

ABSTRACT

HEALTH NEEDS ASSESSMENT IN SPECIFIC POPULATION GROUPS IN THE CAYAMBE REGION, PICHINCHA PROVINCE, ECUADOR

The study searches for an alternative epidemiological method that may integrate historical, social, economic and cultural variables in the explanation of the health-disease phenomena. It studies the general development of agricultural production in the Cayambe Region, Pichincha Province, Republic of Ecuador and its impact on the distribution and use of the land and other natural resources by different population groups and on their general living conditions and ultimately on their health status.

A sample of 295 families (1507 individuals) were studied. The collected information on their demographic, socio-economic, cultural, health and anthropometric characteristics was integrated into a descriptive study of the different groups, according to their insertion in the agricultural production (cooperatives, capitalist farms, subsistence production and agro-industry).

The most important variables were integrated in a causal model and studied using the path analysis technic. The constructed model was able to explain 57.8% of the variability of the health status of the people and identify the specific contribution of the social and economic variables on the morbidity of the studied families.

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My whole life has always had the support and understanding of my parents and siblings. My wife and sons provided all the love, encouragement, understanding, psychotherapy and effort I needed to take this task to a completion. This thesis is the result of all your efforts. Thank you.

Jose Suarez-Torres

PREFACE

This study is done at a time when the drums of war resound in the world, when under the pretext of the "national security and vital interest" of the super powers, the peoples that look to pursue their right to be masters of their own resources and of their own destinies are destroyed and repressed. Violence has been institutionalized in order to contain any attempt to reduce the privileged of the national and international groups that control the world economy. It has never been more apparent than now how mortality and morbidity are determined by the ambition of the few who look to control greater resources and profits at the expense of the majority.

More than ever ideology, clothed as science, has tried to conceal and ignore the social origins of sickness and death with its reductionists and ahistorical concepts of reality. Science has been limited to satisfying the need for accumulation of capital, but not to satisfy human needs. Never before has the injustice and malevolence of an economic system that has at its disposal the technological knowledge and necessary resources to solve the problems of food, housing, education and health of the human population become more apparent, a system that turns to production of arms, more and more destructive to life on earth, in order to monopolize the control of the world's natural resources, displacing the populations to whom these resources belong.

It has always been apparent, especially for the exploited, that poverty engenders illness and that poverty is, for the most part, a social occurrence that results from the way in which society has been organized to distribute resources and the products of human labor; an order of things which has been justified and maintained through arguments of the superstructure, economic coercion and the mere use of strength. Nevertheless, the prevailing positivist scientific paradigm does not take such relationships into account. The medical profession has taken the course of curative methods, which rather than combat the root of illness, have permitted the additional accumulation of capital, leaving unprotected to those groups which, as the poor and the old people, cannot be beneficial to this process of accumulation.

This study has sought to overcome such ideological limitations by using historical and socio-economic variables in the explanation of the status of health of specific groups residing in a region of the Republic of Ecuador. Here we analyze the conditions of health-disease within a process of development and "modernization" of the agricultural production that has taken place in the Andean Ecuadorian region.

I hope this study contain some contribution, although minimal, to the peasant's search for equal enjoyment of the natural resources and a better standard of living and health. In the event this is attained, we will be happy that all the effort put into this study has not been in vain.

Given the difficult situation that the majority of the Ecuadorian people face, as the great Latin American Garcia Marquez said,

"We feel we have the right to believe that it is not yet too late to undertake the creation of an opposite utopia. A new and all-embracing utopia of life where none would decide for others even how to die, where truly love exist and happiness is possible, where peoples condemned to a hundred years of solitude finally and eternally have a second chance on Earth."

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CHAPTER 1

HEALTH AS A SOCIAL PHENOMENON (THEORETICAL FOUNDATIONS).

1.1 HISTORICAL DEVELOPMENT OF THE MAIN CURRENTS OF THOUGHT IN HEALTH.

Human society, in its several historical periods, has had health-disease phenomena as one of its main preoccupations. Each social group, in each historical period and geographical location, has tried to understand the pathological processes, the determining factors and the prevention and treatment mechanisms, in accordance with their comprehension of the other phenomena in nature.

For example, primitive man tried to explain disease using mythical and supernatural elements, based on his empirical knowledge. Later on, with the development of scientific thought during the slavery period, medical knowledge began to be based on logic foundations and with defined objectives of study. These latter were based on observations of objective reality. Hypocrates made the first systematic observations of the nosologic processes and related disease to environmental conditions. Greek medicine was, consequently, an objective science (1).

With the advent of feudal society and the ideological dominance of religion, science, including medicine, lost its objectivity. There developed a metaphysical idealist character, which attempted to explain all natural phenomena, including disease, as a manifestation of the divine will, and as a result of the continuous struggle between "good" and "evil" forces. As a consequence, the objective component of Greek medicine was totally subordinated to the dominant religious ideological component of the Middle Ages, leading to a sparse development of science during that period (2).

The transition from feudalism to capitalism meant, among other things, the overcoming of the limitations of a metaphysical concept (view of the world) of reality. The emergent mode of production, capitalism, required an increment in productivity and a reduction of the costs of production, in order to produce profit and the accumulation of capital, the basis of the new productive system. In order to accumulate capital, it was necessary to increase surplus by the extension and intensification of the working day, and by the development of better instruments (3). Thus, the search for new technology, which used new forms of energy (steam, petroleum, etc) reduced production time and costs. This required the knowledge and control of nature, which was the main stimulus for the development of science during this period (4).

In the health sector, scientific development returned to Hippocratic thought once again. Observation was considered the main

source of explanations for pathological processes. New systematic observations of the conditions leading to disease and the characteristics of the affected groups were developed at that time. An important development of the scientific understanding of disease and some of its determining factors, began to take place. During the XVI century, several scientific books were published, such as Agricola's: *De Re Metalica* (5), and Paracelsus's: *Monographs* (6), and on other studies of diseases among miners, which related the diseases to the environmental conditions in which mining took place (7). By the late 1700's, an important book, *De Morbis Artificum Diatriba* of Ramazzini, systematized the knowledge of occupational diseases, recognized environmental factors as the main determinants of disease, and stated the importance of occupation in the genesis of disease (8).

The same scientific approach was developed even more during the period of the Industrial Revolution in Europe, at the end of the XVIII and beginning of the XIX centuries, when several epidemic diseases spread through several countries. Several physicians looked for elements that explained the outbreaks. Through the systematization of the main methodological approaches to the study of the health disease phenomena, important developments in epidemiological thinking were produced.

By the middle of the XIX century, most of the main currents of thought in epidemiological research were established. During that period, in England and Germany, several theoretical and political

debates on how to discover causal factors, and how to combat epidemic diseases took place. The main differences between the two most important epidemiological approaches arose from the debates between the contagionist and anticontagionist camps (9).

The group defending the contagionist theory considered that diseases were the result of the introduction of a foreign element in the human organism producing pathological changes. According to these groups, medical research was to direct its efforts to discovering those foreign agents producing the disease. The main assumption was the existence of pathogenic microorganisms. This biological view of disease was strengthened by the discoveries of Pasteur and Koch.

The discoveries of specific microorganisms stimulated additional research of "etiological agents" of different diseases from a microbiological, chemical and physical perspective. Later on, this view oriented efforts to the production of vaccines. The Epidemiological Monocausal Current was completely established (10-12).

The other group, the anticontagionists, thought that the main determining factors of disease were completely attached to the development of the new mode of production. They stated that the expulsion of the labor force from the agricultural units, especially in England, and their insertion into industrial production generated severe disruptions in the lives of the peasant families. These

families, migrating to the cities, found themselves living under very adverse conditions, produced by fluctuations in the economy, such as crowding, insufficient food, poor sanitation, poverty and insecurity (13). The anticontagionists emphasized the strong relationship between the socio economic conditions of a population and disease (14-16).

The contagionists, which included Virchow, Greenhow and Simon, believed that the prevention of disease was not only a medical consideration, but, mainly, an economical, political and social one. They stated that the best solution to the epidemic conditions was to change the conditions that allowed them to develop. Virchow emphasized the multifactorial character of disease and stated that the daily material conditions of the people were among the most important factors (17).

At the end of the XIX century, the two main epidemiological currents of thought were completely defined. Nevertheless, due to the works of Pasteur, Koch, Ehrlich and other bacteriologists, the unicausal germ theory gained in importance. New microorganisms and substances associated with pathological processes were identified. The general impact of this medical approach has been considered as the main factor in the decline of morbidity and mortality during the XX century. Nevertheless, several other authors believe that the decline of most of the diseases, mainly infectious diseases, began long before the discovery of the "causal agents" and the antimicrobial agents (18,19).

It is important to indicate that this unicausal biological paradigm led to the establishment of a new approach in medicine, based on laboratory finding. This view served as the norm for the medical school, particularly after the Flexner Report, at the beginning of the 1900's (20). Several authors have questioned the main assumptions, circumstances and recommendations of the report, since it coincides with the interests of the large industries and foundations that financed that study (21,22), and because "...it shifted the focus of research from societal problems -a topic that implied potential threat to the organization of the capitalist production and class struggle -to pathophysiological disturbances at the level of individual patients in a much less threatening subject matter" (23).

Nevertheless, in spite of the large quantity of resources devoted to laboratory research and to the development of vaccines and antibiotics, the unicausal paradigm could not explain or prevent most of the diseases, specially among low income groups. For that reason, new ideas about the health disease phenomenon were developed, such as those presented in the following paragraphs.

Leavel and Clark developed a new epidemiological approach, recognizing the existence of three intervening elements in the genesis of diseases: agent, host and environment (24). According to this theory, several environmental factors -sanitary conditions, weather, vegetation, fauna, etc.- factors related to the etiologic

agent -pathogenicity, transmissibility, viability, etc.- and those related to the host -nutrition and immunology, habits, etc- would determine the entrance of "an etiologic agent" in the human organism, thus causing disease.

The differences between this new epidemiological notion from the monocausal paradigm are minimal however. Although this theory defines three groups of elements, they are seen as affecting the entrance of the microbacterial agent into the organism which is considered the only pathogenic element of the disease (25). Multicausality is merely apparent; upon closer analysis it consists of the same monocausal view, adding to it in that it incorporates some circumstantial social variables, some classification criteria and the view of the natural history of disease. This view takes into account the historical development of some biological, and occasionally social factors, but isolated from the surrounding social reality.

This epidemiological approach developed out of the positivist sociological view, which believes that society, as well as disease, cannot be studied in its essence, but in its apparent aspects and in a segmentary way. According to this school of thought, science must observe social phenomenon as one phenomena ruled by the laws of nature (26). Similarly, it believes that the health-disease phenomenon, like other natural and social phenomena, must be studied by a neutral science, devoid of any judgemental values. Accordingly, the social elements incorporated in the explanation of

disease would be considered simple, circumstantial, metaphysical facts, detached from the fundamental social processes, which, in capitalist society, are determined by the need of accumulation of capital.

For several decades, a number of researchers have looked for a more profound explanation of the process of genesis of disease. They have tried to base their findings on objective elements of reality. They have included biological and social factors in the attempt to overcome the limitations of the ecological view of Leavell and Clark. They have tried to explain disease by linking it to certain cultural and ethno-racial characteristics (27-30), to behavior patterns of the individual, changes in life style (31-34), stress situations (35-41), to coping mechanisms used in dealing with conflict or to certain habits, like alcoholism, smoking, polyphagia, etc (42,43). Some authors even consider certain general living conditions: housing, crowding, low income, low educational level, unemployment (44), and some of them included factors like social class, defined by income level, but lacking the explicative power of social inequality. So, it was found that social class was inversely related to general mortality (45-51), infant mortality (52,53), incidence of disease (54-63), of infectious and parasitic diseases (64-68), as well as of mental disease (69-75), hypertension (76), cancer (77), etc. It was also found that social class was directly related to life expectancy (78).

These more elaborate epidemiological studies have been

considered advances in the theory of disease. They have looked for several causal elements, defined by the statistical relationships among the immediate phenomena observed. They have tried to analyze, in a way which is slightly broader but, at the same time, reductionist of a complex reality in which pathological processes take place, with the assumption that scientific research should simplify a complex problem to the point where an experiment can be carried out in a simplistic way. The complex reality of physical, biological and social processes has been reduced to simple components, in order to be adjusted, manipulated and controlled in an experimental way (80).

This "ideology medicine" reproduces a mechanical notion of the human being, which perceives alterations as being of the individual, rather than of collective society. According to Navarro, this reductionist ideology ignores a collective causality, since it would require a collective answer, presenting a threat to the status quo (81).

This epidemiological approach has removed the explicative elements from the general social process, as if disease had an isolated existence independent of nature and the historical development of society. This view does not lead to the comprehension of the social processes and their relationship to pathogenic mechanisms, resulting in a serious ideological bias (82). This ideological bias takes for granted that it is impossible to study the organization of society "scientifically", presenting it as an

untouchable entity beyond any analysis which may consider it a pathogenic agent (83).

The practical consequence of these epidemiological theories has been the medicalization of society, which favors the accumulation of capital in specific industries, like the pharmaceutical and medical equipment industries, hospitals, etc. This practical paradigm is also misguided in that it sees health as exclusively dependent upon the magnitude of health services and the number of times individuals visit a physician or receive treatment. Navarro has aptly stated that the same economic and political forces that organize society also determine the form and structure of its health services (84).

This exaggerated positivist medicalization has generated an evergrowing contradiction between the expansion of more sophisticated and technologically advanced health services, and their inaccessibility to low income groups, who are unable to afford the high cost of medical care. This organization of medical practice has converted health care into a privilege in society for if lack of money is a barrier to receiving health care, the system is discriminatory (85). Therefore the ability of the health services to improve the health status of the population, especially that of the poor, has been limited:

"The best estimates indicate that the medical system (doctors, drugs, hospitals) affect about 10 percent of the

usual indices for measuring health: whether you live at all (infant mortality), how well you live (days lost to sickness), how long you live (adult mortality). The remaining 90 per cent is determined by factors over which doctors have little or no control, from individual life style (smoking, exercise, worry), to social conditions (income, eating habits, physiological heredity), and the physical environment (air and water quality). Most bad things that happen to people are at present beyond the reach of medicine"(86).

Due to the limitations of this epidemiological approach, several authors thought the health-disease phenomenon had to be studied as a phenomenon that occurs within the organization of society, in direct interrelationship with the forms of social production, consumption and reproduction. They believed that the biological and the social factors have to be integrated in the study of the genesis of disease.

They base their thought on the notion that the main activity of people is the search for the means of satisfying one's daily needs, for which reason individuals have socially organized the work process, taking from nature all those elements needed for their survival. This productive process has become more complex and differentiated due to the development of the forces of production (better knowledge of natural phenomena and the laws of nature, and the use of efficient technology). By this process, the human race

appropriates natural resources and produces important modifications in nature: physical (i.e. change in the course of rivers, explored mountains), chemical (i.e. pollution) and biological (i.e. destruction of animal and plant species) changes. Therefore, one must realize that the environment is not only a result of the development and evolution of nature, but also a product of the historical social development.

In this relationship with nature, human beings are also the subject of their own changes, using up his energy and exposing himself to different risks, from different climatic conditions to industrial radiation and pollution. Nonetheless, exposure to the factors in the productive process is not homogeneous for everyone, but is differentially determined by the degree of development and technification of society (development of the forces of production), the way in which the productive process is organized within society (social relations of production), and consequently, by the position that certain individuals or population subgroups hold in that process of production. It is evident that the differentiation in social classes, derived from the ownership or lack of ownership of means of production, determines the relative and absolute exposure to negative factors and a higher risk for morbidity. These negative factors influencing man's health have been defined by Breilh and Granda as "countervalues" (87).

It is important to recognize the fact that in the same productive process exists the important contradiction between the

well-being of the workers and the need of the social system to accumulate surplus and capital (88,89), although the dominant ideology "tries to convince labor that those social relations are not only natural, but also just," and that the worker is compensated with an adequate salary, which may allow one to obtain the satisfaction of his needs at the level of consumption (90).

In this way the social conflict is shifted from the area of production to that of consumption, to the struggle for better salaries and compensation for damages generated in the work place. An additional consequence of this ideological view is the separation of two worlds, the world of production and the world of consumption, as if the damages generated in the work place did not have any relation to those produced outside of it. This situation has led to the implementation of a branch of medicine, the occupational medicine, as a medical component, historically controlled by the dominant classes, who determine what the damages are as well as the compensation (91).

At the same time, this process of production has made available to society those elements needed for the survival, growth and development of the different population groups. Unfortunately, the distribution of that social product is not homogeneous, but markedly unequal, a situation which results from the division of society into classes, the owners or non-owners of the means of production. Consequently, the same social process determines the differentiation of population groups in relation to their position in the production

process, and in relation to the quantity of the social product available to them. Therefore, there is a dialectical integration of the productive and reproductive processes in society.

The elements of social reproduction not only make possible the recovery of the individual labor of the workers, but also of all the family members. These positive elements for family development have been defined by Breilh and Granda as "values", within the health disease process in society (92).

Thus, in the same social process we find factors that are beneficial to the health of population groups (values), and others that are detrimental (countervalues) to their health (93). Therefore, the health-disease phenomenon must be recognized, not as an abstract metaphysical entity reduced to experimental conditions, but rather as a dialectical, concrete entity, within a specific natural and social reality.

This implies that one must analyze the status of health of a specific population in its geographic, historic and socio economic context, not in an isolated way, but inserted in a larger economic system, where a set of contradictions between values and countervalues act on the different individuals and population groups. Consequently, this approach has been named the historical, dialectical, epidemiological current.

The importance of this approach lies in that it goes beyond the

positivist theory, allowing the health disease phenomenon to be seen in its causal complexity. It allows one to identify the effect that the different processes of development of production have on the status of health, at the general level, as well as the physiopathological mechanisms, at the individual level, and it permits a greater understanding of effects on morbidity and mortality within the general social milieu, and the health-differences of the populations. It increases the possibility of development of preventive measures. These measures, by modifying components in the production and reproduction aspects of society, favor the development of society by helping resolve the social and health differences in populations, as well as the fundamental contradiction between socio-economic development and social well-being.

1.2 CONSIDERATIONS IN THE STUDY HEALTH CONCEPTS AND STATUS IN AGRARIAN SOCIETIES.

1.2.1 SOCIO ANTHROPOLOGICAL CONSIDERATIONS

Several methodological approaches to the study of peasant societies have been developed. Some have considered mainly cultural elements, while other have considered different aspects of the productive and organization characteristics.

The main socio-anthropological approaches have attempted to study the agrarian economy, because it has allowed the satisfaction of some of the needs of the peasant populations (94). They have also considered the family as the main unit of production and consumption

(95-98).

These anthropological approaches have important differences in the definition of the study objective. So, several currents have limited such studies to small population groups, under a localist perspective, while others studied them within a regional context, and even within a global perspective:

a) Those utilizing localist approaches (microtheories) have limited their studies to the equilibrium between consumption and autoexploitation within peasant families (99). They follow mainly demographic models (100), which prioritizes the labor force/dependent population relations, as well as their relationship to the means of production (101).

This approach limits the study to the family's production, and ignores the specific social and productive relations of the families with the rest of the society (102), and circumscribe the study to the description of surface aspects of family life, without trying to explain those facts (103).

b) The regional approaches try to find the relationship of the peasant economies with the environment, the force of adaptation to the natural and biological elements, following a clear ecologist approach (104-106).

These approaches have had greater importance in the last few

decades, because of the integration of geographic elements (politically and physically), like those of space, territoriality, spatial location, types of interchange, etc. But, they have kept some of the limitations of the localist theories, such as the lack of integration of the ecosystem with the general social productive organization (106). Therefore, they have missed the integration of historical elements which may explain the particular characteristics of societies, and the social processes in them (107).

c) The globalist approaches, developed after the 1950's, try to surpass the localist and regional conceptions by placing the peasant economy within a nation (108). They recognize the importance of a larger study object: the peasant population and its relations to other groups (109), in the micro-macro economic reality (110).

During the 1960's, a new critical element was introduced: the perspective of historical development in a peasant community, which allowed the identification of the power and autonomy structures in the peasant groups, and the relations among the different social classes (111). This situation meant a differentiation of the social classes in the rural areas (112).

This new anthropological approach emphasized the fact that rural societies should not be considered as "peasant economies" oriented to the production and exchange of values in order to satisfy the survival needs of the groups, according to the classic definition of peasant economy, but as subservient to large modes of

production, which determine the organization and production organization of the peasant communities (113).

This approach had questioned the regional ecologic conception, considering that, as was stated by Archetti, "social structures and processes are the ones that determine the appropriation and use of space by certain factors in order to satisfy certain needs", mainly those of accumulation of capital (114).

