 6th income bracket (ENCA 50-6)

SECTOR - 50 - , STRATUM - 6 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.192 -0.001	0.031 -0.014	-0.002 -0.001	0.001 -0.032	-0.014 -0.048	-0.013 -0.027	-0.002 -0.015	0.009 -0.013	-0.015 -0.001
6	0.021 -0.000	-0.033 0.001	-0.002 -0.000	-0.003 -0.007	-0.002 -0.021	-0.002 -0.007	-0.000 -0.002	0.003 -0.002	0.001 0.002
11	-0.014 0.000	-0.053 -0.000	1.121 0.001	-0.186 -0.066	0.006 -0.404	-0.079 -0.054	-0.001 0.007	0.017 -0.079	-0.000 -0.059
13	0.006 -0.000	-0.010 -0.000	-0.015 -0.000	0.024 -0.017	-0.005 -0.053	-0.017 -0.015	-0.001 -0.005	0.004 -0.017	-0.000 0.004
17	-0.004 -0.000	-0.012 -0.001	-0.000 -0.001	-0.005 -0.013	-0.141 -0.009	-0.003 -0.010	-0.001 -0.051	-0.001 -0.003	-0.001 -0.004
27	-0.022 -0.001	-0.030 -0.004	-0.009 -0.002	-0.031 -0.061	-0.024 -0.087	-0.230 -0.054	-0.002 -0.025	-0.004 0.030	-0.004 -0.017
31	-0.009 -0.001	-0.016 -0.002	-0.001 -0.001	-0.008 -0.016	-0.013 -0.011	-0.003 -0.012	-0.242 -0.014	0.044 -0.003	-0.002 -0.004
33	0.024 -0.001	-0.000 -0.000	0.003 -0.002	0.003 -0.020	-0.020 -0.009	-0.009 -0.015	0.027 -0.021	-0.420 -0.009	-0.000 -0.010
44	-0.050 -0.001	-0.002 -0.016	-0.001 -0.001	-0.004 -0.018	-0.012 -0.018	-0.005 -0.014	-0.001 -0.013	0.001 -0.005	-0.126 -0.003

Table C-101. (continued)

SECTOR - 50 - , STRATUM - 6 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.008 -0.287	-0.019 -0.002	-0.001 -0.002	-0.009 -0.022	-0.018 -0.014	-0.005 -0.017	-0.002 -0.019	-0.002 -0.005	-0.002 -0.007
48	-0.046 -0.000	-0.001 -0.105	-0.001 -0.001	-0.003 -0.016	-0.010 -0.016	-0.005 -0.013	-0.001 -0.011	0.001 -0.005	-0.015 -0.003
49	-0.016 -0.002	-0.042 -0.005	-0.002 -0.626	-0.019 -0.047	-0.039 -0.031	-0.010 -0.037	-0.004 -0.042	-0.005 -0.010	-0.005 -0.014
59	-0.009 -0.000	-0.012 -0.001	-0.003 -0.001	-0.008 -0.233	-0.008 0.125	-0.012 0.000	-0.001 -0.008	-0.001 -0.012	-0.001 -0.005
60	-0.025 -0.001	-0.044 -0.005	-0.013 -0.003	-0.031 0.098	-0.027 -0.599	-0.028 0.052	-0.002 -0.029	-0.002 -0.027	-0.004 0.041
62	-0.011 -0.000	-0.014 -0.002	-0.003 -0.001	-0.010 -0.001	-0.009 0.090	-0.015 -0.215	-0.001 -0.010	-0.001 -0.015	-0.002 -0.002
70	-0.007 -0.001	-0.017 -0.002	-0.001 -0.002	-0.008 -0.019	-0.049 -0.013	-0.004 -0.015	-0.001 -0.239	-0.002 -0.004	-0.002 -0.006
76	-0.022 -0.001	-0.030 -0.004	-0.009 -0.002	-0.031 -0.061	-0.024 -0.086	0.030 -0.054	-0.002 -0.026	-0.004 -0.231	-0.004 -0.017
90	0.002 -0.000	-0.003 -0.001	-0.006 -0.001	0.002 -0.018	-0.010 0.157	-0.011 -0.005	-0.001 -0.011	-0.002 -0.011	-0.001 -0.321