The globalist approach insists that the study of peasant societies in Latin America must start from the study of the modes and rhythms of penetration of capital in the rural areas: new social divisions of labor, use of labor force, and reassignment and concentration of productive resources, all of which may favor profits and accumulation of capital (115). It must also consider the changes in the peasant economy and in the development of the productive forces, which begin to depend, at increasing rates, on the increment of fixed capital (technology), rather than on the direct output of extensive exploitation of natural resources (116).

This anthropological approach considers that "when new modes of production advance within a society, displacing, destroying or integrating previous modes of production, the spacial forms also undergo a process of destruction, displacement or integration, maintaining or modifying their functionality" (117). Therefore, the law of capital accumulation must be determining not only the conditions of capitalist reproduction, but also that of the

non-capitalist sector. It implies the study of productivity and profitability of the different agricultural units, forms and magnitudes of surplus transference from the dominated productive modes to the dominant ones (118).

In this investigation, we have considered that the globalist approach to the study of rural populations may allow a greater understanding of the differentiation of the peasant economies, the changes in the social process of production and reproduction, and consequently the impact of those changes on the health status of the peasant groups in Ecuador and Latin America. This anthropological approach is in harmony with the epidemiological concept for the study of the health and disease phenomenon in a rural population.

1.2.2 EPIDEMIOLOGICAL CONSIDERATIONS

Epidemiology, defined as the science which studies the health-disease phenomenon in populations, has followed the general paradigms of medicine. In the last few decades, especially, most authors have considered that epidemiology has become oriented to the study of the distribution of disease and physiologic conditions in human populations, as well as to the factors influencing that distribution (119-121).

The dominant epidemiological approach, as was stated above, followed the positivist approach, which simplifies the conditions of observation, assumes the neutrality of science, and the biologization of society, and considers the populations as

homogenous, where the risk of disease and death may be equal for every social group. Susser has criticized that epidemiological "tradition" because of the methodological limitation that isolated the pathological processes from the rest of the social reality, ignoring the fact that health does not exist without persons, and that persons comprise societies. Therefore, any study of the attributes of men is also a study of the manifestations of the form, structure and processes of the social forces (92,122).

Therefore, as was also stated in the historical revision of the paradigms in medicine, it is important to recognize the link of the pathological processes with the process of development of the productive forces. It means the integration of the following basic assumptions in epidemiological research:

- a) A concept of historical development of the social and health processes.
- b) A concept of differentiation of social groups, according to their form of insertion in the process of production, depending on the relations of production implemented by each society, in specific moments and places.
- c) A concept of differentiation of the distribution of the social product among the members of a society, and consequently the characteristics of reproduction of the different social groups.

d) A concept of existence of values and countervalues, in the processes of production and reproduction, which play important roles in the determination of the health-disease status of a population group.

Therefore, in the research on health status of population groups, it is necessary to identify the different social groups within the study population, the elements of production and reproduction of each one of them, within a global comprehension of the social and historical development. So, the integration of historical and dialectical socio-anthropologic and epidemiologic approaches is an epistemological approach in the holistic understanding of the genesis of disease in a concrete society. This is the conception that guides the present investigation of the main determinants of the health status of the rural population in Cayambe County, in Ecuador.

CHAPTER 2

GENERAL STUDY DESIGN.

2.1 GOALS.

This study was designed to determine the main physical, biological and social factors contributing to the status of health of a rural population in Ecuador. At the same time, it was done with the intent to test a research methodology to be applied nationally.

2.2 OBJECTIVES.

2.2.1 GENERAL OBJECTIVE

To study the morbidity and mortality of different populations found in an historically and geographically determined mode of production, as well as the degree of utilization of the different health care systems.

2.2.2 SPECIFIC OBJECTIVES

2.2.2.1 To study the historical development of the mode of production in different types of agricultural productive units in the Cayambe rural area.

2.2.2.2 To characterize the agricultural productive units, and the specific population groups inserted into them.

2.2.2.3 To study the knowledge, attitudes and belief system of the families about health and disease.

2.2.2.4 To study the health status of the families and determine their needs, by natality and mortality trends and by a cross-sectional study.

2.2.2.5 To ascertain the characteristics of utilization of the medical practice systems.

2.3 METHODOLOGICAL DESIGN.

This study follows a systematic approach, by which the model's variables were organized and systematized, according to their corresponding degree of complexity as well as the relationship of one variable to another.

Through a deductive process of operationalization of variables, we then proceeded to identify the variables, within the stated objectives, as well as the simpler variables within the more complex variables which could be verified empirically. The simple variables served to design the different questionnaires to collect the information. The forms for collecting data were based on the simple variables.

The information collected was studied statistically, through procedures discussed in a following section, which allowed, through

a process of theoretical synthesis, the construction of a higher level abstraction about reality: the relative importance of the different variables in the configuration of the internal structure and in the operation of the system.

The methodological steps followed in the present study were:

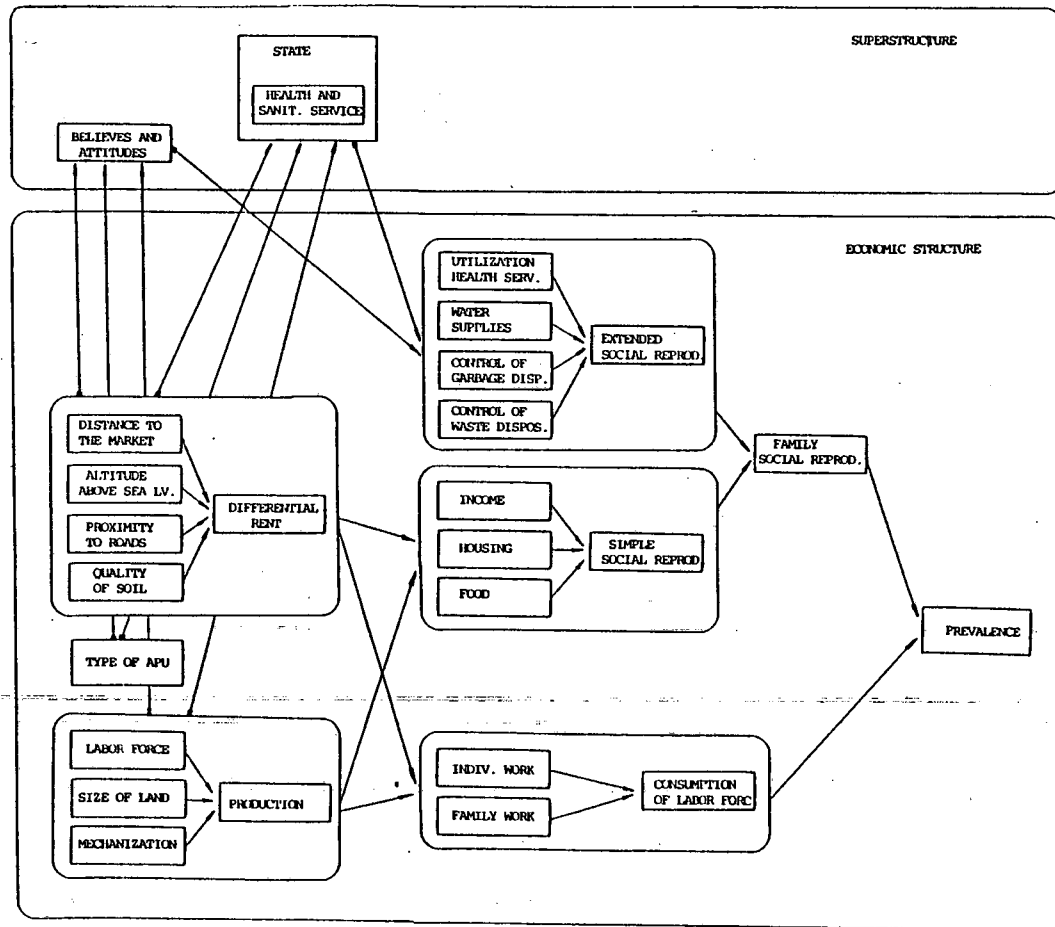
2.3.1 SYSTEMATIZATION OF THE EXISTING INFORMATION. DEFINITION OF THE OBJECT OF THE STUDY AND ELABORATION OF HYPOTHESIS.

Agriculture is the main economic activity in Ecuador, with the highest percentage of the population, mainly in the rural areas, dedicated to its production. For this reason, it was necessary to identify, systematize and relate the main elements of an agricultural economy, developing a model, which is represented in Graph 2.1.

Different types of agricultural production units (APU): cooperatives, large capitalist farms, small peasant units and agro industries, were identified, in which different productive forces play a part such as the labor force, the object of labor [land] and instruments of labor. Some additional elements were also recognized, such as the distance to the market place (County Seat), the altitude above sea level, quality of soil, which play an important role in the cost of production and commercialization, as well as in determining what is referred to as the agricultural differential rent (additional profit obtained by the more profitable UPA's—due to their fertility, efficiency or geographic accessibility—in

CAYAMBE PROJECT

GRAPH 2.1 DIAGRAM OF THE THEORETICAL RELATIONS AMONG THE VARIABLES IN THE STUDY OF HEALTH NEEDS ASSESSMENT IN SPECIFIC POPULATION GROUPS. 1982



relation to the less productive units)(122), which contributes to an additional differentiation of the rural population.

In Graph 2.1, one can see how the agricultural productive organization has a direct influence on the superstructure: not only to the peasant families' ways of understanding reality, their beliefs and attitudes but also their relationship to state agencies. This will determine how the State responds to the needs of specific populations (laws, regulations, infrastructure and services).

Similarly, it can be noted that the labor process plays an important role not only in the use of the individual's and the family's labor force but also in the acquisition of the main elements that contribute to the growth and development of the families, such as housing, food acquired directly by agricultural products or indirectly by means of a salary (family simple social reproduction). To those elements it is necessary to add those environmental factors, sanitation and health services (extended family social reproduction) which play additional roles in the social reproduction of the families.

All the variables considered in Graph 2.1 organized according to the proposed hypothesis model, tested with the development of this research, are reported to play an important role in determining the status of health of specific population groups (morbidity and mortality).

These hypothetical relationships among the variables must be tested in a concrete population, thus, the rural population of the Cayambe County, Pichincha Province was chosen as the locale of our study. This county was selected because it is one of the most important areas of agricultural development, representative of a typical process of "modernization" of the agrarian production in the Andean region of Ecuador. Cayambe has been considered a model area where the transition from precapitalist large farm production into one where capitalist salaried relations predominate has taken place. It is a rich region relatively close to Quito with different ecological niches, where several socio-anthropological studies have been conducted, providing basic bibliographical and base-line material.

Using this holistic model we were able to formulate the following hypotheses, which will allow us to test the underlying assumptions:

- a) There is no association between the development of the modes of production and the morbidity and mortality of the population in the rural areas of Cayambe nor the utilization of health services.
- b) There is no association between the position of the head of the household in the process of production and the status of the health of his/her family.
- c) There is no association between the concentration of land

property in the fertile and accessible areas and the displacement of the rural population into areas of higher altitude, less fertility and accessibility.

d) There is no association between the area, soil quality and accessibility of the productive unit and the family tie to a market economy.

e) There is no association between the family tie to a market economy and the family salaried income, living conditions and status of health.

f) There is no association between the family tie to a market economy and the access, acceptance and utilization of the health and education facilities and services by the families.

2.3.2 OPERATIONAL DESIGN

The core of the operational design is a cross-sectional study of the status of health of the different communities, based on the patterns of specific health indicators. This approach was considered the most advantageous given the difficulty of using alternative methods. A retrospective study was not possible since there is no systematic information already gathered which would permit a socio-economic analysis. A prospective study, although ideal, requires important human and material resources which were not available.

This cross-sectional study using patterns of health indicators, was based on the following methodological approaches:

2.3.2.1 Documented historical study of the development of production in the area of study and nationally. The main historical, anthropological and sociological studies of the Cayambe area were researched.

2.3.2.2 Study of the characteristics of production of the main types of agricultural productive units in the area was carried out through field surveys, conducted by interviews with community leaders.

2.3.2.3 Structured interviews with families, on the present production and reproduction characteristics of the families, their knowledge about the health-disease phenomena, and their attitudes regarding formal and informal medical practices and agents.

2.3.2.4 Documented study of vital statistics to establish the patterns of the main health indicators: general mortality, infant mortality and natality, using available information at county and township levels. (The limitations of this type of information consisted of not being able to identify families within smaller geographic units, or with specific social-economic characteristics. In addition, the completeness and accuracy of the information was also in question).

2.3.2.5 Study of the present status of health of rural families, through clinical exams of all the family members.

This research design followed the recommendations of an international group of experts of the World Health Organization, who believed that the best approach to studying the health of a population was through a survey, since certain factors, such as socio-economic categories "may be more reliable when gathered from interviews or observations in a sample survey than from a general national system of reporting" and that "... it would be more desirable to collect certain types of information on health conditions, environmental factors, and health activities and services in combination with general household inquiries regarding different aspects of life (employment, education, housing, food, clothing and other consumer goods, transportation, social security, etc.)" in the form of multi-purpose surveys. This approach allowed the future selection of "suitable (and usually small) fractions of the original first-phase sample for collection of more detailed and more technical information in the second phase"(124).

2.3.3 OPERATIONALIZATION OF VARIABLES.

Through an analytic process, the initial complex variables were broken down into other simpler variables which could be verified empirically. This process is presented in Table 2.1. The specific objectives of this study were broken down into their corresponding complex variables. In the second and third steps, the complex variables were reduced into less complex variables (dimension of the variables) and finally, into simple variables (indicators) to be used in the collection of information.

This process of operationalization of variables allowed us to identify groups of homogeneous indicators used in the different questionnaires, and in the (most adequate) field work techniques (activities).

The following forms and questionnaires were developed to collect the information:

Instrument 1: Health indicators of each township studied, 1962-1978.

Instrument 2: Demographic information of families.

Instrument 3: Characteristic of agricultural productive units in the area.

Instrument 4: Socio-economic characteristics of the families.

Instrument 5: Knowledge of and attitudes toward health of the families.

TABLE 2.1 OPERATIONALIZATION OF THE VARIABLES
IN THE STUDY HEALTH NEEDS ASSESSMENT
IN SPECIFIC POPULATION GROUPS.
CAYAMBE COUNTY, 1982

OBJECTIVES	VARIABLES	DIMENSIONS	INDICATORS	QUESTIONNAIRES	TECHNIQS	
1. TO STUDY THE SOCIAL AND ECONOMIC DEVELOPMENT OF THE STUDY AREA. DETECTING CHANGES IN THE MODES OF PRODUCTION IN THE LAST 30 YEARS.	-GEOGRAPHIC	-GEOLOGIC -TYPE OF SOIL -WATER -FAUNA	-LOCALIZATION AND MAGNITUDE OF THE NATURAL RESOURCES	-BIBLIOGRAPHICAL CARDS	-BIBLIOGRAPHICAL SEARCH	
	-GEOGRAPHIC	-OCCUPATION	-URBAN/RURAL POPULATION -ECONOMICALLY ACTIVE POPULATION -EXTENSION	-INSTRUMENT 01	-DOCUMENTARY STUDY	
2. TO STUDY THE SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE POPULATION GROUPS, AND THE FAMILY SYSTEM IN RELATIONSHIP TO PRODUCTION	-OWNERSHIP OF MEANS OF PRODUCTION	-OWNERSHIP OF LAND -OWNERSHIP OF WATER	-RELATIONS WITH THE MEANS OF PRODUCTION -OWNER -NO OWNER -COMMUNAL -OTHER	-BIBLIOGRAPHICAL CARDS -INSTRUMENT 02	-BIBLIOGRAPHICAL SEARCH -DOCUMENTARY STUDY	
	-SOCIAL RELATIONS OF PRODUCTION	-SOCIAL DIVISION OF LABOR		-CENSUS INFORMATION		
		-TECHNICAL DIVISION	-TYPE OF ECONOMIC ACTIVITY			
		-LOCALIZATION	-GEOGRAPHIC -POLITICAL -EXTENSION	-NUMBER OF HECTARES	-INSTRUMENT 03	-DOCUMENTARY STUDY -FIELD OBSERVATION -INTERVIEW
		-SIZE OF LAND		-LTS/SECTION	-OCCUPATION -INFORMANTS	
		-IRRIGATION WATER	-VOLUME OF WATER	-QUANTITY TYPE		
		-ORIENTATION OF THE PRODUCT	-TYPE OF PRODUCTS -CATTLE -AGRICULTURAL -INDUSTRIAL -CRAFTS -QUANTITY OF PRODUCT			
		-AVAILABILITY OF LOGISTIC HELP	-TYPE OF CREDIT -TYPE OF TECHNICAL ASSISTANCE			
		-INSTRUMENTS OF PRODUCTION	-MATERIAL -TRACTORS -COMBINES -TRUCKS/CARS	-DIFFERENT TYPES		-FAMILY INTERVIEW
		-POPULATION INSERTED IN THE UNITS OF PRODUCTION	-GEOGRAPHIC CHARACTER.	-AGE, SEX DISTRIBUTION BY TYPE OF ACTIVITY	-INSTRUMENT 04	-FAMILY INTERVIEW
3. TO STUDY THE KNOWLEDGE, ATTITUDES AND BELIEF SYSTEM OF THE FAMILIES ABOUT HEALTH AND DISEASE.		-CONSUMPTION OF THE LABOR FORCE	-DISTANCE TO THE WORK PLACE -DURATION OF THE WORK DAY			
		-SOCIAL REPRODUCTION	-RECOVERY OF THE LABOR FORCE	-DISTANCE TO THE MARKET PLACE -DURATION OF THE WORK DAY (QUANTITY SEAT)	-OBSERVATION AND FAMILY INTERVIEWS	
			-FAMILY INCOME	-AGES -PRODUCTS		
			-FOOD	-FREQUENCY OF FOOD INTAKE (TYPE)		
			-HOUSING	-TYPE OF HOUSING -SANITARY INFRASTR. -AREA/INDIVIDUAL		
			-EDUCATION	-HIGHER GRADE -DISTANCE TO SCHOOL		
			-COMMUNITY ORGANIZAT.	-PARTICIPATION IN COMMUNITY ACTIVITIES -TYPE AND NUMBER		
			-MEANS OF COMMUNICAT.	-RADIO, TV, NEWSPAPER -TRANSPORTATION -DISTANCE TO ROAD -FREQUENCY OF VEHICLES		
		-KNOWLEDGE	-HEALTH DEFINITIONS -DETERMINING CAUSES -PREVENTION -SOLUTION			
		-ATTITUDES	-TO DISEASE -TO HEALTH AGENTS -POLA DEALERS -MEDICIANS			
4. TO STUDY THE SOCIAL, COMMUNITY AND GROUP RESPONSE TO THE HEALTH PROBLEMS.	-HEALTH TRENDS	-GENERAL MORTALITY -INFANT MORTALITY -MORBIDITY -REGISTERED PATHOLOGY	-RATES 1962-1978	-VITAL STATISTICS	-DOCUMENTARY STUDY -FAMILY INTERVIEW	
	-PRESENT MORBIDITY	-CLINIC	-PREVALENCE/AGE AND SEX -CLINICAL FINDINGS	-INSTRUMENT 06	-CLINICAL EXAMS	
5. TO STUDY THE HEALTH STATUS OF THE FAMILIES AND DETERMINE THEIR NEEDS, BY MORBIDITY AND MORTALITY TRENDS AND BY A CROSS-SECTIONAL STUDY OF MORBIDITY.		-ON HEALTH PERSONNEL	-LOCALIZATION -SPECIALITY -TYPE	-INSTRUMENT 07	-CASE FOLLOWUP	
		-ACCESSIBILITY	-ACCESSIBILITY -TIME -MEANS OF TRANSPORTATION			
		-HEALTH SERVICES	-ADEQUACY -HUMAN RESOURCES -INFRASTRUCTURE -EQUIPMENT -MEDICINES	-NUMBER, CAPACITY -NUMBER, ADEQUACY -DISTANCE TO H. CENTER -TYPE		
		-KNOWLEDGE ON HEALTH AGENTS, SERVICES AND PROGRAMS	-HEALTH SERVICES	-RESEMBLANCE OF THE PROGRAMS		
		-USE OF HEALTH AGENTS	-REFERRAL	-TYPE OF AGENT -TIME OF EVALUATION -TREATMENT PROVIDED -EVOLUTION		

Instrument 6: Frequency of food intake by families.

Instrument 7: Status of health of the family members (physical exams).

2.3.4 COLLECTION OF INFORMATION IN THE FIELD.

We proceeded to determine and identify a sample of families in the study area and finally to collect the information using the corresponding instruments, as follows.

2.3.4.1 SAMPLING PROCEDURES.

The universe of study was defined as the population in the rural areas of Cayambe County, Pichincha Province, with 19,554 inhabitants, according to the 1974 Population Census. This population lives in an area of 363 square kilometers, cartographically defined.

The sampling procedure was carried out in two steps: random determination of single square kilometer cells, by cartography ($n=42$), and random sampling of 8 families in each one of the cells. The sample size was determined following the Mendenhall procedure for a two stage cluster sampling (125).

A field verification of the sampling cells and families was conducted. Three cells were eliminated because no families were found, so the final sample included 39 cells and 312 families.

2.3.4.2 FIELD WORK.

The collection of information in the field was conducted in several steps, according to the following chronogram:

a) Preparatory phase:

Oct 81 - Mar 81 - Bibliographical research.

Sep 81 - Nov 81 - Instrument design.

Oct 81 - Jan 82 - Sample determination and field verification.

Jan 82 - Feb 82 - Instrument pretest.

b) Collection of information phase:

Mar 82 - Apr 82 - Documented collection of health indicators.

- Interviews with the head of households:
socio-economic, production and demographic questionnaires.

Jun 82 - Jul 82 - Interview with the parents on attitudes on health and health services, and frequency (type) of food intake.

Jun 82 - Jul 82 - Physical exams and anthropometric measurements of family members.

2.3.5 ANALYSIS AND SYNTHESIS OF INFORMATION.

For processing of data and their integration and analysis, the Cyber 74 Computer System of the University of Minnesota was utilized. Specific statistical procedures were used to perform a descriptive and inferential study of the variables as well as a general test of the study model.

The descriptive component of the study included frequency distributions and cross-tabulations. For the inferential component, Pearsons' correlation coefficients of all the study variables were obtained; simple regressions, allowed the study of the relationships among the children growth and development variables; one and two way analysis of variance and covariance, allowed the study of different variables according to the different types of agricultural units; factor analysis was implemented for the construction of certain indices. The integration of the most important study variables was done by multiple regressions and path analysis.

The most important component in the statistical study of the relationships among the study variables was the path analysis. It allowed the integration of the theoretical model of relationship of variables, by constructing the path diagram, with different levels of relationship, and the calculation of the path coefficients (standarized multiple regression coefficients) that measure the degree of standarized variability in the dependent variables determined by a standarized unit of the independent variables. The

path analysis allowed the identification of the degree of direct, and indirect relationship (through other variables), of some of the study variables on other intermediate variables, and on the dependent variable, health status of the people. At the same time it allowed the calculation of the determination coefficients, which measure the overall effect (direct and indirect) of the study variables on the dependent variables. In this way, it was possible to determine the degree of contribution of the different study variables on the health status of the people in the rural areas or Cayambe.

The results of this statistical analysis served as the bases for testing the specific hypothesis as well as the whole hypothetical model of the determination of the status of health of rural populations.

CHAPTER 3

GEOGRAPHICAL AND HISTORICAL LOCATION OF CAYAMBE.

3.1 GEOGRAPHICAL LOCATION.

This study was executed in the rural zone of Cayambe County, in the Province of Pichincha, in the Republic of Ecuador (Map 3.1). Cayambe County has six Townships: Ascazubi, Canguahua, Cayambe, Cusubamba, Olmedo and Oton. It covers approximately 996 square kilometers, has irregular terrain, and ranges in altitude from 2400 to 5790 meters at the top of the Cayambe mountain after which the county is named. The equator crosses the central part of the county (Map 3.2).

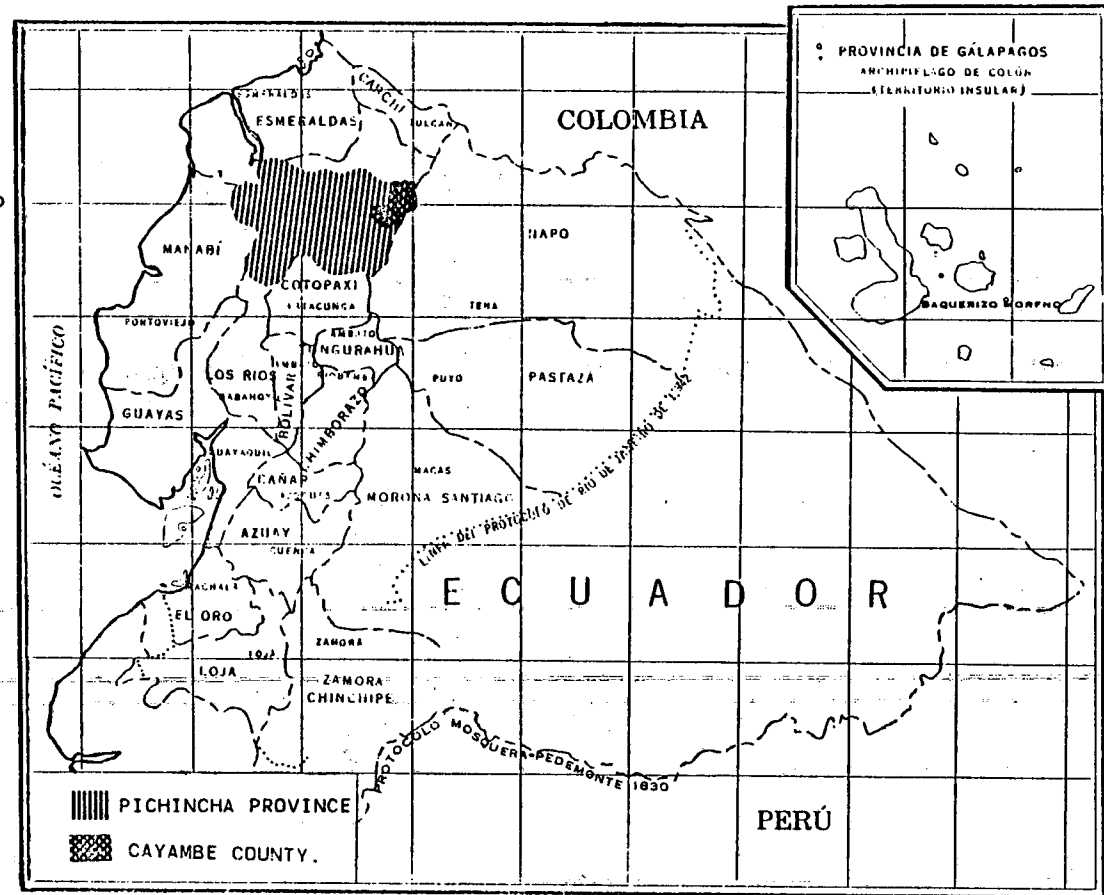
The county's topography consists of four different areas:

a. Central valley, flat, with an average altitude of 2800 m above sea level. The soil is fertile and there is an abundance of water that can be used for irrigation purposes. The main dairy ranches of the region are located in this valley.

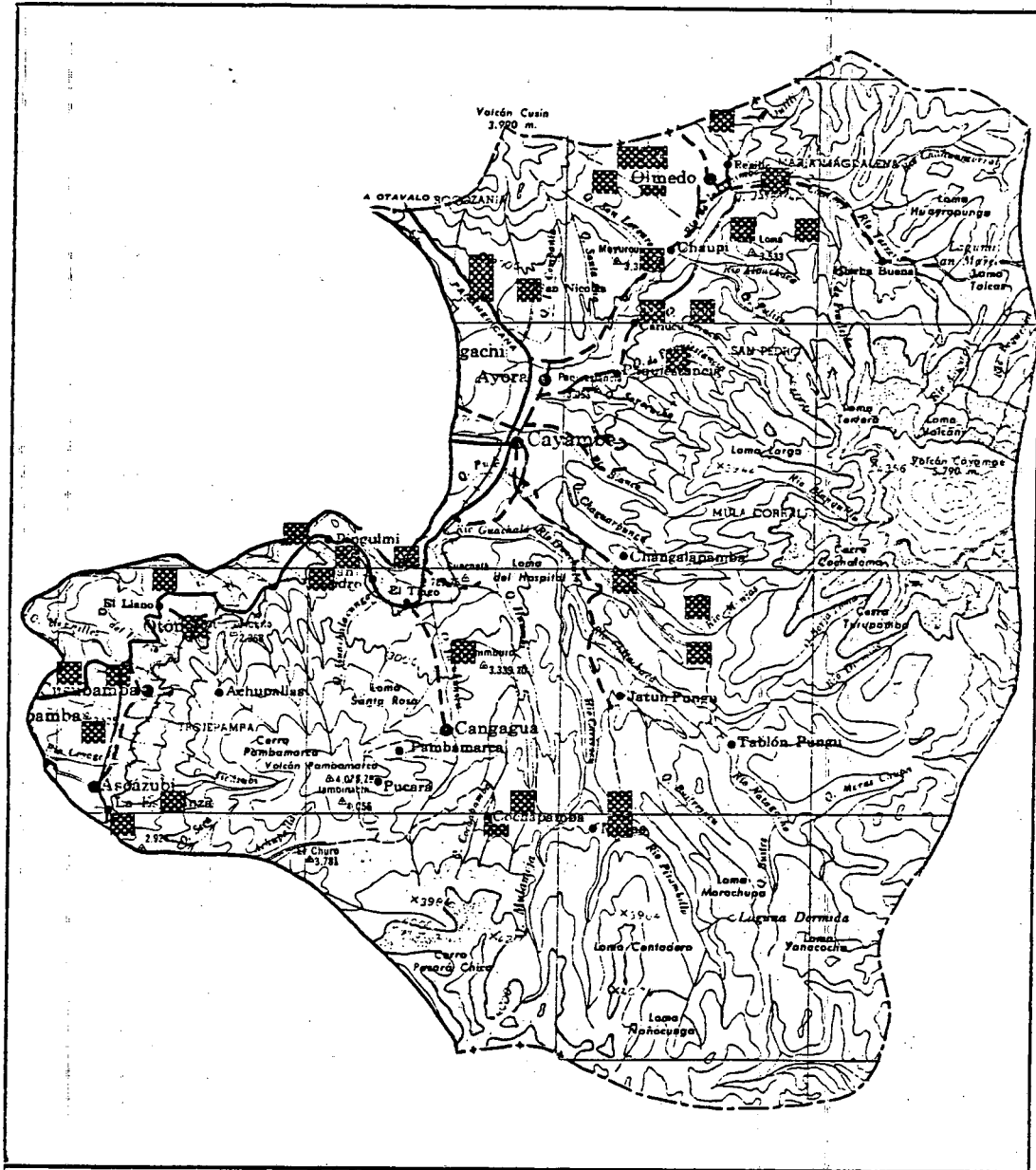
b. Flat area, which extends from the central valley into the Olmedo Township, with an average altitude of 3000 m, above sea level, also has fertile soil and adequate irrigation water. A number of cooperatives, peasant production units and some capitalist farms are located in this area.

c. Mountainous plateau, irregular, located within Canguahua township, with an average altitude of 3400 m, has less fertile soil

MAP 3.1 LOCALIZATION OF THE CAYAMBE COUNTY
IN THE REPUBLIC OF ECUADOR



MAP 3.2 LOCALIZATION OF THE POPULATION GROUPS
IN THE STUDY. CAYAMBE COUNTY,
PICHINCHA PROVINCE, 1982



which is frequently eroded. Several indigenous communities and peasant units, as well as some capitalist farms and cooperatives, are present in this area.

d. Mountain spurs, with very irregular and steep slopes, are frequently very eroded. Some peasant units are located in this area.

The temperature varies with altitude, ranging from 18 C in the central valley, to less than 0 C on the Cayambe mountain. There are no seasonal changes of temperature, due to the area's being right on the equator. The temperature does change daily; it is generally cool and cold at night, and moderate during the day. There is a rainy season which begins in October and ends in February, reaching a rain index of 1500 mm/year.

There are numerous rivers and rivulets throughout the County from the snow thaws of Cayambe mountain. Unfortunately, due to the irregularity of the terrain, there are some areas where the availability of water is limited. Thus, it is the central valley that has the greatest amount of irrigation water available.

The presence of the Cayambe mountain which is continuously covered with snow, has an important effect on the weather of the region; its air currents create a colder climate. This area, to a large extent, is very suited for agriculture and cattle farming.

The Cayambe region was, in pre-Columbian times, the seat of a very important Indian nation. Several archeological monuments, which serve as testimony to the important achievements of these people, had been discovered. The following is a synopsis of the development of the peasant economy in the area during the different historical periods.

3.2.1 DEVELOPMENT DURING THE PRE-COLUMBIAN TIMES.

The indigenous populations in the north-central zone of what is now Ecuador, reached high stages of development during pre-Columbian times. The region must have been the political center of a vast group of different ethnic groups.

Those nations must have been organized according to kinship and reciprocity (mutual obligation, favors, labor, etc.), with exchange of goods and services conditional upon the economic and ritual control of different ecological niches which assured access to the group's holdings as well as the reproduction of those holdings using agriculture. According to Murra, there is evidence that the groups attained maximum control of their ecological environments, under an economic system of circulation-distribution (126). This system allowed a real symbiosis of the tribes and the ecological niches, which favored the production and reproduction of the indigenous population (127).

Cayambe was located in the center of a network of complementary ecological zones, organized in a relatively integrated economic and

political system. At the center, there was a microvertical organization of neighboring zones, in addition to a generalized exchange system that connected these centers with distant complementary ecological zones controlled by other nations (128).

The Spanish chroniclers record the existence of groups that were very highly developed demographically as well as politically, such as those of the region of Cayambe. This area was comprised of the towns of Otavalo, Cochasqui, Perucho y Pifo, and other smaller localities (llactacunas) such as Guayllabamba, Tabacundo, Perucho y Perugache (129,130), these people have left a number of pyramids and a system of forts, which serve as archeological evidence of their level of development, particularly the pyramids, ramps and funeral mounds of Cochasqui and the 13 forts (pucas) in Pambamarca (131).

The Cayambis, as well as the Cochasquies, were the indigenous groups that put up the greatest resistance to the Inca conquerors during the XVI century. Commanded by Nasacota Puento, Quiamba Puento and Hieroico Puento, the Cayambis sustained a war with the Incas until they were finally defeated after 17 years of fighting (132). Having defeated popular resistance, the Inca empire took control of the local "senorios etnicos" (nations) and imposed their economic system, a pyramidal hierachical system of tributes, through which, without having to change the existing native organization very much they were able to redistribute the surpluses (133) and store deposits.

The short occupation (50 years) of the Incas did not allow the full implementation of the Incaic model of state, although certain practices such as military control and the establishment of tribute rates according to the particular local characteristics of each area were imposed upon the Cayambi-Caranqui region (134). The indigenous mode of agricultural production did not vary significantly; to the contrary, it was strengthened with the development of roads and an urban infrastructure. So much so, in fact that when the Spaniards arrived in 1534 the local ethnic groups reappeared, since their structural bases, their forms of organization, their customs and symbolism had not yet been altered (135).

3.2.2 DEVELOPMENT DURING COLONIAL TIMES.

Once the Spanish conquerors obtained complete military control of the Indigenous populations, "the economic base of the Indian world" changed:

- a. The land and other natural resources became the property of the Spanish Crown.
- b. The labor force was subjugated to economic relations that made accumulation a privilege of the Spanish.
- c. A system that drained the local wealth to the metropolis (Spain) was imposed, severely affecting the conditions of production and reproduction of the indigenous population. This situation caused the destruction of native Indian life and the demographic extermination of many groups living in the area.

"If the empire's population was around 8 million inhabitants in 1530, preceding the Conquest, and if it was reduced to 1.3 million around 1590, it can be understood that this decrease of more than 80% completely disorganized the traditional structures of society." (136).

The Spanish conquerors, when they took the land and productive regions, totally ignored the logic behind the structure of the Indigenous economy and seriously altered the mechanisms of native reproductive economy, like that of the vertical complementary system of ecological niches. The population was displaced from the areas with the best natural resources to less fertile regions.

The colonial system was one of "encomiendas", a system of farm production, where the "encomendero" (Spanish farmer) had the obligation to indoctrinate and provide for the material well-being of the Indigenous population in exchange for the free use of their labor in agricultural or textile production, within the boundaries of the lands given to him by the Spanish Crown. Clearly, this system was based on severe exploitation of the local native people, by means of intensive and prolonged working days and tributes. Each Indian person between the age of 18 and 50 had to pay tributes to the Spanish Crown in the form of agricultural products when the family owned their own piece of land or in the form of money if they sold their products in the marketplace or their labor in the "mita" system, a compulsory work system that forced the Indian population to work at high risk and intensive jobs (mining, lumber, harvest,

construction, textile manufacturing, sugar refineries, etc.) (137).

The Spanish Crown forced the payment of salaries and conducted commerce with Spain, in order to pay tribute as well as to drain important metals to the metropolis (Spain) more easily. Thus the accumulation of capital in the colonies was avoided. A centralized colonial system was set up which did not secure the redistribution of wealth for the well-being of all as had existed before, but rather concentrated capital in Spain (138).

As a result of this new social system, Indian culture was completely destroyed. All their symbolism and beliefs were repressed. Their views of the cosmos underwent a process of rapid acculturation that ended in the destruction of the Indian world (139).

Two main contradictions arose as colonial society developed and became more serious in nature as time went on. One of the contradictions occurred between the exploited Indians and the Spanish colonist for the use of natural resources and labor, and the other between the colonist and the Spanish Crown for the use of surplus. These contradictions became more important as the colonists tried to increase their control of the land and the labor force:

"...the monopolization of land, in addition to the increase in tributes, were the main means to obtaining it [labor force]. Upon changing the conditions of indigenous production drastically, they forced the Indians to

'voluntarily agree' to use the resources of the farm in exchange for labor, then caused them to get into debt in order to force them to remain on the land as farm laborers. All of this when the land was not completely taken by certain landlords, with whole communities on it" (140).

By the XVIII century, the legalization of large land estates was totally consolidated, already existing as a form of local power. The general conditions of the peasant population became worse, leading to the inability to pay tributes, which provided the necessary conditions and the "justification" for the landowners to increase the expropriation and exploitation of land, natural resources and labor (141). The colonist farms became a powerfully productive system, core of the colonial economy. The breaking down of the indigenous economic system forced the Indian communities to establish relationships of dependency with external agents -landowners, merchants, politicians, clergy- since they were no longer able to maintain and develop their own relationships of reciprocity and exchange.

The colonists assigned small pieces of land (huasipungos) to the peasant families, who had to pay a rent laboring four to five, or more, days a week in the hacienda. The establishment of this system based on the huasipungo allowed some population growth within the farm structure (142). The population depended completely on the farm for their reproduction. Consequently the farm system acquired

economic, political and ideological power. The consolidation of this system of agricultural production, that monopolized the ownership of the land and subjugated most of the population, established the necessary conditions for the system's self reproduction that outlived the colonial period until very recent years.

The landowners became the center of local power that disputed the colonial surplus with the Spanish monarchy. This contradiction developed into the open disagreement and struggles with the spanish authorities, ending with the liberation campaigns in the early 1800's and the building of the new social and political bases of the new independent republic.

3.2.3 DEVELOPMENT DURING THE REPUBLIC.

3.2.3.1 Period of cacao exportation.

During the first part of the XIX century, the Latin American independence movement began under the influence of the ideas of the French Revolution and with the economic support of British mercantilism. In Ecuador, independence was won and a republic was established in 1822.

Independence externally meant the end of Spanish control of the economy and the freedom to trade with other nations, mainly with the British Empire, but internally, the social relations of production remained unchanged. For most of the population, this situation only meant a switch from a Spanish master, to a "criollo" (Spaniard born

in America) (143).

The Ecuadorian economy continued to be primarily agricultural based on the same colonial system of production: concentration of the land and other natural resources in the hands of the landowners, and the feudal relationship of the population to the farm through the huasipungo system. The large landed estate continued to be "the main unit where the economic structure, political power and ideology of Ecuadorian society found their expression" (144).

During the first 50 years of the Republic, an additional process of concentration of farm land took place in the interest of obtaining greater land revenues (145). This situation meant greater displacement of the present population to less ecologically favorable areas, which had an altitude higher than 3000 m above sea level, and which were more vulnerable to climatic conditions (146).

During that period, the Ecuadorian economy began to adapt itself to the needs and requirements of the world capitalist system, developing new agricultural machinery for use of production geared to exportation of "tropical" products within a new model of international division of labor. Since then, the Ecuadorian economy has been based on two poles of development, one being the cultivation of farms in the Andean region for national consumption, and the other being the cultivation of coastal farms geared to exportation of tropical products.