Table C-102. A complete set of price elasticities for products in food basket of Metropolitan Lima, 7th income bracket (ENCA 50-7)

SECTOR - 50 - • STRATUM - 7 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.300 -0.001	0.082 -0.022	-0.012 -0.001	0.024 -0.035	-0.016 -0.058	-0.011 -0.037	-0.003 -0.024	0.014 -0.011	-0.023 0.008
6	0.046 -0.000	-0.130 0.003	-0.007 -0.000	0.011 -0.014	-0.005 -0.025	-0.005 -0.017	-0.001 -0.008	0.006 -0.005	0.003 0.005
11	-0.151 -0.001	-0.202 -0.012	4.291 -0.001	-0.415 -0.459	-0.023 -2.255	0.061 -1.618	-0.001 -0.034	-0.017 0.063	-0.013 0.184
13	0.032 -0.001	0.020 0.001	-0.041 -0.001	-0.230 -0.023	-0.012 -0.019	-0.020 -0.010	-0.002 -0.017	0.018 -0.020	0.001 0.012
17	-0.007 -0.001	-0.019 -0.002	-0.000 -0.001	-0.007 -0.022	-0.302 -0.022	-0.005 -0.008	-0.001 -0.059	-0.001 -0.005	-0.002 -0.005
27	-0.014 -0.001	-0.025 -0.002	0.007 -0.001	-0.024 -0.053	-0.015 -0.160	0.073 -0.114	-0.002 -0.022	0.002 -0.048	-0.002 0.008
31	-0.014 -0.001	-0.029 -0.003	-0.000 -0.001	-0.013 -0.030	-0.024 -0.033	-0.008 -0.013	-0.460 -0.035	0.064 -0.008	-0.003 -0.005
33	0.045 -0.001	0.022 0.001	-0.005 -0.001	0.046 -0.016	-0.026 0.010	0.001 0.022	0.058 -0.039	-0.785 0.001	0.001 -0.023
44	-0.084 -0.001	0.006 -0.029	-0.003 -0.001	0.001 -0.027	-0.019 -0.034	-0.007 -0.016	-0.002 -0.028	0.002 -0.007	-0.247 -0.002

Table C-102. (continued)

SECTOR - 50 - , STRATUM - 7 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.007 -0.309	-0.018 -0.002	-0.000 -0.001	-0.006 -0.022	-0.018 -0.022	-0.005 -0.008	-0.001 -0.026	-0.001 -0.005	-0.002 -0.005
48	-0.078 -0.001	0.008 -0.193	-0.003 -0.001	0.002 -0.023	-0.016 -0.029	-0.006 -0.014	-0.002 -0.023	0.002 -0.006	-0.028 -0.001
49	-0.003 -0.000	-0.007 -0.001	-0.000 -0.117	-0.002 -0.008	-0.007 -0.008	-0.002 -0.003	-0.001 -0.010	-0.001 -0.002	-0.001 -0.002
59	-0.010 -0.000	-0.015 -0.001	-0.014 -0.001	-0.006 -0.726	-0.009 0.467	-0.013 0.119	-0.001 -0.014	0.001 -0.012	-0.001 -0.010
60	-0.020 -0.001	-0.033 -0.003	-0.053 -0.001	-0.009 0.335	-0.021 -1.091	-0.036 0.361	-0.002 -0.030	0.002 -0.036	-0.003 0.098
62	-0.030 -0.002	-0.052 -0.005	-0.070 -0.002	-0.014 0.129	-0.034 0.639	-0.052 -1.300	-0.003 -0.050	0.002 -0.051	-0.005 0.011
70	-0.002 -0.000	-0.004 -0.000	-0.000 -0.000	-0.001 -0.005	-0.034 -0.005	-0.001 -0.002	-0.000 -0.048	-0.000 -0.001	-0.000 -0.001
76	-0.014 -0.001	-0.024 -0.002	0.008 -0.001	-0.024 -0.053	-0.015 -0.161	-0.048 -0.114	-0.001 -0.022	0.002 0.077	-0.002 0.008
90	0.011 -0.001	-0.000 -0.001	0.021 -0.001	0.011 -0.046	-0.017 0.479	0.007 0.048	-0.001 -0.026	-0.007 0.007	-0.001 -0.935