The production on the farms in the Andean region, for the most part, maintained the productive organization of the colonial times. The "huasipunguero" (person within the huasipungo system) labored in farm production, while his family farmed the piece of land ("huasipungo") lent to him by the landowner and provided the landowner with additional labor, whenever needed, for a salary (147). Thus, the peasant family was involved in two types of relationships:

- a. Precapitalist relations: huasipungo.
- b. Capitalist relations : salaries.

Similarly, the farms in the coastal region began to increase their production for exportation. The conditions, rich soil, proximity to exportation ports and low population density, were favorable for the accumulation of capital (148). and thus spurred important migrations from the highlands to the coastal region (149).

The Ecuadorian economy began to depend more and more on agricultural production for exportation, especially during the 1860's with the development of the cocoa production, which contributed 30-35% of the national economy. The merchants and bankers dealing with the foreign market controlled and kept a large part of the generated wealth (150).

By the end of the 19th century, the governmental budget depended, to a large extent, on exportation taxes. This situation aggravated the contradiction between the political hegemony of the

Andean landowners and the economic hegemony of the new coastal bourgeoisie. This contradiction was resolved by the liberal revolution of 1895, which granted the political control of the state to the coastal bourgeoisie (151).

The new government stimulated production for exportation and was able to obtain additional funds to build an infrastructure and provide services, and was thereby able to consolidate the Ecuadorian state (152).

The expansion of the exportation of cocoa continued during the first two decades of this century, when a severe reduction in demand for tropical products began to take place, due to the severe world economic crisis and competition from other African and Latin American countries (153).

The agricultural exports were markedly reduced to the point that in 1932 Ecuador was able to export only 65% of the amount exported in 1929. This situation severely affected the balance of payments and the services of the public debt (154,155) and caused a severe political crisis that lasted until 1947. The complete economic dependence of the Ecuadorian development on the industrialized countries was evident; in Ecuador, the overall development has been a process of dependency on the conditions and needs of a foreign economic system (156, 157).

3.2.3.2 Period of exportation of bananas

The crisis in Ecuador's economy of the 1930's and 1940's was finally overcome by international demand for another tropical product, bananas, arising from the outbreak of World War II, and the destruction of Central American plantations by plagues and cyclones. This increasing demand opened a new frontier in agriculture in the coastal region (158), with the incorporation of new land and more labor forces migrated from the Andean region (159).

The banana became the main exportation product, with exportation rising from 8 million dollars in the 1940's to 80 million during the 1950's. The Ecuadorian economy showed signs of recovery that lasted during that decade.

Since the beginning of the Republic, the changes in agricultural production took place only in the coastal region, where the main crops were oriented to exportation, while in the Andean region the changes were minimal, even until the 1950's. At that time, the concentration of land reached one of its highest points, particularly in the Andean region. According to the 1954 Agricultural Census, 1.2% of the agricultural productive units (APUs), larger than 550 hectares, owned 48% of the useful land (160).

In the Andean region, the landowners maintained most of the control of the social system. They were able to maintain a system of production on the Andean farms that did not differ too much from the one present during the XIX century, although it was modified to

include salary relationships (161). The rural population was still able to use some of the resources controlled by the large estates in exchange for different forms of payments, according to the predominant types of production:

a. Huasipungueros: They utilized a piece of the landowner's land, but had to pay in labor (3-6 working days) or in products (about half of the crops).

b. Yanaperos: In exchange for the use of certain resources of the farm, like water, grassland, roads, etc. they had to work a certain number of days a week without pay in the farm house or on the farmland.

c. Free laborers. They worked on the farms for a salary in a typical capitalist relationship.

d. Renters: They paid in cash for the use of a certain size APU.

e. Minifundista: A peasant farmer, the owner of small pieces of land, with crops for use by the family. They very seldom sold their labor for a salary.

Of these groups, the huasipungueros were the main source of labor in farm production, while the other groups may have occasionally worked, when additional labor was required, as at sowing and harvest time (162).

As time went by, the salaried relationship became more frequent, specially during the 1950's. As Guerrero stated,

"...at the level of the process of production of the farms, the introduction of capitalism rested on the specific structures of the charging of rent by labor, leading to a double set of exploitative relationships: capitalists and precapitalists. This dichotomy is present in two types of direct workers, huasipungueros and free laborers, both members of the same extended rural family".

"These two facts are also found in the non-worker [patron], but not in two different agents (landowner and capitalist) but in a double function of one agent: the farmer" (163).

During the 1950's, a process of industrial development began to take place. Some of the income of the bourgeoisie of the coastal region was invested in industry, meeting the demand for certain goods of the internal Ecuadorian market, like beverages, cloth, cement, shoes and electric appliances (164,165). This industrial development, however, occurred with the use of imported raw materials, foreign brands, patents and technical assistance (166), and depended on the foreign currency derived from the exportation of tropical products. This situation caused an irregular growth, which also became limited with a new crisis in agro-exportation.

In the Andean region, the agricultural structure was becoming afunctional within the capitalist development in Ecuador, resulting in serious rural-urban migration. Industrialization generated an obvious need for additional labor and it was, therefore, necessary to loosen the ties of the population to the agricultural farms.

At the same time, this industrialization and urbanization process generated an additional demand for food products (milk and dairy products, meats, grains, etc.), creating a very favorable situation for increasing profits for those landowners who were able to modernize their production.

Since our study took place in the Andean region, some additional emphasis will be placed in the description of the agricultural units in that region. By the 1950's, the agricultural units in that region had an unequal development in their productive forces and relationships in production, as was documented in the CIDA report, in 1965 (167). This report describes the following types of farms:

a. Infra-traditional farms. The precapitalist relationship is predominant. The farmers have limited productivity and are barely specialized. The production is a combination of agriculture and livestock. There intensive utilization of labor, and little mechanization. Extensive units are required.

b. Traditional farms in disintegration. The precapitalist

relationships are in crisis; intense political pressure from the laborers and peasants exists. Agricultural units are of low productivity, with diversified production. The governmental estates (Ex-Social Assistance Program) were among this groups of farms.

c. Ordinary traditional farms. They were able to overcome the precapitalist relationship, but were not able to develop the productive forces, with minimal specialization.

d. Emergent modern farms. They were able to overcome the precapitalist relationship, developing a clear salarial capitalist relationship.

Barsky subdivided the last farm category into:

- Modern Intensive farms, where the profits, investments and technology were high.
- Modern extensive farms, with limited accumulation of capital and incorporation of technology (168).

It was stated by Guerrero that the infra-traditional farms and the ones in disintegration tended to disappear by the 1960's, as a consequence of the transformations that took place during that decade. While the ordinary traditional farms continued to produce without specialization, the modern farms were transformed into capitalist farms with a high degree of development of the forces of production (169,170).

The development of agriculture, until the 1950's, was limited and not combined with the development of the overall economy (171), mainly due to the decomposition of the precapitalist forms of production and the penetration of capitalism. This was a period of crisis, mainly in the rural areas of the Andean region (172), which caused a decrease in productivity, resulting from the limited utilization of the natural resources, the inability to use the labor force that was forced to migrate to the coastal region, and sparse reinvestments in the agricultural production, due to the high unproductive consumption of the landowners (173). This situation was aggravated by the demographic growth, reducing the land/laborer ratio, causing stagnation in the development of the forces of production (174), and a sharpening of the social contradictions, with clear signs of peasant discontent (175).

The modernization of the farms required the suppression of precapitalist relations, mainly represented by the huasipungo. Some farmers began to step out of those relations by granting the property of the huasipungos to the huasipunguero as payment for vacation time, social security, overtime, etc. Notwithstanding, the landowners "kept the right" to grant a different piece of land to the

huasipungueros, so they were able to gain back the more productive and rentable land in the market economy. They relocated the huasipungueros in areas of inferior quality, steep, subject to erosion and less fit for mechanization. They would also reduce the size of the land given. The huasipungueros and their families, in exchange, had to work on the farms whenever they were notified; the farms had all the labor force needed without the landowner's having any obligation to the displaced laborer.

A new important factor affected Ecuador's economy by the late 1950's. The exportation of the main tropical product, bananas, dropped because of the fall of the international prices, and competition from Central American plantations. As in previous periods, there was a new general crisis of the economy, generating general unrest (176).

As a result of this crisis, in Ecuador as well as other Latin American countries, several structural reforms were planned, under the auspices of the Alliance for Progress, a strategy of the US government. For example, the Conference of Latin American Chancellors in Punta del Este (Uruguay, 1961) emphasized the need to "stimulate programs of land reform" (177).

These international politics of modernization of precapitalist social relationships in Third World countries, was part of the New Deal strategy, implemented by international companies, foundations and organizations, as a response to the social unrest of the region, and to the possible influence of the Cuban revolution on the rest of Latin America (178).

In Ecuador, there existed the additional need to shift the emphasis of the process of capital accumulation to that of substitutive industrialization. For that purpose, an increase in production and in a consumer market was required: the modernization of agrarian production (179).

In the identification of the agrarian problems, a recognition of a crisis of the general structure was implicit; it was a must to develop new forms of production that would facilitate the accumulation of capital, and the modernization of some forms of production, mainly precapitalist, which limited or stagnated the development of the capitalist mode of production (180).

In Ecuador, the design of a program for land reform was a clear manifestation of a struggle of different interest groups in the agrarian process:

a. Agro-industrial groups, assisted by transnational enterprises, pressing for a salaried relationship on their plantations, mainly in

the coastal region.

- b. Peasant population, pressing for the use of natural resources.
- c. Landlord groups, trying to obtain additional profits by the incorporation of capital into farming.
- d. North American politics pressing for diminution of the more critical exploitative situations, neutralization of the peasant pressure, and maintenance of political control (181,182).

The modernization of agriculture in Ecuador, was initiated by the State with practices favoring the cattlemen, such as subsidies, credits, tax exemptions, technical assistance, etc., which allowed for an initial capitalization of the more efficient farms (183).

This process was accelerated by the State with the decree of the Land Reform Law (decree 1480, July 11, 1964), which proposed that:

1. The lands affected are those that remained idle for the last 3 years, those deficiently cultivated, and those where the demographic density is great, and those where the laws of agricultural work are violated.
2. The maximum size for agricultural units is set at 2500 hectares in the coastal region and 800, in the Andean region.
3. The efficiently cultivated agricultural units are exempt from the possibility of expropriation.
4. The huasipungo and yanapa systems are declared illegal, and the huasipungueros and yanaperos were to receive reimbursement.
5. The rent system would be allowed for 8 years, once the law goes

into effect.

6. The "aparceria" system form of production by which the landowners provides the land and seeds, and the peasant his/her labor and the final crop is devided into two equal parts, is also abolished (184).

In Ecuador, the process of land reform had a limited effect in relation to redistribution of land, but was able to consolidate the efficient farmers. The huasipungueros were given land in the worst ecological areas, while the landowners were able to keep the most productive lands.

The changes in agricultural production had negative effects for the great majority of the rural population. Only the huasipungueros received a little piece of land, while the rest of the rural population did not have any part in the redistribution of the land (185). In exchange for the pieces of land, however, the huasipunguero lost all their rights of payment for vacation, social security, and other benefits, and at the same time, lost all the possibilities of access to the natural resources controlled by the large estates, like water, wood, grassland, etc. Consequencely, a new limitation for the use of different ecological niches was imposed on the rural population.

3.2.3.3 Period of exportation of petroleum.

During the 1970's, the Ecuadorian economy began to be based on the exportation of a new product, petroleum. The world energy crisis, derived from the Arab oil embargo, created an increasing demand for the exportation of this product from Ecuador. The State was the center of control of this exportation, which determined articulation and resulted in the generation of an expanded government income, from 4,102 millions of sucres in 1971, to 11,428 millions in 1974 (178% increase), leading to the notion that the exportation of petroleum would be the final solution for the critical social problems, the "Ecuadorian miracle" (187, 188).

During the early 1970's, the Ecuadorian exportation of petroleum reached its highest level, generating an important national income. A system of loans, both governmental, for infrastructure construction, and private, for industrial development, was created. These loans were to be paid back with the profits for the exportation of petroleum. During this decade, no strategy for an independent development was established. On the contrary, the degree of dependency on the industrialized countries grew larger. The ownership of the means of production became more concentrated, and the foreign debt increased significantly. The needed changes in order to improve the general living conditions of most of the population were not accomplished. The consolidation of the State and of an economic system that shifted the emphasis of capital accumulation from

exportation of tropical products to industrialization was accomplished (189).

The State stimulated a consumist model, which favored the accumulation of capital in the internal market (190, 191). It actively intervened in the process of industrialization and favored international investment, which grew from 276 millions of dollars in 1970, to 880.2 millions in 1977, mainly directed toward industrialization (192). Several measures were taken to stimulate industrialization, like credits, exemption of custom and income taxes, importation of capital goods (mainly machinery) (193-195).

While industrial development was greatly encouraged, rural development was not. The promised reforms of the Military Government, mainly the larger agrarian reform, never took place. As may be gathered from the comparison of the Agrarian Census of 1962 with that of 1974, the changes in the general structure of land ownership were very limited. Even though there was a decrease in the number of agricultural units in areas of 500 or more hectares, there was an increase in productive units in areas between 10-50 and 50-100 hectares, which consolidated a rural "petite bourgeoisie" (196).

The sparse development in the rural sector was mainly dependent on the increase in productive land (colonization) rather than on an increase in productivity of the agricultural units (197). Agricultural development took place mainly on the main plantations

devoted to exportation (cotton, soy, abaca, african palm, etc.)(198), while there was a clear decrease in production of the rest of the units, mainly those of the medium and small farmers who grew food for the national food consumption. There was a significant decrease in the production of grains, legumes and vegetables (199). This situation forced the government to start importing food, mainly wheat, corn and rice, with dollar values of 370 millions in 1967 and 700 millions in 1972 (200).

As was previously stated, the only development taking place in Ecuador during the 1970's was in the industrial sector, oriented to replacing imports of durable goods, intermediate products and some capital goods. This industrial development, however, needed foreign raw or intermediate materials, technology and investments. Only on a limited basis did the Ecuadorian industries require national materials (textiles: 50%, intermediate goods:30%, capital goods:10%)(201). For that reason, industrialization was very vulnerable to the fluctuations of international economy.

This process of industrial development had the additional effect of concentration of private property and generated greater intersectorial imbalances, severely affecting the rural areas, with little possibility of using the labor force which was forced to leave the farms (202).

Notwithstanding, the State tried to neutralize the more severe

crisis in the rural areas, trying to change the process of Land Reform. In October 1973, The Ecuadorian Military Junta passed the Second Land Reform Law (Decree 1172), with the following main objectives:

- a. To improve the distribution of the ownership of the land.
- b. To provide credit and technical assistance to the farmers.
- c. To help organize the commercialization of the farm products.
- d. To provide services for community improvement (203).

This new land reform law did not differ significantly from the previous law. It forced the less efficient landowners to develop a process of modernization, in that the law affected the deficiently cultivated farm which would not fulfill a "social function". The law and regulations were so lax that they were very weakly enforced (204).

Up to 1978, the concentration of ownership of the land was as great as in previous decades: 400 landlords had 10 times more land than 200,000 small farmers. Less than 10.6% of the large agricultural estates were affected by the two Land Reform Laws, mainly the State farms (205).

An interesting summary of the impact of the Land Reform Laws is presented by Barsky, et al, using the Census data (Table 3.1):

- "a) There is an important increase in the number of units (50.8%) and in the area (32.5%).

CAYAMBE PROJECT

TABLE 3.1 EVOLUTION OF THE NUMBER AND AREA OF THE AGRICULTURAL UNITS BY STRATA IN THE ECUADORIAN ANDEAN REGION. 1954-1974.

TAMAÑO HA.	NUMERO DE EXPLOTACIONES						SUPERFICIE TOTAL					
	1954		1974		Evolución 54/74		1954		1974		Evolución 54/74	
	No.	o/o	No.	o/o	No.	o/o	No.	o/o	No.	o/o	No.	o/o
-1/	83.714	32.2	113.537	35.1	29.823	35.5	40.400	1.4	49.574	1.6	9.174	22
1/ 5	128.439	49.5	138.370	42.9	9.931	7.7	301.300	10.0	315.924	10.3	14.624	4
5/ 10	22.443	8.7	29.067	9.1	6.624	29.5	154.700	5.1	195.302	6.4	40.602	26
10/ 20	10.570	4.1	18.266	5.6	7.696	72.8	142.000	4.7	241.226	7.8	99.226	60
20/ 50	7.322	2.9	13.798	4.3	6.476	88.4	220.000	7.3	421.866	13.7	201.866	91
50/ 100	3.594	1.4	6.014	1.9	2.420	67.3	218.700	7.2	368.043	12.1	149.343	68
100/ 500	2.368	0.9	2.935	0.9	567	23.9	471.100	15.6	504.702	16.4	33.602	-7
500/1000	330	0.1	312	0.1	- 18	- 5.4	228.300	7.6	205.714	6.7	- 22.586	-9
1000/2500	251	0.1	201	0.06	- 50	- 19.9	362.700	11.9	300.860	9.8	- 61.831	- 17
+2500	138	0.1	86	0.04	- 52	- 37.7	881.200	29.2	471.054	15.3	- 410.146	- 46
TOTAL	259.160	100.0	322.586	100.00	63.417	24.5	3.020.400	100.0	3.074.274	100.0	53.874	2

SOURCE: O. BARSKY, POLITICAS AGRARIAS, P. 78

- b) The fact that the large estates (larger than 1000 hectares) has lost 652.167 hectares, which represent 29% of the total land they had in 1954 is significant.
- c) A result of this distribution and of the process of colonization, is the growth of the units, between 10 and 500 Ha. Particularly important is the growth of the 20-50 and 50-200 Ha strata.
- d) The important growth of the middle strata does not mean the disappearance of the large estates, but a loss of their relative importance.
- e) The redistribution of the land also benefited the strata of less than 5 Ha, which increased by 24.6% in the control of the land"(206).

These tendencies are explained mainly through the inheritance process, and to a lesser extent to the land reform, colonization, sale, or liquidation of the precarious forms of production. This new land reform law meant a consolidation of the monopolistic ownership of the land, and a mechanism of political control of the peasant population (207, 208).

But this modernization of the agricultural production did not benefit most of the rural population. The small farmers (ex-huasipungueros and peasants) had extremely small agricultural units, without productive value for a market economy, infertile, with high erosion, and of poor yield, and was not sufficient, given the

labor force of a rural family. They were not provided with technical assistance, so they kept on using primitive agricultural methods on small pieces of land, on which they barely could subsist (209). Only a few small farmers were able to specialize their production of vegetables and legumes to be sold in the local market with very little profit.

The process of fragmentation of the small farms was aggravated by progressive inheritance subdivisions. The social and economic problems of the rural areas became more severe. This critical situation has not been helped by the governmental action, and has caused massive migratory movements to the big cities.

All this unequal development of the rural areas was taking place while the exportation of petroleum was at its peak. After 1975, however, it was possible to find some important signs of the decline of the "ecuadorian miracle": reduction in the amount of petroleum exported, due to reduction of the international demand, and boycotts on the part of the oil transnationals.

This situation resulted in the reduction of the national income and the increase of the fiscal deficit and foreign debt. The international investments began to drop rapidly, as in the production and exportation of certain industrialized products, all of which produced a negative trade balance for Ecuador of 160 millions of dollars (210).

At the national level, the economic crisis produced massive underemployment and unemployment. The International Organization of Labor estimated that more than 75% of the economically active population, had incomes smaller than 2844 sucres (95 dollars) a month. This meant that three-fourths of the Ecuadorian population had insufficient income to meet their basic needs.

The Military Government tried to stimulate some economic measures, like credit and tax exceptions to increase exportation, mainly of tropical products. It tried to stimulate the investments in the rural area by eliminating the process of land reform, and implementing the Agricultural Promotion and Development Law, by which subsidies and credits were given to the large estates. This situation meant the consolidation of the capitalist social relations in the rural areas and the additional impoverishment of the middle and small farmers (211).

This development in the mode of production in Ecuador may be best exemplified by the Cayambe region. The general description of the colonial and early republican times are present in the agricultural production in that county. Cayambe is perhaps the most typical case of the modernization process taking place in the Andean region during the last 30 years, which explains the importance of conducting the present study in that area.

In Cayambe county, this process of modernization of the agricultural production had its vanguard, during the 1960's. The Cayambe landowners, making use of the good ecological conditions for dairy production, with heavy investments introduced technology to develop a specialized production of milk: artificial insemination, mechanical milking devices, artificial grassland, and the importation of cattle of high milk production.

The large agricultural units were able to produce 90% of the total milk production in Cayambe, which allowed them to obtain high profits, to accumulate capital, and to reinvest in the farms. These agricultural units become completely mechanized, capitalist dairy farms, which used very little manpower (212).

The agricultural productive units (APUs) with less than 5 hectares, in the county we are studying, are, by far, the most common, reaching 94.6% of the total number of APUs, and covering only 8.5% of the land, with an average of 1.3 hectares per APU, according to the 1974 Census (213).

Some cooperative APUs developed in this zone, from the dissolution of some of the traditional farms, mainly the State's.

In the Cayambe region, the very high level of dairy production favored the establishment of dairy processing plants during the early 1970's. They were able to monopolize the production of milk not only

in Cayambe County, but also in parts of the Pichincha and Imbabura Provinces. This new industry was very much controlled by the big farmers, the major investors, and lately, has been controlled by the Nestle Transnational Company.

This dairy industry was able to create some employment in administrative, technical and transportation activities, requiring certain specialization and qualifications of the workers. Therefore, most of the local peasant population was not eligible for these positions. Thus, the contribution of this industry to the solution of underemployment of the local population was minimal.

This process of development in Cayambe, as well as in other regions in Ecuador, increased the differences among the rich and the poor, displaced thousands of laborers from their agricultural settings, who were not incorporated into the industrial process, thus becoming part of the slums of the big cities (226). New forms of production and new types of social relations created new forms of consumption and reproduction in the labor force. As already stated, this situation was detrimental for most of the population, and it has been hypothesized that it must have had a detrimental effect on the status of health of the population.

After having described geographically, historically and socially, the population of Cayambe, it is important to learn about the magnitude and distribution of the social and health phenomena

among the different population groups, involved in different forms of agricultural production in the area of study, all of which will be presented in the following chapters.

CHAPTER 4

PRESENT STATUS OF THE POPULATION IN RURAL AREAS OF CAYAMBE.

4.1 CHARACTERIZATION OF THE PROCESS OF PRODUCTION.

In previous chapters the unequal development of agricultural production in the Cayambe region was recognized. Differences in size, use of labor force, incorporation of mechanization, and relations of production were noted in the agricultural units. Therefore it is necessary to develop a more specific and differential characterization of the development of the productive forces (labor force and means of production) in the different forms of agricultural production.

4.1.1 CHARACTERIZATION OF THE LABOR FORCE.

4.1.1.1 DEMOGRAPHIC CHARACTERISTICS

In the study of the characteristics of the labor force, it is necessary to consider not only the population presently involved in the process of production, but also the one that may eventually be involved. This means the consideration not only of the laborers but also their families.

According to the III Population and Housing Census of 1974, the total population of the county was 34,163 inhabitants, 48.4% residing in the county seat, and the rest residing in different townships: Ascazubi 5.7%, Cangahua 22.4%, Olmedo 15.4%, Oton 4.0%, and Cusubamba 4.1%. Of the total population, 11,190 inhabitants

lived in the city of Cayambe, while the rest, 22,973 inhabitants (67.2%), lived in the rural areas (Table 4.1).

At the county level, the male population was 16,639 (48.7%) and the female 17,523 (51.3%). It is a young population, with 53.2% of the inhabitants younger than 20 years of age (Table 4.2).

In the rural areas, the age and sex distribution of the population does not differ from the general population distribution in the county. Of the 22,963 inhabitants, 48.8% were males and 51.2% were females, while 53.5% were younger than 20 years of age (Table 4.3).

Among the 295 study families, the age and sex distribution did not differ from the census data. Of the 1507 study individuals, 752 were males (49.9%) and 755 were females (50.1), and 839 (55.6%) were younger than 20 years of age (Table 4.4).

The families in the sample differed in the form of involvement in agricultural production. Of 1507 individuals, 47.0% were directly or indirectly tied to peasant production, 38.5% to cooperatives, 7.8% to agro-industry, and 6.6% to capitalist farms (Table 4.5). These data show, from the size of the involved population, the importance of the forms of peasant production and cooperatives within Cayambe county.

This is a population with a high proportion (48.6%) of

CAYAMBE PROJECT

TABLE 4.1 POPULATION BY PLACE OF RESIDENCE AND TOWNSHIP
TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	CENTER	PERIPHERY	TOTAL
CAYAMBE	11190 67.68 76.64	5342 32.31 27.31	16532 48.4
ASCAZUBI	1020 52.74 6.98	914 47.25 4.67	1934 5.66
CANGAHUA	944 12.32 6.26	6716 87.67 34.34	7660 22.46
OLMEDO	933 17.75 6.39	4321 82.24 22.09	5254 15.38
OTON	226 16.36 1.34	1155 83.63 5.9	1381 4.04
CUSUBAMBA	286 20.54 1.95	1106 79.45 5.65	1392 4.07
TOTAL	14599 42.74	19554 57.25	34163 100

SOURCE: III POPULATION CENSUS, 1974.

CAYAMBE PROJECT

TABLE 4.2 POPULATION BY AGE GROUPS AND SEX IN
TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	MALES	FEMALES	TOTAL
0-9	5522 50.58 33.18	5395 49.41 30.78	10917 31.95
10-19	3663 50.36 22.01	3610 49.63 20.6	7273 21.28
20-39	3795 46.43 28.8	4384 53.6 25.01	8179 23.94
40-59	2437 48.39 14.64	2599 51.6 14.83	5036 14.75
60>	1222 44.32 7.3	1535 55.67 8.75	2757 8.07
TOTAL	16639 48.7	17523 51.29	34162 100

SOURCE: III POPULATION CENSUS, 1974

CAYAMBE PROJECT

TABLE 4.3 POPULATION BY AGE GROUPS AND SEX IN
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

AGE GRP	MALES	FEMALES	TOTAL
0-9	3822 50.37 34.12	3765 49.62 32.00	7587 33.04
10-19	2366 50.27 21.12	2340 49.72 19.89	4706 20.49
20-49	2613 46.56 23.33	2998 53.43 25.48	5611 24.43
40-59	1645 48.87 14.68	1721 51.12 14.63	3366 14.65
60>	754 44.53 6.73	939 55.46 7.98	1693 7.37
TOTAL	11200 48.77	11763 51.22	22963 100

SOURCE: III POPULATION CENSUS, 1974

CAYAMBE PROJECT

TABLE 4.4 AGE BY SEX DISTRIBUTION OF THE STUDY POPULATION.
RURAL CAYAMBE COUNTY, ECUADOR, 1982

AGE GROUPS	SEX		ROW TOTAL
	COUNT		
	ROW PCT COL PCT	MALE FEMALE	
0 - 4	140	127	267
	52.4	47.6	17.7
	18.6	16.8	
5 - 9	132	118	250
	52.8	47.2	16.6
	17.6	15.6	
10 - 14	98	88	186
	52.7	47.3	12.3
	13.0	11.7	
15 - 19	52	84	136
	38.2	61.8	9.0
	6.9	11.1	
20 - 29	112	122	234
	47.9	52.1	15.5
	14.9	16.2	
30 - 39	87	88	175
	49.7	50.3	11.6
	11.6	11.7	
40 - 49	56	62	118
	47.5	52.5	7.8
	7.4	8.2	
50 - 59	43	36	79
	54.4	45.6	5.2
	5.7	4.8	
60 - 69	18	21	39
	46.2	53.8	2.6
	2.4	2.8	
70 - +	14	9	23
	60.9	39.1	1.5
	1.9	1.2	
COLUMN TOTAL	752 49.9	755 50.1	1507 100.0

RAW CHI SQUARE = 12.15421 WITH 9 DEGREES OF FREEDOM.
SIGNIFICANCE = .2048
CONTINGENCY COEFFICIENT = .08945

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.5 STUDY POPULATION BY TYPE OF AGRICULTURAL PRODUCTION.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
COOPERATIVE	580	38.5	38.5	38.5
CAPIT. FARM	100	6.6	6.6	45.1
PEASANT	709	47.0	47.0	92.2
AG. INDUSTRY	118	7.8	7.8	100.0
TOTAL	1507	100.0	100.0	

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

economically dependent individuals (younger than fifteen and older than 65 years of age). This proportion was significantly higher in the cooperatives (53.3%) than in the other types of units (Table 4.6).

4.1.1.2 OCCUPATIONAL CHARACTERISTICS

The IIIrd Population and Housing Census of 1974 showed that of the 21,126 individuals 12 years of age or older, only 44.4% were fulfilling economic activities, 82.2% among males, and 10.7% among females (Table 4.7).

In the rural areas of the county, of the 14,019 individuals in the same category, only 44.4% were considered economically active, 86.2% among males, and 7.0% among females (Table 4.8).

Most of the economically active population of the county was involved in agricultural production. According to the census data, the people in that population group (9379) worked in agriculture in a high proportion (51.2%), but worked in smaller proportions in other activities like construction (11.3%), services (12.2%), and the manufacturing industry (9.8%) (Table 4.9). So the importance of agricultural production in the economy of the region is quite significant.

When considering only the rural areas, the importance of agriculture was seen to be even greater. Of 6237 economically active individuals, 4292 (68.8%) were involved in agriculture, 711 (11.4%)

CAYAMBE PROJECT

TABLE 4.6 STUDY POPULATION BY LEVEL OF ECONOMIC DEPENDENCY.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF APU	COUNT ROW PCT COL PCT	DEPEN- DENT	ACTIVE	ROW TOTAL
COOPERATIVE	309 53.3 42.2	271 46.7 35.0	580 38.5	
CAPIT. FARM	46 46.0 6.3	54 54.0 7.0	100 6.6	
PEASANT	323 45.6 44.1	386 54.4 49.9	709 47.0	
AG. INDUSTRY	55 46.6 7.5	63 53.4 8.1	118 7.8	
COLUMN TOTAL	733 48.6	774 51.4	1507 100.0	

RAW CHI SQUARE = 8.16063 WITH 3 DEG. FREED.
CONTINGENCY COEFFICIENT = .07339 SIGNIFICANCE = .0428

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.7 POPULATION 12 YEARS OF AGE OR OLDER BY SEX
AND ECONOMIC ACTIVITY.
TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

COUNT ROW PCT COL PCT	ACTIVE	INACTIVE	TOTAL
MALES	8178	1773	9951
	82.2	17.8	47.12
	87.2	15.9	
FEMALES	1201	9974	11175
	10.74	89.25	52.87
	12.79	84.9	
TOTAL	9379	11747	21126
	44.4	55.6	100

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.8 POPULATION 12 YEARS OF AGE OR OLDER BY SEX
AND ECONOMIC ACTIVITY
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

COUNT ROW PCT COL PCT	ACTIVE	INACTIVE	TOTAL
MALES	5716 86.24 91.64	912 13.75 11.71	6628 47.27
FEMALES	521 7.04 8.35	6870 92.95 88.28	7391 52.72
TOTAL	6237	7782	14019

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.9 ECONOMICALLY ACTIVE POPULATION BY
TYPE OF OCCUPATION
TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	NUMBER	PCT
AGRICULTURE	4803	51.2
CONSTRUCTION	1059	11.3
SERVICES	1147	12.2
IND. WORKER	923	9.84
OTHER	1447	15.42
TOTAL	9379	

SOURCE: III POPULATION CENSUS, 1974, P. 261

in construction, 361 (5.8%) in services and 275 (4.4%) in the manufacturing industry, according to the census data (Table 4.10).

Most of the economically active population in the county worked for a salary (56.0%) or were self employed (31.6%); smaller percentages were family workers without remuneration (5.2%), and the smallest group is the patrons (2.6%) (Table 4.11). In the rural areas of the county these proportions were very similar: 55.0% worked for a salary, 31.7% were self-employed, 6.6% were family workers without compensation, and 2.9% were patrons (Table 4.12).

The previous information shows the severe economic disparity within the county, because more than half of the population had become rural proletariats working for a salary, while less than 3% of the population constituted the patrons. This also suggests the high concentration of ownership of the means of production. Among the rest of the population, less than 40% were self-employed or work without remuneration in the family fields.

As Table 4.13 shows, of the 280 study families who provided information on their main economic activity, 143 (51.1%) were involved in agriculture, 34 (12.1%) were agricultural equipment machinists, so a total of 177 families (62.5%) were tied to agricultural production, while sixty three (22.5%) worked in construction, and thirty two (11.4%) worked in agro-industry. Most of the construction workers and machinists came from peasant families, 74.6% and 52.9% respectively.

CAYAMBE PROJECT

TABLE 4.10. ECONOMICALLY ACTIVE POPULATION BY
TYPE OF OCCUPATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	NUMBER	PCT
AGRICULTURE	4292	68.8
CONSTRUCTION	711	11.4
SERVICES	361	5.8
IND. WORKER	275	4.4
OTHER	598	9.5
TOTAL	6237	

SOURCE: III POPULATION CENSUS, 1974, P. 263

CAYAMBE PROJECT

TABLE 4.11 ECONOMICALLY ACTIVE POPULATION
BY TYPE OF OCCUPATION
TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	NUMBER	PCT
WAGE LABORER	5258	56.1
SELF EMPLOYED	2972	31.7
WITHOUT SALARY	485	5.2
LANDHOLDER	245	2.6
OTHER	4.9	4.5
TOTAL	9379	

SOURCE: III POPULATION CENSUS, 1974, P. 258.

CAYAMBE PROJECT

TABLE 4.12 ECONOMICALLY ACTIVE POPULATION
BY TYPE OF OCCUPATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	NUMBER	PCT
WAGE LABORER	3433	55.0
SELF EMPLOYED	1979	31.7
WITHOUT SALARY	415	6.6
LANDHOLDER	181	2.9
OTHER	229	3.7
TOTAL	6237	

SOURCE: III POPULATION CENSUS, 1974, P. 260.

CAYAMBE PROJECT

TABLE 4.13 MAIN ECONOMIC ACTIVITY OF THE HEAD OF THE
HOUSEHOLD BY TYPE OF AGRICULTURAL UNIT
STUDY POPULATION, RURAL CAYAMBE COUNTY, 1982

	CATTLE FARMING	MACHINIST	CONSTRC. WORKER	INDUSTR. WORKER	OTHER	TOTAL
COOPERATIVES	78 73.5 54.5	13 12.3 38.2	8 7.5 12.7	3 2.8 9.4	4 3.77 50.0	106 37.9
CAPIT. FARMS	7 38.9 5	2 11.1 5.9	7 38.9 11.1	2 11.1 6.3	0 0 0	18 6.4
PEASANT. PROD.	58 43.9 40.5	18 13.6 52.9	47 35.6 74.6	5 3.8 15.6	4 3.0 50.0	132 47.1
AGRO INDUSTRY	0 0 0	1 4.2 2.9	1 .2 1.6	22 91.7 68.8	0 0 0	24 8.6
COLUMN TOTAL	143 51.0	34 12.1	63 22.5	32 11.4	8 2.8	280 100

CHI2 = 202.804 D.F. = 12 SIG. = 0
CONTINGENCY COEFFICIENT = .65128

NUMBER OF MISSING OBSERVATIONS = 15

SOURCE : SOCIO ECONOMIC QUESTIONNAIRE

The general participation of women in productive activities is quite important, although the census data do not show this. According to the field study information presented in Table 4.14, 71.4% of the housewives developed some productive activities, mainly in peasant production (78.2%), capitalist farms (70.6%) and cooperatives (66.7%). Only 41.7% of the housewives in the agro-industry developed economic activities, this difference being statistically significant.

The participation of other family members in productive activities is also important. More than 50% of the families had at least one additional family member involved in production. The average number of additional family members working varied from .87 in agro-industry, to 1.0 in cooperatives, to 1.4 in capitalist farms, and 1.5 in peasant production. In general, there was greater participation in economic activities by the children of families involved in agriculture (Table 4.15).

The educational level of the families in the region was also very limited. In 1974, the census data showed that the illiteracy index of the population in Cayambe county was very high, because out of 27,310 individuals six years of age or older, 12,964 (47.5%) were illiterate. This proportion was even higher in the rural areas, where of 18,096 in that age group, 10,879 (60.11%) were illiterate, while in the urban areas, of the 9,214 people in the same age group, 2085 (22.6%) were illiterate. These differences are statistically

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TABLE 4.14 PARTICIPATION OF WIFE IN PRODUCTION BY TYPE OF AGRICULTURAL UNIT
STUDY POPULATION CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	PARTICIPATION		
	COUNT	WORKING	NON WORKING
	ROW PCT COL PCT		
COOP	66 66.7 34.7	33 33.3 43.4	99 37.2
CAPITAL. FARM	12 70.6 6.3	5 29.4 6.6	17 6.4
PEASANT PRODCT	104 78.2 54.7	29 21.8 38.2	133 50.0
AGRO INDUSTRY	8 47.1 4.2	9 52.9 11.8	17 6.4
COLUMN TOTAL	190 71.4	76 28.6	266 100.0

RAW CHI SQUARE = 9.03715 WITH 3 DEG. FREED.
SIGNIFICANCE = .0288 CONTINGENCY COEFFICIENT = .18127

NUMBER OF MISSING OBSERVATIONS = 29

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.15 PARTICIPATION OF CHILDREN IN PRODUCTION BY TYPE OF AGRICULTURAL UNIT
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	COUNT		NUMBER OF CHILDREN PARTICIPATING								ROW TOTAL	
	ROW PCT	COL PCT	0	1	2	3	4	5	6	7		8
COOP	57	14	14	10	8	0	1	2	2	0	0	108
	52.8	13.0	13.0	8.3	7.4	0	.9	1.9	1.9	0	0	36.6
	38.8	35.0	30.4	45.5	40.0	0	25.0	66.7	40.0	0	0	
CAPITAL FARM	7	4	5	0	0	0	2	0	0	0	0	18
	38.9	22.2	27.8	0	0	0	11.1	0	0	0	0	6.1
	4.8	10.0	10.9	0	0	0	50.0	0	0	0	0	
PEASANT PRODC	67	20	23	11	12	7	1	1	2	1	1	145
	46.2	13.8	15.9	7.6	8.3	4.8	.7	.7	1.4	.7	.7	49.2
	45.6	50.0	50.0	50.0	60.0	100.0	25.0	33.3	40.0	100.0	0	
AGRO INDUSTRY	16	2	4	1	0	0	0	0	1	0	0	24
	66.7	8.3	12.5	4.2	0	0	0	0	4.2	0	0	8.1
	10.9	5.0	8.7	4.5	0	0	0	0	20.0	0	0	
COLUMN TOTAL	147	40	46	22	20	7	4	3	5	1	1	295
	49.8	13.6	15.6	7.4	6.8	2.4	1.4	1.0	1.7	.3	.3	100.0

RAW CHI SQUARE = 36.0999 27 DEG.FREED. SIGNIFICANCE = 0.100

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

significant (Table 4.16).

The illiteracy index was higher for females than for males at the county level, especially in the rural areas. Table 4.17 shows that the illiteracy index in the urban areas was higher for females than males (28.1% and 16.6%, respectively). In rural areas the difference was even greater (70.2% and 49.3%) (Table 4.18).

Taking into account the educational levels of the individuals, the deficiency of education was even more evident. If we consider the urban population six years of age or older (n=9214), 22.9% were illiterate, 26.5% reached the first to third grades in elementary school and 34.6%, the third to sixth grades. Only 13.9% reached some level in high school (sixth through twelfth grades), and 1.6% were in the university (Table 4.19).

The educational level was even poorer in rural areas, since of the population six years of age or older (n=17,901), 60.8% were illiterate, 19.6% were between grades one and three, 16.7% were between grades four and six. Only 2.1% and .2% had reached high school or university levels, respectively (Table 4.20). This educational deficiency was statistically greater for females than for males, both at the urban as well as the rural level (Tables 4.19, 4.20).