Table C-103. A complete set of price elasticities for products in food basket of Metropolitan Lima, 8th income bracket (ENCA 50-8)

SECTOR - 50 - , STRATUM - 8 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	-0.174 -0.000	0.054 -0.014	-0.008 -0.000	0.016 0.010	-0.004 0.017	0.001 0.036	-0.000 -0.005	-0.006 0.001	-0.015 -0.009
6	0.030 -0.000	0.143 0.002	0.027 -0.000	-0.038 -0.055	-0.003 -0.081	-0.013 -0.132	-0.001 -0.004	0.033 -0.013	0.002 0.029
11	-0.102 -0.000	0.604 -0.009	-0.875 -0.000	0.050 0.037	-0.009 0.127	-0.041 0.145	-0.003 -0.011	0.054 -0.041	-0.009 -0.133
13	0.018 -0.000	-0.077 0.001	0.005 -0.000	-0.004 -0.008	-0.004 -0.009	-0.001 -0.009	-0.001 -0.005	0.004 -0.001	0.001 0.001
17	0.001 0.000	0.002 0.000	0.000 0.000	0.001 0.003	0.071 0.004	0.001 0.002	0.000 -0.010	0.000 0.001	0.000 0.001
27	0.001 -0.000	-0.041 -0.000	-0.005 -0.000	-0.003 -0.030	-0.007 -0.035	0.022 -0.055	-0.001 -0.009	0.002 -0.016	-0.000 0.001
31	0.006 0.001	0.005 0.001	-0.000 0.001	0.005 0.014	0.015 0.016	0.003 0.007	0.244 0.019	0.017 0.003	0.002 0.005
33	-0.017 -0.000	0.152 -0.002	0.011 -0.000	0.007 0.010	-0.009 0.013	0.003 0.031	0.010 -0.011	-0.409 0.003	-0.002 -0.010
44	-0.047 -0.001	0.005 -0.021	-0.002 -0.001	-0.000 -0.009	-0.012 -0.009	-0.002 0.002	-0.002 -0.016	-0.003 -0.002	-0.183 -0.306

Table C-103. (continued)

SECTOR - 50 - , STRATUM - 8 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.002 -0.072	-0.003 -0.000	-0.000 -0.000	-0.002 -0.004	-0.004 -0.005	-0.001 -0.003	-0.001 -0.005	-0.001 -0.001	-0.000 -0.001
48	-0.049 -0.001	0.006 -0.178	-0.002 -0.001	0.000 -0.009	-0.012 -0.009	-0.002 0.003	-0.002 -0.016	-0.003 -0.002	-0.024 -0.006
49	-0.003 -0.000	-0.005 -0.001	-0.000 -0.120	-0.003 -0.007	-0.007 -0.008	-0.002 -0.004	-0.001 -0.009	-0.001 -0.002	-0.001 -0.002
59	0.003 -0.000	-0.040 -0.000	0.001 -0.000	-0.004 -0.281	-0.006 0.129	-0.006 0.068	-0.001 -0.008	0.002 -0.006	-0.000 -0.002
60	0.005 -0.000	-0.050 -0.000	0.003 -0.000	-0.004 0.114	-0.006 -0.331	-0.007 0.118	-0.001 -0.008	0.002 -0.007	-0.000 0.025
62	0.012 -0.001	-0.130 -0.000	0.005 -0.001	-0.010 0.077	-0.018 0.161	-0.019 -0.484	-0.003 -0.023	0.004 -0.019	-0.000 0.003
70	-0.003 -0.000	-0.006 -0.001	-0.000 -0.000	-0.003 -0.008	-0.017 -0.009	-0.002 -0.005	-0.001 -0.141	-0.001 -0.002	-0.001 -0.003
76	0.001 -0.000	-0.041 -0.000	-0.005 -0.000	-0.003 -0.030	-0.007 -0.035	-0.016 -0.055	-0.001 -0.009	0.002 0.022	-0.000 0.001
90	-0.010 0.000	0.068 -0.001	-0.013 0.000	0.003 -0.001	0.000 0.102	0.003 0.023	0.000 0.000	-0.023 0.003	-0.001 -0.167

Table C-104. A complete set of price elasticities for products in food basket of Metropolitan Lima, 9th income bracket (ENCA 50-9)

SECTOR - 50 - , STRATUM - 9 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
1	0.016 0.000	-0.002 -0.001	0.001 0.000	-0.000 0.004	0.001 0.008	0.001 0.003	0.000 0.001	-0.000 0.001	-0.002 -0.000
6	-0.002 -0.000	-0.001 -0.000	-0.003 -0.000	-0.001 -0.010	-0.001 -0.029	0.005 -0.009	-0.000 -0.002	-0.000 0.003	0.000 0.003
11	0.013 0.001	-0.051 0.001	0.752 0.000	-0.067 0.138	0.010 -0.749	0.129 0.035	0.012 0.015	-0.044 0.104	0.000 0.122
13	-0.002 -0.000	-0.004 -0.000	-0.007 -0.000	0.008 -0.021	-0.002 0.001	-0.021 -0.014	-0.000 -0.003	-0.000 -0.017	-0.000 -0.002
17	-0.003 -0.000	-0.005 -0.001	-0.000 -0.000	-0.002 -0.007	-0.119 -0.012	-0.002 -0.006	-0.000 -0.054	-0.001 -0.002	-0.001 -0.003
27	0.000 -0.000	0.013 -0.000	0.015 -0.000	-0.025 -0.012	-0.002 0.265	-0.359 0.007	-0.001 -0.003	0.002 0.060	-0.000 -0.043
31	-0.005 -0.001	-0.009 -0.001	0.003 -0.000	-0.004 -0.006	-0.009 -0.009	-0.005 -0.005	-0.308 -0.013	0.018 -0.004	-0.001 -0.006
33	-0.004 -0.000	-0.003 -0.000	-0.012 -0.000	-0.001 -0.022	-0.004 -0.043	0.004 -0.018	0.014 -0.035	-0.059 0.001	-0.000 0.003
44	-0.011 -0.000	-0.004 -0.012	-0.001 -0.000	-0.002 -0.009	-0.006 -0.016	-0.002 -0.008	-0.001 -0.008	-0.001 -0.002	-0.152 -0.003

Table C-104. (continued)

SECTOR - 50 - , STRATUM - 9 -

	1 46	6 48	11 49	13 59	17 60	27 62	31 70	33 76	44 90
46	-0.002 -0.398	-0.003 -0.000	-0.000 -0.000	-0.001 -0.004	-0.003 -0.007	-0.001 -0.004	-0.000 -0.005	-0.000 -0.001	-0.000 -0.002
48	-0.006 -0.000	-0.003 -0.087	-0.000 -0.000	-0.001 -0.005	-0.003 -0.009	-0.001 -0.004	-0.000 -0.005	-0.000 -0.001	-0.012 -0.002
49	-0.006 -0.001	-0.010 -0.001	-0.001 -0.290	-0.004 -0.013	-0.009 -0.022	-0.003 -0.010	-0.001 -0.014	-0.001 -0.003	-0.001 -0.005
59	-0.002 -0.000	-0.010 -0.001	0.003 -0.000	-0.007 -0.397	-0.004 0.146	-0.004 0.111	0.000 -0.006	-0.002 -0.006	-0.001 -0.004
60	-0.001 -0.000	-0.015 -0.001	-0.012 -0.000	-0.001 0.082	-0.005 -0.335	0.034 0.022	0.000 -0.007	-0.003 0.022	-0.001 0.027
62	-0.001 -0.000	-0.011 -0.001	0.001 -0.000	-0.006 0.135	-0.004 0.047	0.001 -0.335	0.000 -0.006	-0.002 -0.002	-0.001 0.002
70	-0.005 -0.000	-0.008 -0.001	-0.000 -0.000	-0.003 -0.011	-0.036 -0.019	-0.003 -0.009	-0.001 -0.226	-0.001 -0.003	-0.001 -0.004
76	-0.000 -0.000	0.006 -0.001	0.012 -0.000	-0.020 -0.023	-0.003 0.169	0.059 -0.006	-0.001 -0.004	0.001 -0.286	-0.001 -0.329
90	0.001 0.000	0.012 0.001	0.011 0.000	0.000 -0.002	0.004 0.179	-0.031 0.015	-0.000 0.005	0.002 -0.020	0.001 -0.023