When comparing the educational level of the study population five years of age or older by type of agricultural productive unit

CAYAMBE PROJECT

TABLE 4.16 POPULATION 6 YEARS OF AGE OR OLDER
 BY LITERACY STATUS AND PLACE OF RESIDENCE.
 TOTAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	URBAN	RURAL	TOTAL
LITERATE	7129 49.69 77.37	7217 50.3 39.88	14346 52.53
ILLITERATE	2085 16.08 22.62	10879 83.91 60.11	12964 47.46
TOTAL	9214 33.73	18096 66.26	27310 100
CHI2=3441.16	DF=1	SIG=0.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.17 POPULATION 6 YEARS OF AGE OR OLDER
 BY LITERACY STATUS
 URBAN CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	MALES	FEMALES	TOTAL
LITERATE	3675	3454	7129
	51.5	48.4	77.4
	83.3	71.9	
ILLITERATE	734	1351	2085
	35.2	64.8	22.6
	16.6	28.1	
TOTAL	4409	4805	9214
	47.8	52.1	100
CHI2=172.7354	DF=1	SIG=.001	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.18 POPULATION 6 YEARS OF AGE OR OLDER
 BY LITERACY STATUS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	MALES	FEMALES	TOTAL
LITERATE	4437 61.4 50.7	2783 38.5 29.8	7220 39.9
ILLITERATE	4313 39.6 49.3	6566 60.3 70.2	10879 60.1
TOTAL	8750	9349	1809
	CHI2=826.576	DF=1	SIG=.001

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.19 POPULATION 6 YEARS OF AGE OR OLDER
 BY SEX AND EDUCATIONAL LEVEL
 URBAN CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	MALES	FEMALES	TOTAL
NONE	734 35.2 16.8	1351 64.8 28.5	2085 22.9
LITERATE	13 56.5 .3	10 43.5 .2	23 .3
1-3	1174 48.1 26.9	1267 51.9 26.7	2441 26.5
4-6	1782 56.5 40.8	1370 43.5 28.9	3152 34.6
HIGH SCH.	553 43.7 12.7	710 56.2 14.9	1263 13.9
COLLEGE	106 73.6 2.4	38 26.4 .8	144 1.6
TOTAL	4409 47.9	4805 52.1	9214 100

CHI2=276.300 DF=5 SIG=0.000

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.20 POPULATION 6 YEARS OF AGE OR OLDER
 BY SEX AND EDUCATIONAL LEVEL
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	MALES	FEMALES	TOTAL
NONE	4313	6566	10879
	39.6	60.4	60.8
	49.9	70.9	
LITERATE	77	25	102
	75.4	24.5	.56
	.9	.3	
1-3	2101	1407	3508
	59.9	40.1	19.6
	24.3	15.2	
4-6	1919	1074	2993
	64.1	35.9	16.7
	22.2	11.6	
HIGH SCH.	203	171	374
	54.3	45.7	2.1
	2.3	1.8	
COLLEGE	34	11	45
	75.5	24.4	.25
	.4	.1	
TOTAL	8647	9254	17901
	48.3	51.7	100

C H I=863.86

D F=5

SIG. 0.000

SOURCE: FIELD WORK INFORMATION

(APU), it can be seen that the people in agricultural production had significantly lower education levels than those in agro-industry. While 41.1% of people in cooperatives were illiterate, 44.2% were in that condition within the capitalist farms, and 46.7% among the people in peasant production; this contrasts with 9.1% in agro-industry (Table 4.21).

The information about the educational levels of families in different types of APUs agrees with previous findings: the educational levels among different agricultural groups did not differ statistically, but there was a significant difference when comparing those groups with the agro-industry group, which had much higher educational levels (Table 4.22).

A very important element in the study of the characteristics of the labor force is the form of involvement in the different types of agricultural or industrial production. It was found that the labor force in peasant production develops most of the agricultural activities within the family's small pieces of land, with the help of other family members. Occasionally, they may work in one of the large neighboring estates or in the construction, for a salary. So the family's subsistence depends on the agricultural production of the APU, and on salaried incomes.

In the cooperatives, the families obtain some crops from small pieces of land that they can cultivate on individual bases; besides this they have to labor on the cooperative common land, in exchange

CAYAMBE PROJECT

TABLE 4.21 LITERATE POPULATION 5 YEARS OF AGE OR OLDER
 BY TYPE OF AGRICULTURAL PRODUCTION. STUDY POPULATION,
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	LITERATE		ROW TOTAL
	COUNT		
	ROW PCT	NO	
	YES		
	COL PCT		
	UNIT		
COOPERATIVE	272	190	462
	58.9	41.1	37.3
	34.2	36.4	
CAPIT. FARM	48	38	86
	55.8	45.2	6.9
	6.6	8.0	
PEASANT	316	277	593
	53.3	46.7	47.8
	43.6	53.6	
AG. INDUSTRY	90	9	99
	90.9	9.1	8.0
	12.4	2.0	
COLUMN TOTAL	791	449	1240
	58.5	36.1	100.0

RAW CHI SQUARE = 54.22715 WITH 9 DEG. FREED.
 CONTINGENCY COEFFICIENT = .20469 SIGNIFICANCE: .001

SOURCE: PHYSICAL EXAMS QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.22 LEVEL OF EDUCATION BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	LEVEL OF EDUCATION						ROW TOTAL	
		NONE	1 - 3 ELEMENT	4 - 6 ELEMENT	1 - 3 HIGH SCH	4 - 6 HIGH SCH	1 - 3 UNIVERS		4 - 7 UNIVERS
COOPERATIVE	169 36.6 36.3		116 25.1 36.2	161 34.8 43.2	11 2.4 26.2	4 .9 12.9	1 .2 25.0	0 0 0	462 37.3
CAPIT. FARM	35 40.7 7.5		27 31.4 8.4	19 22.1 5.1	2 2.3 4.8	3 3.5 9.7	0 0 0	0 0 0	86 6.9
PEASANT	253 42.7 54.4		162 27.3 50.6	154 26.0 41.3	16 2.7 38.1	6 1.0 19.4	1 .2 25.0	1 .2 20.0	593 47.8
AG. INDUSTRY	8 8.1 1.7		15 15.2 4.7	39 39.4 10.5	13 13.1 31.0	18 18.2 58.1	2 2.0 50.0	4 4.0 80.0	99 8.0
COLUMN TOTAL	465 37.5	320 25.8	373 30.1	42 3.4	31 2.5	4 .3	5 .4	1240 100.0	

RAW CHI SQUARE = 228.29317 WITH 18 DEG.FREED. SIGNIFICANCE = 0
CONTINGENCY COEFFICIENT = .39431

SOURCE: DEMOGRAPHIC QUESTIONNAIRE

for a salary. The products from the common land are sold to pay the debt to the Ecuadorian Institute of Land Reform (IERAC) for the award of the land.

The population employed in the capitalist farms, may or may not have a small pieces of land, but their main income comes from the salaries paid by the landlords. Occasionally, they may do some additional work in construction or in other APUs.

As has been presented in the last few paragraphs, the characteristics of production of the families in the different types of agricultural production, at the present time, are very similar, with slight differences in the emphasis on subsistence production or on wages, although the members of the cooperatives may have the potential use of all the land in the unit, after they finish paying their debts.

As a partial summary, it may be stated that the population in the rural areas of Cayambe has a plentiful labor force, poorly qualified, tied mainly to the subsistence agricultural production, and frequently selling their labor force for a salary. The contradiction between the characteristics of this population and their limited use of natural resources has become of great significance, as is presented in the next chapter.

4.1.2 CHARACTERISTICS OF THE OWNERSHIP OF THE LAND.

The most important means of production in an agricultural

economy is the land. Therefore the degree of control over this natural resource is of vital importance. It is important to remember that the system of land ownership was established by the Spanish conquerors during colonial times, and has been maintained by the criollo landlords until the present time.

According to the 1974 Agricultural Census, of the 4212 Agricultural Productive Units (APUs) in Cayambe, 2205 (52.4%) had extensions of one hectare or less, covering a total of 1597 hectares (2.5% of the total land available), the average being .724 hectares per APU. The APUs of one to four hectares constituted 30% of the total units in the zone, and covered only 6.0% of the land, with an average of 2.9 hectares per APU. This situation highly contrasts with the large estates, which had areas between 50 and 499 hectares, constituting only 1.6% of all the APUs in the zone, and covering 20.7% of the available land, with an average of 201.5 hectares per APU. The larger farms, with areas greater than 500 hectares, and a total number of 23 (.5%), covered a total area of 39,359 hectares (62.6%), and had an average size of 1711.1 hectares (Table 4.23).

Considering that the minimum extension of a unit in order to provide a minimum adequate subsistence to a family is 5 hectares, we may conclude that 82.4% of the APUs were insufficient to satisfy the needs of the families in that rural area.

Of the total number of APUs, 3,390 (80%) were legally owned with titles, covering an area of 48,238 hectares. Most of them (67.4%)

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TABLE 4.23 NUMBER AND AREA OF AGRICULTURAL UNITS
 BY TYPE OF AGRICULTURAL UNIT.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	UNITS		AREA		MEAN AREA
	NUMBER	PCT	HA	PCT	
<1	2205	52.4	1597	2.54	.724
1-4	1262	30.0	3772	6.0	2.98
5-49	487	11.6	5046	8.0	10.36
50-499	67	1.6	13052	20.7	201.5
500>	23	.5	39357	62.64	1711.1
TOTAL	4212		62824		14.91

SOURCE: CENSO AGROPECUARIO, INEC, 1975.

were inherited or bought, and covered 73.5% of the total area, while those awarded by the land reform process constituted 13% of the total number of APUs, and covered only 3.2% of the land. Besides, 262 APUs (6.2%) were rented, with a total area of 1487 hectares (2.4%). The land used without legal titles constituted only .7% of the total number of APUs and of the total area. Other forms of production, mainly of mixed character, constituted 8.9% of the UPAs, and occupied 20.1% of the land (Table 4.24). So, until 1974, the rural population (huasipungueros) only received 4% of the available land as a result of the land reform process.

Between 1975 and 1980, some of the State farms owned by the Ministry of Health (Ex-Social Assistance Direction), a total of 8,703 hectares, were awarded to some peasant communities and then organized into cooperatives (Table 4.25).

The census data provides clear evidence of the severe inequalities in relation to land ownership in the county. It is important to observe the characteristics of the APUs in the study families. Of the 295 sample families, 88.9% had APUs with areas smaller than five hectares, 7.8% with areas between five and ten hectares, and only 3.4% had larger units (Table 4.26). Every family had an average of 2.6 hectares (SD=4.7), with a total area of 783 hectares. The average size of the APU was greater among the people in the cooperatives (3.2 hectares) than among the other groups, peasant production (2.6 hectares) and capitalist farms (2.2 hectares). The area of the land owned by the families in

CAYAMBE PROJECT

TABLE 4.24 NUMBER AND AREA OF AGRICULTURAL UNITS
BY TYPE OF OWNERSHIP.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	UNITS		AREA	
	NUMBER	PCT	NUMBER	PCT
INHERITED	2842	67.4	46231	73.5
AG. REFORM	548	13.0	2007	3.2
RENTER	262	6.2	1487	2.4
NO OWNER	33	.7	452	.7
OTHER	378	8.9	12646	20.1
TOTAL	4212		62823	

SOURCE: CENSO AGROPECUARIO, INEC, 1975, P. 166

CAYAMBE PROJECT

TABLE 4.25 HEALTH MINISTRY FARM LAND REDISTRIBUTION
1975-1980.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	HECTARES
SANTO DOMINGO 1	787.29
SANTO DOMINGO 2	714.57
LA CHIMBA	1193.16
SAN PABLO URCO	497.05
MUYURCO	613.53
EL CHAUPI	570.47
PISANVILLA	4207.68
CARIACU	119.29
TOTAL	8703.04

SOURCE: INFORMATION IERAC

CAYAMBE PROJECT

TABLE 4.26 SIZE OF AGRICULTURAL UNIT OWNED BY THE FAMILY BY TYPE OF PRODUCTION
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF APU	COUNT	NUMBER OF HECTARES							ROW TOTAL				
		ROW PCT COL PCT	NONE	< 1	1-4	5-9	10-14	15-19		50-99			
COOP	9	8.3	15	13.9	69	63.9	10	9.3	5	4.6	0	0	108
		14.8	22.7	51.1	43.5	71.4	0	0	0	0	0	0	36.6
CAPITAL FARM	1	5.6	6	33.3	9	50.0	2	11.1	0	0	0	0	18
		1.6	9.1	6.7	8.7	0	0	0	0	0	0	0	6.1
PEASANT PRODC	32	22.1	44	30.3	53	36.6	11	7.6	2	1.4	2	1	145
		52.5	66.7	39.3	47.8	28.6	100.0	100.0	100.0	100.0	100.0	100.0	49.2
AGRO INDUSTRY	19	79.2	1	4.2	4	16.7	0	0	0	0	0	0	24
		31.1	1.5	3.0	3.0	0	0	0	0	0	0	0	8.1
COLUMN TOTAL	61	20.7	66	22.4	135	45.8	23	7.8	7	2.4	2	1	295
													100.0

RAW CHI SQUARE = 86.30987 WITH 18 DEG.FREED. SIGNIFICANCE = .0000
CONTINGENCY COEFFICIENT = .47576

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

agro-industry was insignificant, .4 hectares (Table 4.27).

The size distribution of the APUs owned by the study families in the different townships in Cayambe county present differences that are statistically significant, favorable for the county seat, and unfavorable for the Oton and Cusubamba townships ($p=.001$) (Table 4.28). But these differences are mainly due to individual differences rather than regional ones, as can be seen in the analysis of variance ($p=.608$) (Table 4.29), even though the mean sizes varied from 1.2 hectares in Ascazubi, up to 3.1 hectares in Olmedo, with the means of the other townships close to the county mean of 2.6 hectares

It is important to remember that the owners of middle to large-size farms were few, most of them living in cities like Cayambe or Quito. Therefore, only three families were identified with APUs greater than 15 hectares

The fact that 89% of the study families had APUs with less than five hectares coincides with the census data, showing how most of the natural resources were not available for most of the rural population in Cayambe County.

The possession of farm animals by the study families was limited, with insignificant differences ($p=.364$). The number of head of cattle was limited, with an average of 2.4 head/family in the total sample, ranging from 3.3 in the cooperatives to .4 in

CAYAMBE PROJECT

TABLE 4.27 SIZE OF FAMILY LAND AREA BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CODE	VALUE LABEL	SUM	MEAN	STD. DEV	SUM OF SQ	N
1.	COOP	351.0000	3.2500	2.5177	678.2500	(108)
2.	CAPITAL FARM	40.0000	2.2222	1.6647	47.1111	(18)
3.	PEASANT PRODC	381.0000	2.6276	6.2160	5563.8897	(145)
4.	AGRO-INDUSTRY	11.0000	.4583	1.0206	23.9583	(24)
	TOTAL	783.0000	2.6542	4.6914	6470.7322	(295)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE   *
*
* BETWEEN GROUPS          157.5231           ( 3)           52.5077
*
* WITHIN GROUPS          6313.2091           (291)          21.6949
*
* TOTAL                   6470.7322           (294)
*
*****
*
* F =      2.4203      SIG. = .0663      ETA SQRD = .0243
*
*****

```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.28 SIZE OF AGRICULTURAL UNIT OWNED BY FAMILY BY TOWNSHIP.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	SIZE OF AGRICULTURAL UNIT. (HECTARES)								ROW TOTAL
	COUNT ROW PCT COL PCT	NONE	< 1 HA	1-4 HA	5-9 HA	10-14 HA	15-19 HA	50-99 HA	
CAYAMBE	33	31	41	10	0	2	1	118	
	28.0	26.3	34.7	8.5	0	1.7	.8	40.0	
	54.1	47.0	30.4	43.5	0	100.0	100.0		
ASCAZUBI	11	8	6	0	1	0	0	26	
	42.3	30.8	23.1	0	3.8	0	0	8.8	
	18.0	12.1	4.4	0	14.3	0	0		
CANGAHUA	7	19	43	7	4	0	0	80	
	8.8	23.8	53.7	8.8	5.0	0	0	27.1	
	11.5	28.8	31.9	30.4	57.1	0	0		
OLMEDO	5	3	36	6	1	0	0	51	
	9.8	5.9	70.6	11.8	2.0	0	0	17.3	
	8.2	4.5	26.7	26.1	14.3	0	0		
OTON	5	4	5	0	1	0	0	15	
	33.3	26.7	33.3	0	6.7	0	0	5.1	
	8.2	6.1	3.7	0	14.3	0	0		
CUSUBAMB	0	1	4	0	0	0	0	5	
	0	20.0	80.0	0	0	0	0	1.7	
	0	1.5	3.0	0	0	0	0		
COLUMN TOTAL	61	66	135	23	7	2	1	295	
	20.7	22.4	45.8	7.8	2.4	.7	.3	100.0	

RAW CHI SQUARE = 59.34291 WITH 30 DEG.FREED. SIGNIFICANCE = .0011
CONTINGENCY COEFFICIENT = .40923

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.29 SIZE OF LAND OWNED BY THE FAMILY BY TOWNSHIP.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	CAYAMBE	312.0000	2.6441	6.7905	5395.0508	(118)
2.	ASCAZUBI	33.0000	1.2692	2.0699	107.1154	(26)
3.	CANGAHUA	238.0000	2.9750	2.7558	599.9500	(80)
4.	OLMEDO	160.0000	3.1373	1.9496	190.0392	(51)
5.	OTON	28.0000	1.8667	2.5875	93.7333	(15)
6.	CUSUBAMB	12.0000	2.4000	1.1402	5.2000	(5)
	TOTAL	783.0000	2.6542	4.6914	6470.7322	(295)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE   *
*
* BETWEEN GROUPS          79.6434           ( 5)          15.9287       *
*
* WITHIN GROUPS          6391.0888          (289)         22.1145       *
*
*   TOTAL                  6470.7322          (294)
*
*****
*
* F =      .7203   SIG. = .6087   ETA SQRD = .0123
*
*****

```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

agro-industry (Table 4.30).

Possession of pigs was also limited, with an average of 1.9 head/family, ranging from 2.6 in the cooperatives, to 1.7 in the peasant production, to 1.1 in the capitalist farms, and to .6 in the agro-industry. These differences show, in the analysis of variance, statistical significance ($p=.005$)(Table 4.31).

The differences in the number of poultry owned by the families in the different types of APUs were minor, with means close to 4.3 poultry/family, according to the analysis of variance ($p=.148$) (Table 4.32).

Similar findings were present in the number of guinea pigs owned by the study families, with very little variation from the mean of 6.2 head/family ($p=.066$)(Table 4.33).

From this information about farm animals, we may conclude that their number was very limited, and that only slight differences existed among the different types of agricultural production.

4.1.3 CHARACTERISTICS OF THE LABOR PROCESS.

The agricultural process, among the study families, has been reduced to two main types of labor:

a. Labor in the family unit, which uses mainly manpower and very little technology. The activities are intensive, with the participation of several members of the family. They fulfill all the

CAYAMBE PROJECT

TABLE 4.30 NUMBER OF CATTLE BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	360.0000	3.33332	6.7754	4912.0000	(108)
2.	CAPITAL FARM	21.0000	1.1667	2.1213	76.5000	(18)
3.	PEASANT PRODC T	332.0000	2.2897	9.9819	14347.8345	(145)
4.	AGRO- INDUSTRY	11.0000	.4583	1.5317	53.9583	(24)
	TOTAL	724.0000	2.4542	8.1656	19603.1322	(295)

```

* * * * * A N O V A   T A B L E * * * * *
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE
*
* BETWEEN GROUPS          212.8394           ( 3)          70.9465
*
* WITHIN GROUPS           19390.2928          (291)         66.6333
*
* TOTAL                    19603.1322          (294)
*
*
* F =      1.0647      SIG. = .3644      ETA SQRD = .0109
*
* * * * *
    
```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.31 NUMBER OF PIGS BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	291.0000	2.6944	3.4301	1258.9167	(108)
2.	CAPITAL. FARM	20.0000	1.1111	1.5676	41.7778	(18)
3.	PEASANT PRODC	248.0000	1.7103	3.1533	1431.8345	(145)
4.	AGRO- INDUSTRY	15.0000	.6250	1.7892	73.6250	(24)
	TOTAL	574.0000	1.9458	3.1564	2929.1322	(295)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE   *
*
* BETWEEN GROUPS          122.9783           ( 3)           40.9928
*
* WITHIN GROUPS           2806.1539          (291)           9.6431
*
* TOTAL                    2929.1322          (294)
*
*****
*
* F =      4.2510      SIG. = .0058      ETA SQRD = .0420
*
*****
    
```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.32 NUMBER OF POULTRY BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	583.0000	5.3981	7.6987	6341.8796	(108)
2.	CAPITAL FARM	86.0000	4.7778	4.0520	279.1111	(18)
3.	PEASANT PRODC	517.0000	3.5655	4.5625	2997.6276	(145)
4.	AGRO- INDUSTRY	102.0000	4.2500	8.8723	1810.5000	(24)
	TOTAL	1288.0000	4.3661	6.2923	11640.4610	(295)

***** ANOVA TABLE *****

	SUM OF SQUARES	DEG.FREED.	MEAN SQUARE
BETWEEN GROUPS	211.3427	(3)	70.4476
WITHIN GROUPS	11429.1183	(291)	39.2753
TOTAL	11640.4610	(294)	

F = 1.7937 SIG. = .1485 ETA SQD = .0182

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.33 NUMBER OF GUINEA PIGS BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	861.0000	7.9722	9.7946	10264.9167	(108)
2.	CAPITAL FARM	99.0000	5.5000	6.9557	822.5000	(18)
3.	PEASANT PRODCY	709.0000	4.8897	7.0061	7068.2345	(145)
4.	AGRO- INDUSTRY	160.0000	6.6667	16.0615	5933.3333	(24)
	TOTAL	1829.0000	6.2000	9.1643	24691.2000	(295)

***** ANOVA TABLE *****

	SUM OF SQUARES	DEG.FREED.	MEAN SQUARE
BETWEEN GROUPS	602.2155	(3)	200.7385
WITHIN GROUPS	24088.9845	(291)	82.7800
TOTAL	24691.2000	(294)	

F = 2.4250 SIG. = .0659 ETA SQD = .0244

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

activities in field preparation and seeding, up to the harvest. These activities are done in direct contact with environmental elements.

b. Labor in the larger productive units for a salary. One or more members of a family participate as permanent or temporary workers on a larger farm, or in construction. They fulfill activities in direct exposure to environmental elements. For those salaried workers in the agroindustry, the activities are also intensive, but they use some machinery and have relative protection from environmental factors. However, they are more exposed to new factors produced by the industrial process.

The salaried income of a family has also been considered an important indicator of the consumption of the labor force through employment outside the APU. For that reason, salaries will be considered as an indicator of consumption of the labor force, as well as a means of obtaining goods for the family.

The salary income of the study families varied from less than 100 sucres/month (US\$3.1, according to the 1982 exchange of one dollar=32 sucres), to more than 10,000 sucres/month (US\$312.00). The general mean salary income was 2,840 sucres (SD=3464) (Table 4.34 and Graph 4.1). This income showed an inverse relationship with the size of the APU owned by a family, the families with smaller agricultural units having larger salaries ($p=.033$) (Table 4.35). These data show that the need to sell the labor force is greater in those families with smaller units.

CAYAMBE PROJECT

TABLE 4.34 DISTRIBUTION OF FAMILY SALARY INCOME. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

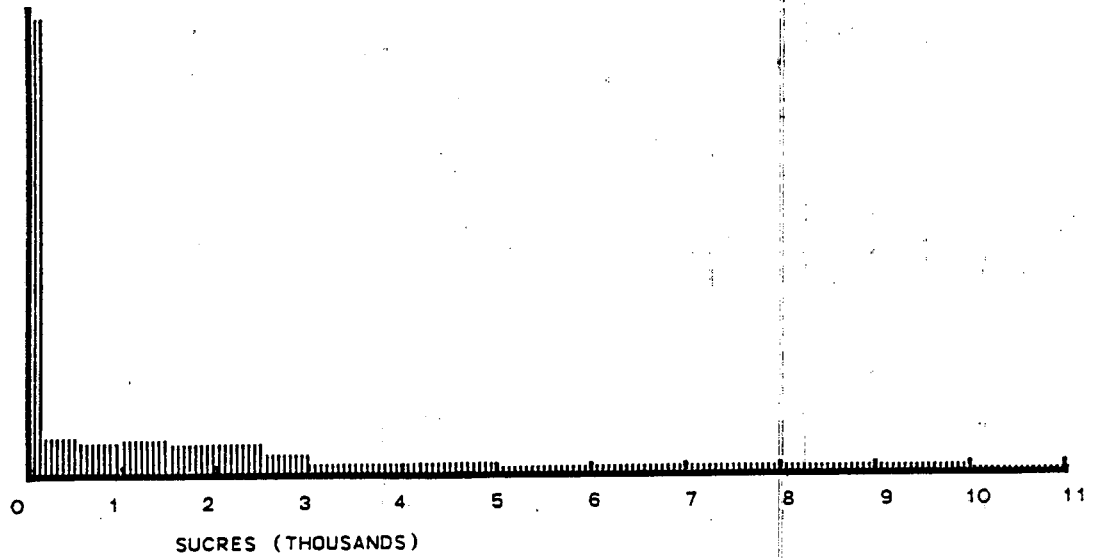
	NUMBER	PERCENT
<100	80	27.1
101-500	20	6.8
501-1000	21	7.1
1001-1500	23	7.8
1501-2000	18	6.1
2001-2500	19	6.4
2501-3500	13	4.4
3001-5500	54	18.3
5001-10000	26	8.8
>10000	21	7.1
TOTAL	295	100.0

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 4.1 MONTHLY SALARY INCOME OF THE FAMILIES.
RURAL CAYAMBE COUNTY, 1982

SUCRES

MEAN : 2840 SUCRES STD. DESV.: 3463
VALID CASES : 295

SOURCE : SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.35 MONTHLY FAMILY SALARY INCOME BY SIZE OF FAMILY OWNED LANDS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

SIZE OF AGRICULTURAL UNIT	INCOME (SUCRES) X 100											ROW TOTAL
	COUNT ROW PCT COL PCT	<1	1-5	5-10	10-15	15-20	20-25	25-30	50	50-100	>100	
NONE	12 19.7 15.0	3 4.9 15.0	1 1.6 4.8	3 4.9 13.0	5 8.2 27.8	4 6.6 21.1	1 1.6 7.7	11 18.0 20.4	10 16.4 38.5	11 18.0 52.4	61 20.7	
< 1 HA	13 19.7 16.2	4 6.1 20.0	4 6.1 19.0	8 12.1 34.8	5 7.6 27.8	6 9.1 31.6	7 10.6 53.8	13 19.7 24.1	5 7.6 19.2	1 1.5 4.8	66 22.4	
1-4 HA	39 28.9 48.7	11 8.1 55.0	12 8.9 57.1	9 6.7 39.1	7 5.2 38.9	8 5.9 42.1	4 3.0 30.8	28 20.7 51.9	10 7.4 38.5	7 5.2 33.3	135 45.8	
5-9 HA	10 43.5 12.5	1 4.3 5.0	4 17.4 19.0	3 13.0 13.0	1 4.3 5.6	1 4.3 5.3	1 4.3 7.7	1 4.3 1.9	1 4.3 3.8	0 0 0	23 7.8	
10-14 HA	5 71.4 6.3	1 14.3 5.0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 14.3 4.8	7 2.4	
15-19 HA	1 50.0 1.2	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 50.0 1.9	0 0 0	0 0 0	2 .7	
50-99 HA	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 100.0 4.8	1 .3	
COLUMN TOTAL	80 27.1	20 6.8	21 7.1	23 7.8	18 6.1	19 6.4	13 4.4	54 18.3	26 8.8	21 7.1	295 100.0	

RAW CHI SQUARE = 74.50095 WITH 54 DEG.FREED. SIGNIFICANCE = .0337
CONTINGENCY COEFFICIENT = .44903

SOURCE= SOCIO-ECONOMIC QUESTIONNAIRE

The salary income varied according to the type of agricultural unit. This type of income was greater among those involved in the agro-industry, with a mean of 8,885 sucres (SD=3487), than among those in agriculture, from an average of 1661 (SD=2525) in the cooperatives, to 2055 (SD=1600) in the capitalist farms, and to 2853 (SD=3194) in peasant production. These differences are statistically significant according to analysis of variance ($p=.000$) (Table 4.36).

The family's salary income increased significantly with more accessibility to the county seat (considered as an index, grouping the inverse of the geographic distance, the type of roads weighted according to their relative distance, and the relative frequency of vehicle movement in each one of them) (Table 4.37). The demand in the county seat for a salaried labor force was greater, in construction as well as in services.

4.2 CHARACTERISTICS OF THE PROCESS OF SOCIAL REPRODUCTION

The social reproduction of the labor force, and consequently of the families, is determined by all those elements that directly favor the living conditions of the individual workers and their families, like food, housing, and, indirectly, like the environmental and infrastructural conditions such as health services, educational facilities, roads, sanitation, etc.

In a peasant economy, the elements of social reproduction are mainly obtained from what the family harvests in their own APU. In

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TABLE 4.36 FAMILY SALARY INCOME BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	174000.0000	1611.1111	2525.7860	.6826E+09	(108)
2.	CAPITAL FARM	37000.0000	2055.5556	1600.4493	43544444.4444	(18)
3.	PEASANT PRODCT	413750.0000	2853.4483	3194.3943	.1469E+10	(145)
4.	AGRO- INDUSTRY	213250.0000	8885.4167	3487.5393	.2797E+09	(24)
	TOTAL	838000.0000	2840.6780	3463.4323	.3527E+10	(295)

```

***** A N O V A   T A B L E *****
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE   *
*
* BETWEEN GROUPS          .1051E+10           ( 3)          .3504E+09
*
* WITHIN GROUPS           .2475E+10           (291)         .8506E+07
*
* TOTAL                    .3527E+10           (294)
*
*****
*
* F = .41.1985   SIG. = .0000   ETA SQRD = .2981
*
*****
    
```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.37 DIRECT ACCESSIBILITY TO THE MARKET PLACE (COUNTY SEAT)
BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	887.6860	4.6720	5.6632	6061.5142	(190)
2.	CAPITAL. FARM	609.0000	9.6667	5.3732	1790.0000	(63)
3.	PEASANT. PROD.	2154.8690	5.7927	4.6861	8147.0595	(372)
4.	AGRO- INDUSTRY	1416.0000	19.1351	.9976	72.6486	(74)
TOTAL		5067.5550	7.2497	6.4396	28944.9311	(699)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES  DEGREES OF FREEDOM  MEAN SQUARE
*
*  BETWEEN GROUPS      12873.7088          ( 3)          4291.2363
*
*  WITHIN GROUPS       16071.2223        (695)          23.1241
*
*    TOTAL              28944.9311        (698)
*
*****
*
*  F = 185.5745  SIG = 0  ETA SQRD = .4448
*
*****

```

SOURCE: FIELD WORK INFORMATION

the traditional precapitalist farms, family social reproduction depended on production in the huasipungo, and on some additional products given by the landlord. In the present situation, when the families are directly or indirectly tied to a market economy, the family subsistence depends on the products of their unit, and on the salaries obtained by selling the labor force of one or more family members.

The amount of products harvested by a family was mainly dependent on the size of the agricultural unit and, to a lesser extent, on the agricultural techniques and environmental conditions.

The harvest contributes directly to the family nutrition, and indirectly to the acquisition of other means of subsistence, through exchange or sale. Therefore, family social reproduction was dependent on the size of the agricultural unit, as well as on salary income, both of which allow a family to satisfy, to a lesser or greater degree, their subsistence needs. These will be discussed in the following pages.

4.2.1 FOOD INTAKE

It has been stated that most of the crops were used for family nourishment, supplemented by the food that they were able to buy. It is important to learn what type of products they cultivated, because these would constitute the basis of the family diet.

The main crops, according to the information provided by the study families, were corn, cultivated by 58% of the families, barley (48%), legumes (44%), potatoes (39%), and wheat (31%) (Table 4.38).

The crops, among the different types of APUs, did not differ to a great extent from one unit to another. In the cooperatives the emphasis was on the production of barley, wheat and potatoes, cultivated by 58%, 51% and 45% of the families respectively; in the units of families tied to capitalist farms the emphasis was on corn (93%), and barley (43%), and in peasant production the emphasis was on corn (66.7%) and on legumes (47%) (Table 4.39).

Although exhaustive information on the specific family diet was not available because of the extensive study it required, it was possible to consider and compare the frequency of intake of the main food groups among the different types of APUs. According to the information provided by the families, there was no significant difference in the proportion of families that ate vegetables (Table 4.40), and legumes (Table 4.41) with a frequency greater than three times/week. But the proportion of families with a frequency of intake of grains three times or more/week was greater among the families tied to agricultural production (31% in cooperatives and capitalist farms, and 26% in peasant production) than among those in agro-industry (14.2%) ($p=.005$) (Table 4.42). An inverse situation was observed in relation to the proportion of families eating meats or fruits three times or more/week, since the proportions in agro-industry were 21% and 22% respectively, while they were smaller

CAYAMBE PROJECT

TABLE 4.38 FAMILIES RAISING SELECTED CROPS. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CATEGORY LABEL	COUNT	PCT OF RESPONSES	PCT OF CASES
CORN	142	25.1	58.0
WHEAT	77	13.6	31.4
POTATOES	97	17.2	39.6
VEGETABLES	108	19.1	44.1
BARLEY	118	20.9	48.2
QUINUA	1	.2	.4
GRASS	12	2.1	4.9
FOREST	6	1.1	2.4
FRUITS	4	.7	1.6
TOTAL RESPONSES	565	100.0	230.6
50 MISSING CASES		245 VALID CASES	

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.39 FAMILIES RAISING SELECTED CROPS
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

MAINS CROPS	COUNT ROW PCT COL PCT	TYPE OF AGRICULTURAL UNIT			ROW TOTAL	
		COOP	CAPITAL. FARM	PEASANT PRODCT		AGRO INDUSTRY
	39	15	84	4	142	
CORN	27.5 39.4	10.6 93.8	59.2 66.7	2.8 100.0	58.0	
	51	5	18	3	77	
WHEAT	66.2 51.5	6.5 31.3	23.4 14.3	3.9 75.0	31.4	
	45	4	47	1	97	
POTATOES	46.4 45.5	4.1 25.0	48.5 37.3	1.0 25.0	39.6	
	42	6	60	0	108	
VEGETABLES	38.9 42.4	5.6 37.5	55.6 47.6	0 0	44.1	
	58	7	52	1	118	
BARLEY	49.2 58.6	5.9 43.8	44.1 41.3	.8 25.0	48.2	
	1	0	0	0	1	
QUINUA	100.0 1.0	0 0	0 0	0 0	.4	
	5	1	5	1	12	
GRASS	41.7 5.1	8.3 6.3	41.7 4.0	8.3 25.0	4.9	
	3	0	2	1	6	
FOREST	50.0 3.0	0 0	33.3 1.6	16.7 25.0	2.4	
	0	0	4	0	4	
FRUITS	0 0	0 0	100.0 3.2	0 0	1.6	
	COLUMN TOTAL	99 40.4	16 6.5	126 51.4	4 1.6	245 100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

245 VALID CASES

50 MISSING CASES

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.40 FAMILY VEGETABLES INTAKE BY FREQUENCY
AND TYPE OF AGRICULTURAL UNIT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	COOP	C. FARM	PEAS	AG IND	TOTAL
<3 TIMES/WEEK	294	47	592	115	1048
	28.1	4.5	56.5	11.0	63.5
	61.5	67.1	65.0	60.5	
>3 TIMES/WEEK	184	23	319	75	601
	30.6	3.8	53.1	12.5	36.4
	38.5	32.9	35.0	39.5	
TOTAL	478	70	911	190	1649
	29.0	4.2	55.2	11.5	

CHI=2.810228 NO SIG

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.41 FAMILY LEGUMINS INTAKE BY FREQUENCY
AND TYPE OF AGRICULTURAL UNIT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	COOP	C.FARM	PEAS	AG IND	TOTAL
<3 TIMES/WEEK	120 28.1 83.9	26 6.1 92.9	228 53.4 85.1	53 12.4 86.9	427 85.4
>3 TIMES/WEEK	23 31.5 16.1	2 2.7 7.2	40 54.8 14.9	8 11.0 13.1	73 14.6
TOTAL	143 28.6	28 5.6	268 53.6	61 12.2	500 1

CHI=1.6320 NO SIG

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.42 FAMILY GRAINS INTAKE BY FREQUENCY
AND TYPE OF AGRICULTURAL UNIT, STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	COOP	C. FARM	PEAS	AG IND	TOTAL
<3 TIMES/WEEK	230 28.3 68.2	37 4.5 68.5	456 56.0 73.7	91 11.2 85.8	814 72.9
>3 TIMES/WEEK	107 35.4 31.7	17 5.6 31.5	163 54.0 26.3	15 5.0 14.2	302 27
TOTAL	337 30.2	54 4.8	619 55.5	106 9.5	1116

CHI=13.40677

P<.005

SOURCE: FIELD WORK INFORMATION

in the cooperatives (7.9% and 17.6% respectively), in the capitalist farms (8.1% and 5.3% respectively), and in the peasant productions (5.8% and 17.0% respectively) ($p=.05$) (Tables 4.43, 4.44).

The main nutritional differences among the study subgroups is that grains had relatively greater importance among the groups in agricultural production, while meats and fruits were relatively more important among the families in agro-industry. This situation agrees with the fact that the families in agriculture consumed what they were able to grow, rather than what they could afford to buy, like meats and fruits. On the contrary, the families in agro-industry, depended more on their salaries and were able to afford more frequently those foods like meats and fruits.

4.2.2 LIVING CONDITIONS

The characteristics of the houses of the families in the study differ in relation to the type of housing, area of construction and sanitary conditions.

The families lived in houses of different types. Some of them lived in huts (houses of one room, with walls of adobe, straw roof, generally without windows and with dirt floor), others in type A houses (houses with 2 to 4 rooms, walls of compressed dirt, straw or tile roofs, dirt floor, with small windows without glass), type B houses (walls of compressed dirt, tile roofs, wooden floor, several rooms and a separate kitchen, glass windows), and type C houses (brick or concrete walls, wooden floor, tile or concrete roofs,

CAYAMBE PROJECT

TABLE 4.43 FAMILY MEAT INTAKE BY FREQUENCY
AND TYPE OF AGRICULTURAL UNIT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	COOP	C. FARM	PEAS	AG IND	TOTAL
<3 TIMES/WEEK	176 27.8	34 5.4	374 59.2	48 7.6	632
>3 TIMES/WEEK	15 27.8	3 5.6	23 42.6	13 24.1	54 7.8
TOTAL	191 27.8	37 5.4	397 57.9	61 8.9	686

CHI=17.5606 P<.005

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.44 FAMILY FRUIT INTAKE BY FREQUENCY
AND TYPE OF AGRICULTURAL UNIT, STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	COOP	C. FARM	PEAS	AG IND	TOTAL
<3 TIMES/WEEK	243	54	504	103	904
	26.9	6.0	55.8	11.4	
	82.4	94.7	83.0	78.0	82.8
>3 TIMES/WEEK	52	3	103	29	187
	27.8	1.6	55.1	15.3	
	17.6	5.3	17.0	22.0	17.1
TOTAL	295	57	607	132	1091
	27.0	5.2	55.6	12.1	

CHI=7.891099 P<.05

SOURCE: FIELD WORK INFORMATION

large glass windows). According to the information collected in the field, 20.1% of the families lived in huts, 45.2% in type A houses, 26.9% in type B houses, and 7.8% in houses type C (Table 4.45).

The differences in the type of house of the study families was quite important. While more than 60% of the families in agricultural productions lived in lower quality houses; (either huts or type A), 95% of the families in agro-industry lived in houses of higher quality (types B and C). These differences are statistically significant ($p=.000$)

The living area of the houses also presented important variations, with a range of 10 square meters, to 200 square meters. The percentages of families living in houses of more than 100 square meters, were very similar among those in agricultural production (cooperatives 17.6%, capitalist farms 17.7%, peasant production 17.4%). This contrasted with the percentage of families in agro-industry, who live in houses of more than 100 square meters (45.0%)(Table 4.46).

The mean house size of the study families was 70 square meters ($SD=56.8$). The families in the capitalist farms lived in houses with mean area of 66.6 ms ($SD=57.1$), those in the cooperatives, 66.5 square meters ($SD=55.4$), and those in the peasant production 66.9 square meters ($SD=53.9$). This situation contrasted with the 111.7 square meters ($SD=68.8$) of the houses of families in agro-industry. The analysis of variance showed differences statistically

CAYAMBE PROJECT

TABLE 4.45 TYPE OF HOUSING BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	TYPE OF HOUSE			ROW TOTAL
		HUT	HOUSE TYPE A	HOUSE TYPE B	
COOP	29 26.9 50.9	45 41.7 35.2	33 30.6 43.4	1 .9 4.5	108 38.2
CAPITAL. FARM	1 5.6 1.8	10 55.6 7.8	6 33.3 7.9	1 5.6 4.5	18 6.4
PEASANT PRODC	27 19.6 47.4	72 52.2 56.3	30 21.7 39.5	9 6.5 40.9	138 48.8
AGRO INDUSTRY	0 0 0	1 5.3 .8	7 36.8 9.2	11 57.9 50.0	19 6.7
COLUMN TOTAL	57 20.1	128 45.2	76 26.9	22 7.8	283 100.0

RAW CHI SQUARE = 88.26205 WITH 9 DEG.FREED.
CONTINGENCY COEFFICIENT = .48758 SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 12

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.46 FLOOR SPACE FAMILY HOUSE BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	AREA OF CONSTRUCTION (M2)								ROW TOTAL
		LESS 10	11-30	31-50	51-70	71-10	101-150	151-200	201 +	
COOP	9 8.8 81.8	22 21.6 36.7	21 20.6 33.3	12 11.8 32.4	20 19.6 41.7	8 7.8 33.3	5 4.9 41.7	5 4.9 29.4	102 37.5	
CAPITAL FARM	0 0 0	3 17.6 5.0	7 41.2 11.1	3 17.6 8.1	1 5.9 2.1	1 5.9 4.2	1 5.9 8.3	1 5.9 5.9	17 6.3	
PEASANT PRODC	2 1.5 18.2	35 26.3 58.3	30 22.6 47.6	20 15.0 54.1	23 17.3 47.9	11 8.3 45.8	5 3.8 41.7	7 5.3 41.2	133 48.9	
AGRO INDUSTRY	0 0 0	0 0 0	5 25.0 7.9	2 10.0 5.4	4 20.0 8.3	4 20.0 16.7	1 5.0 8.3	4 20.0 23.5	20 7.4	
COLUMN TOTAL	11 4.0	60 22.1	63 23.2	37 13.6	48 17.6	24 8.8	12 4.4	17 6.3	272 100.0	

RAW CHI SQUARE = 30.24255 WITH 21 DEG.FREED. SIGNIFICANCE = .0872
CONTINGENCY COEFFICIENT = .31632

SOURCE: SOECIO-ECONOMIC QUESTIONNAIRE

significant ($p=.008$) among the families in different types of APUs (Table 4.47).