Table C-105. A complete set of price elasticities for products in food basket of Metropolitan Lima, 10th income bracket (ENCA 50-10)

SECTOR - 50 - STRATUM - 10 -

	1 48	6 49	11 59	13 60	17 62	27 69	31 70	33 76	44 90
1	-0.122 -0.009	0.157 0.000	-0.012 -0.009	0.004 -0.055	-0.002 -0.011	-0.007 -0.004	-0.005 -0.003	0.011 -0.007	-0.012 0.008
6	0.040 0.003	-0.201 0.000	0.007 -0.007	0.012 -0.027	-0.006 -0.003	0.000 -0.009	0.001 -0.006	0.005 0.000	0.004 0.000
11	-0.328 -0.025	0.796 0.000	1.789 -0.310	-0.109 -1.842	-0.010 -0.451	0.127 -0.012	-0.145 -0.011	0.255 0.128	-0.033 0.111
13	0.003 0.000	0.057 0.000	-0.007 -0.015	-0.171 -0.103	-0.007 -0.017	-0.011 -0.015	-0.009 -0.007	0.022 -0.011	0.000 0.012
17	-0.001 0.000	-0.005 0.000	0.000 -0.007	-0.001 -0.006	-0.120 -0.002	-0.001 -0.001	0.003 -0.020	0.000 -0.001	0.000 -0.001
27	-0.013 -0.001	0.004 0.000	0.008 -0.028	-0.013 -0.155	-0.004 -0.036	0.139 -0.003	0.000 -0.004	0.005 -0.045	-0.002 0.014
31	-0.116 -0.030	-0.362 -0.008	-0.022 -0.479	-0.082 -0.468	-0.347 -0.165	-0.054 -0.082	-9.057 -0.364	0.500 -0.054	-0.035 -0.079
33	0.057 0.004	0.100 0.000	0.048 -0.037	0.070 0.092	-0.004 0.006	0.013 0.021	0.755 -0.005	-1.266 0.013	0.005 -0.017
44	-0.032 -0.013	0.033 0.000	-0.003 -0.010	0.000 -0.021	-0.007 -0.005	-0.003 -0.002	0.003 -0.007	0.003 -0.003	-0.148 0.000

Table C-105. (continued)

SECTOR - 50 - STRATUM - 10 -

	1 48	6 49	11 59	13 60	17 62	27 69	31 70	33 76	44 90
48	-0.029 -0.086	0.032 0.000	-0.003 -0.007	0.000 -0.017	-0.004 -0.004	-0.002 -0.002	0.001 -0.005	0.002 -0.002	-0.016 0.001
49	-0.002 -0.001	-0.008 -0.217	0.000 -0.012	-0.001 -0.010	-0.008 -0.004	-0.001 -0.002	0.005 -0.009	0.000 -0.001	-0.001 -0.002
59	-0.001 0.000	0.001 0.000	-0.002 -0.145	-0.002 0.107	-0.001 0.008	-0.003 0.005	0.001 -0.001	0.000 -0.003	0.000 -0.003
60	-0.012 -0.001	-0.026 0.000	-0.013 0.081	-0.007 -0.357	-0.010 0.059	-0.015 -0.024	0.005 -0.010	0.002 -0.015	-0.002 0.029
62	-0.007 -0.001	-0.005 0.000	-0.008 0.014	-0.007 0.180	-0.005 -0.329	-0.011 0.006	0.003 -0.006	0.001 -0.011	-0.001 -0.001
69	-0.006 -0.001	-0.043 0.000	-0.003 0.021	0.000 -0.144	-0.007 0.014	-0.002 -0.042	0.002 -0.007	0.003 -0.002	-0.001 0.011
70	-0.001 0.000	-0.002 0.000	0.000 -0.003	0.000 -0.003	-0.018 -0.001	0.000 0.000	0.001 -0.040	0.000 0.000	0.000 -0.001
76	-0.013 -0.001	0.004 0.000	0.008 -0.028	-0.013 -0.155	-0.004 -0.036	-0.045 -0.003	0.000 -0.004	0.005 0.139	-0.002 0.014
90	0.011 0.001	0.011 0.000	0.006 -0.018	0.007 0.220	0.002 0.000	0.010 0.015	0.001 0.002	-0.003 0.010	0.001 -0.225