The quality of the drinking water available for the study families had a large variation. The greatest proportion of families in agricultural settings used the water from rivers and irrigation canals. In the Table 4.48, one can notice that 84.3% of the families in the cooperatives, 72.2% of those in the capitalist farms, 67.4% of those in the peasant production, and 0% of those in the agro-industry used that type of water supply. Smaller percentages used partially purified water from covered reservoirs (cooperatives 10.2%, capitalist farms 22.2%, peasant production 19.1%, and agro-industry 8.7%). A high contrast was found in the percentages of families using potable water, from 91.3% in the agro-industry, down to 8.5% in the peasant production, and to 0% on the capitalist farms and cooperatives, differences that are statistically significant ($p=.000$).

The stated differences become greater when the distance to the water source used by the families was considered. Only 6% of the families had drinking water in the interior of their homes, 65.7% of the families had to go from 10 to 100 m, while 19.8% traveled 100 to 500 m, and 8.6% traveled to greater distances to obtain the water for their daily use (Table 4.49). It was found that the average distance that the study families had to go to their water source was 194.2 m ($SD=454.8$); those in the cooperatives traveled on an average 242.2 m ($SD=476.6$), those in the capitalist farms, 209.4 m

CAYAMBE PROJECT

TABLE 4.47 FLOOR SPACE BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	6790.0000	66.5686	55.4236	310249.0196	(102)
2.	CAPITAL FARM	1130.0000	66.4706	57.1119	52188.2353	(17)
3.	PEASANT PRODC	8900.0000	66.9173	53.9491	384186.0902	(133)
4.	AGRO- INDUSTRY	2235.0000	111.7500	68.8109	89963.7500	(20)
	TOTAL	19055.0000	70.0551	56.7939	874124.1728	(272)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES   DEG.FREED.   MEAN SQUARE   *
*
* BETWEEN GROUPS          37537.0777           ( 3)          12512.3592
*
* WITHIN GROUPS           .8366E+06           (268)         3121.5936
*
* TOTAL                    .8741E+06           (271)
*
*****
*
* F =      4.0083      SIG. = .0082      ETA SQRD = .0429
*
*****
    
```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.48 TYPE OF DRINKING WATER BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	TYPE OF WATER			ROW TOTAL
		RIVER	SPRING WELL	SAFE	
COOP	91 84.3 45.7	6 5.6 42.9	11 10.2 25.0	0 0 0	108 37.2
CAPITAL.FARM	13 72.2 6.5	1 5.6 7.1	4 22.2 9.1	0 0 0	18 6.2
PEASANT PROD	95 67.4 47.7	7 5.0 50.0	27 19.1 61.4	12 8.5 36.4	141 48.6
AGRO INDUSTRY	0 0 0	0 0 0	2 8.7 4.5	21 91.3 63.6	23 7.9
TOTAL	199 68.6	14 4.8	44 15.2	33 11.4	290 100.0

RAW CHI SQUARE = 169.89026 WITH 9 DEG.FREED.
CONTINGENCY COEFFICIENT = .60780 SIGNIFICANCE = 0

NUMBER OF MISSING OBSERVATIONS = 5

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.49 DISTANCE TO THE DRINKING WATER SOURCE FOR THE FAMILIES
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	COUNT ROW PCT COL PCT	DISTANCE TO THE WATER SOURCE (METERS)									ROW TOTAL
		IN THE HOUSE	OUTSIDE 10 M	11-50 M	51-1	101-200M	201-500M	501-1000	1001- 2000 M	2001- +	
COOP		2	21	24	18	14	13	8	2	3	105
		1.9	20.0	22.9	17.1	13.3	12.4	7.6	1.9	2.9	39.2
		12.5	28.0	38.1	47.4	53.8	48.1	72.7	40.0	42.9	
CAPITAL. FARM		0	7	0	2	2	5	2	0	0	18
		0	38.9	0	11.1	11.1	27.8	11.1	0	0	6.7
		0	9.3	0	5.3	7.7	18.5	18.2	0	0	
PEASANT PRODCT		9	43	38	17	10	9	1	3	4	134
		6.7	32.1	28.4	12.7	7.5	6.7	.7	2.2	3.0	50.0
		56.3	57.3	60.3	44.7	38.5	33.3	9.1	60.0	57.1	
AGRO- INDUSTRY		5	4	1	1	0	0	0	0	0	11
		45.5	36.4	9.1	9.1	0	0	0	0	0	4.1
		31.3	5.3	1.6	2.6	0	0	0	0	0	
COLUMN TOTAL		16	75	63	38	26	27	11	5	7	268
		6.0	28.0	23.5	14.2	9.7	10.1	4.1	1.9	2.6	100.0

RAW CHI SQUARE = 67.74340 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .0000
CONTINGENCY COEFFICIENT = .44919

NUMBER OF MISSING OBSERVATIONS = 27

SOURCE: SOCIO ECONOMIC QUESTIONNAIRE

(SD=243.1), and those in peasant production, 169.7 m (SD=474.2). These distances also contrasted with the short average distance that the families in the agro-industry had to travel to their water source: 13.1 m (SD=22.3). This difference, even though it is important, has not been determined to be statistically significant by the analysis of variance ($p=.346$) because of the great variability within the groups (Table 4.50). This situation emphasizes the difficulties that most of the families in the rural area faced in the acquisition of their drinking water.

The form of excrement control varied among the study families. Agricultural families defecate mainly in open fields, 96.3% of the cooperative families used this method, as do 94.1% on the capitalist farms, and 95.1% in peasant production. On the contrary, 41.2% of the families in the agro industry used a sewage system. This difference is statistically significant ($\chi^2=112$, $DF=6$, $p=.000$) and shows the unequal availability of sanitary facilities among the study population (Table 4.51).

In the same way, garbage disposal also varied significantly. Most of the families in agriculture just threw away the garbage in open fields, cooperatives 68.2%, capitalist farms 55.6%, and peasant production 48.3%. Small percentages of families composted the garbage mixing it with dirt for later use as fertilizer: in the cooperatives 18.7%, in the peasant production 31.5%, and in the capitalist farms 33.3%. Very small percentages of families burned or threw away their garbage in isolated gullies. The families in

CAYAMBE PROJECT

TABLE 4.50 DISTANCE TO WATER SOURCE BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	25430.0000	242.1905	476.6020	23623546.1905	(105)
2.	CAPITAL. FARM	3770.0000	209.4444	243.1224	1004844.4444	(18)
3.	PEASANT PRODC	22745.0000	169.7388	474.2498	29913415.8582	(134)
4.	AGRO- INDUSTRY	145.0000	13.1818	22.3912	5013.6364	(11)
	TOTAL	52090.0000	194.3657	454.8261	55233442.1642	(268)

```

* * * * * A N O V A   T A B L E * * * * *
*
*           SUM OF SQUARES   DEG.FREED.   MEAN SQUARE
*
*   BETWEEN GROUPS           .6866E+06           ( 3)           .2289E+06
*
*   WITHIN  GROUPS           .5455E+08           (264)          .2066E+06
*
*   TOTAL                     .5523E+08           (267)
*
* * * * *
*
*   F =      1.1077      SIG. = .3464      ETA SQRD = .0124
*
* * * * *
    
```

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.51 TYPE OF EXCREMENT DISPOSAL BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	TYPE OF EXCREMENT DISPOSAL			
	COUNT ROW PCT COL PCT	LETRIN	OPEN FIELD	SEWAR SYSTEM
	4	103	0	107
COOP	3.7	96.3	0	36.5
	26.7	39.3	0	
	1	16	0	17
CAPITAL. FARM	5.9	94.1	0	5.8
	6.7	6.1	0	
	6	137	1	145
PEASANT PRODCT	4.1	94.5	.7	49.5
	40.0	52.3	12.5	
	4	6	7	24
AGRO INDUSTRY	16.7	25.0	29.2	8.2
	26.7	2.3	87.5	
COLUMN TOTAL	15	262	8	293
	5.1	89.4	2.7	100.0

RAW CHI SQUARE = 153.15503 WITH 9 DEG. FREED.
CONTINGENCY COEFFICIENT = .58590 SIGNIFICANCE = 0

NUMBER OF MISSING OBSERVATIONS = 2

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

agro-industry mainly used garbage collectors (70.8%), and less often burned or threw away the garbage in ditches or open field (12.8%, 4.2% and 8.3% respectively). The differences among the study subgroups is statistically significant ($\chi^2=195$, $DF=12$, $p=.000$)(Table 4.52).

A similar situation is reported in Table 4.53 on the use of electricity. While 91.3% of the families in agro-industry used it, very small percentages of the other subgroups did: peasant production, 26.8%; capitalist farms, 25.0%; and cooperatives, 5.2%)($\chi^2=75$, $DF=3$, $p=.000$).

In the last few paragraphs, the factors presented seem to be related to one another in the several study subgroups; for that reason a housing index was constructed utilizing the principal components in factorial analysis. This housing index showed important differences : the families in the agro-industry presented a higher index than those in the agricultural production, specially those in the cooperatives, who presented the lowest indices (Table 4.54)

CAYAMBE PROJECT

TABLE 4.52 TYPE OF GARBAGE DISPOSAL BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	COLLECT.	BURN	COMPOSTE	DITCH	OPEN FIELD
COOPS	0	7(6.5)	20(18.7)	7(6.5)	73(68.2)
CAPIT. FARMS	0	2(11.1)	6(33.3)		
PEASANT PRD.	0	18(12.6)	45(31.5)	11(7.7)	69(48.3)
AGRO INDUST.	17(70.8)	3(12.5)	1(4.2)	1(4.2)	2(8.3)
TOTAL	17(5.9)	30(10.3)	72(24.6)	19(6.5)	154(52.7)

CHI2 = 195.271 D.F. = 12 P < .000

SOURCE : SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.53 USE OF ELECTRICITY BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	USE ELECTRICITY		ROW TOTAL
	YES	NO	
	COUNT		
	ROW PCT		
	COL PCT		
	5	92	97
COOP	5.2	94.8	37.5
	7.9	46.9	
	4	12	16
CAPITAL FARM	25.0	75.0	6.2
	6.3	6.1	
	33	90	123
PEASANT PRODCT	26.8	73.2	47.5
	52.4	45.9	
	21	2	23
AGRO INDUSTRY	91.3	8.7	8.9
	33.3	1.0	
	63	196	259
COLUMN TOTAL	24.3	75.7	100.0

RAW CHI SQUARE = 75.843 WITH 3 DEG.FREED.
CONTINGENCY COEFFICIENT = .47592 SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 36

SOURCE: SOCIO-ECONOMIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.54 LIVING CONDITIONS OF THE FAMILIES
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	-109.6316	-.5770	1.3554	347.2250	(190)
2.	CAPITAL FARM	12.2079	.1938	1.2923	103.5435	(63)
3.	PEASANT PROD.	62.8700	.1690	1.7728	1165.9218	(372)
4.	AGRO-INDUSTRY	230.5634	3.1157	1.5318	171.2872	(74)
TOTAL		196.0097	.2804	1.9030	2527.6342	(699)

```

* * * * * A N O V A   T A B L E * * * * *
*
*          SUM OF SQUARES   DEGREES OF FREEDOM   MEAN SQUARE
*
* BETWEEN GROUPS          739.6567             ( 3)          246.5522
*
* WITHIN GROUPS          1787.9775            (695)          2.5726
*
* TOTAL                   2527.6342            (698)
*
*
* F = 95.8367   SIG. = 0   ETA SQRD = .2926
*
* * * * *
    
```

SOURCE : SOCIO-ECONOMIC QUESTIONNAIRE

4.2.3 ENVIRONMENTAL CONDITIONS

Some of the general environmental conditions of the area were stated in the chapter on geographic location. The altitude of the communities has a very important role in determining other factors such as temperature, irrigation water, fertility of the soil, etc. Therefore it is important to locate, geographically, the different study subgroups.

The population groups were located from 2600 up to 3500 meters above sea level (Table 4.55). The cooperatives were located at higher altitudes, with an average of 3157 m (SD=183) and a range from 2950 to 3500 m. Peasant production was also located in high altitude areas, with a mean of 2980 m (SD=329), and with a range from 2650 to 3560 m. The capitalist farms were located at lower altitudes, with a mean of 2883 m (SD=104), ranging from 2800 to 3000 m. The variation in altitude of the agro-industry was minimal, around 2800m.

The local temperature presents limited seasonal variations because of the area's equatorial location. Variations mainly due to the altitude above sea level, however, were noted. There is a reduction of .5 C for every 100 m increment in altitude. The mean temperature among the study groups varied from 19.2 C in Ascazubi and Cusubamba to 14.8 C in Rascacho and Naguipogyo (Tabla 4.56.)

CAYAMBE PROJECT

TABLE 4.55 ALTITUDE ABOVE SEA LEVEL OF THE
DIFFERENT STUDY GROUPS.
RURAL CAYAMBE COUNTY. 1982

COOP.	CARIACU	3050 METERS
	CHAUPI	3200
	CHIMBA	3200
	MURURCU	3000
	PESILLO	3200
	PISANVILLA	3500
	SANTO DOMINGO	2950
	MEAN	3157
	STAND. DESV.	183
CAP. FARM	BUENA ESPERANZA	3000 METERS
	COMPANIA	2850
	GUACHALA	2800
	MEAN	2883
	STAND. DESV.	+ 104
PEASANT	ASCAZUBI	2650 METERS
	BUENA ESPERANZA	3000
	COCHAPAMBA	3560
	CUSUBAMBA	2650
	CHAGUARPUNGO	2850
	GUACHALA	2800
	MONJAS BAJO	3200
	NAGUIPOGYO	3460
	OTON	2700
	EL PRADO	2850
	PINGULMI	2800
	RASCACHO	3470
	SANTA MARIANITA	2760
	MEAN	2980
		STAND. DESV.
AGRO. IND.	INEDECA	2900 METERS
	MIRAFLORES	2900
	MEAN	2900
	STAND. DESV.	0

SOURCE : CARTOGRAPHIC INFORMATION

CAYAMBE PROJECT

TABLE 4.56 MEAN ANNUAL TEMPERATURES BY LOCATION
AND BY TYPE OF AGRICULTURAL UNITS.
STUDY POPULATION, RURAL CAYAMBE COUNTY. 1982

DEG. CENTIG.		
COOP.	CARIACU	17.2
	CHAUPI	16.5
	CHIMBA	16.5
	MURURCU	17.5
	PESILLO	16.5
	PISANVILLA	15.0
	SANTO DOMINGO	17.7
	MEAN	16.7
	STAND. DESV.	0.9
CAP. FARM	BUENA ESPERANZA	17.5
	COMPANIA	18.2
	GUACHALA	18.5
	MEAN	18.2
	STAND. DESV.	0.5
PEASANT	ASCAZUBI	19.2
	BUENA ESPERANZA	17.5
	COCHAPAMBA	14.8
	CUSUBAMBA	19.2
	CHAGUARPUNGO	18.2
	GUACHALA	18.5
	MONJAS BAJO	16.5
	NAGUIPOGYO	14.8
	OTON	19.0
	EL PRADO	18.2
	PINGULMI	18.5
	RASCACHO	14.8
	SANTA MARIANITA	18.8
	MEAN	15.3
	STAND. DESV.	1.6
AGRO. IND.	INEDECA	18.0
	MIRAFLORES	18.0
		MEAN
	STAND. DESV.	0

SOURCE : CARTOGRAPHIC INFORMATION

4.2.4 FACILITIES

Several infrastructural elements have an important contribution to the general social reproduction of the rural families. It is important to identify them by region and their magnitude and distribution, as a tool for diagnosis of how the State responds to the needs of the subgroups in the Cayambe region.

4.2.4.1 Roads

The roads in Cayambe county vary a great deal in quality, from first class roads (Panamerican Highway), to second class (stone roads) that link the townships and the county seat, to third class (dirt) roads within the townships.

Some of the study subgroups were located directly along the Pan American Highway, with heavy passenger traffic and freight vehicles. And there were other subgroups in isolated situations, using third class roads, frequently damaged by rain and with very limited traffic. There were still other subgroups on second class roads, like Muyurcu, El Chaupi, La Chimba and Chaguarpungo.

With the collected information it was possible to calculate an accessibility index for each one of the population subgroups, that was applicable for each of the families. Such an accessibility index is calculated by using the inverse of the geographic distance from the county seat, weighted by the relative proportion of road types,

the relative frequency of traffic, and the relative speeds in each segment of the road. The index ranged from 1 (least accessible subgroups) to 25 (most accessible subgroup) (Table 4.57).

The averages of the accessibility indices varied from 3.82 (SD=5.35) in the cooperatives, to 5.76 (SD=4.87) in the peasant production, to 10.11 (SD=6.97) in the capitalist farms, and to 17.79 (SD=10.19) in the agro-industry (Table 4.58). This information showed the limited accessibility of the subgroups tied to the cooperative and peasant production, while the capitalist farms and agro-industry are located closer to the county seat.

4.2.4.2 Educational Facilities.

Most of the population subgroups were served by a limited number of schools. Most of them were localized in the township and county seats, so the accessibility of some of the subgroups was limited.

In the county there were 7 kindergardens (31.0 student/teacher ratio), most of them (80%) located in the county seat. There were 50 elementary schools, with 6122 students and 199 teachers (ratio 30.8); 36% of the schools were located in the county seat. Only 3 high schools were located in the county, with a total of 1390 students and 81 teachers (ratio 7.16) (Table 4.59).

Comparing the number of students attending the schools and the number of people between the ages of 5 and 20 years, it was found

CAYAMBE PROJECT

TABLE 4.57 INDEX OF ACCESSIBILITY OF THE STUDY GROUPS TO THE COUNTY SEAT, RURAL CAYAMBE COUNTY, 1982.

COOP.	CARIACU	2.04
	CHAUPI	1.89
	CHIMBA	1.53
	MURURCU	3.17
	PESILLO	1.25
	PISANVILLA	1
	SANTO DOMINGO	15.87
CAP.FARM	BUENA ESPERANZA	6.68
	COMPANIA	5.52
	GUACHALA	18.14
PEASANT	ASCAZUBI (37)	4.53
	ASCAZUBI (38)	3.25
	BUENA ESPERANZA	6.68
	COCHAPAMBA	1.42
	CUSUBAMBA (31)	4.70
	CUSUBAMBA (32)	4.88
	CHAGUARPUNGO	7.93
	GUACHALA	18.14
	MONJAS BAJO	2.49
	NAGUIPOGUIO	1.0
	OTON (22)	3.5
	OTON (26)	7.0
	PRADO	15.87
	PINGULMI	11.54
RASCACHO (29)	1.98	
RASCACHO (30)	1.74	
SANTA MARIANITA	3.17	
AGR. IND.	INEDECA	25.0
	MIRAFLORES	10.58

SOURCE : FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.58 MEAN INDICES OF ACCESSIBILITY OF THE
STUDY GROUPS TO THE COUNTRY SEAT
BY TYPE OF AGRICULTURAL UNITS.
RURAL CAYAMBE COUNTY, 1982

	MEAN	STD.DESV.
COOPERATIVES	3.82	5.35
CAPIT. FARMS	10.11	6.97
PEASANT PRODC.	5.76	4.87
AGRO INDUSTRY	17.79	10.19

SOURCE : FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.59 SCHOOLS, NUMBER OF STUDENTS AND TEACHERS
BY TYPE OF AGRICULTURAL UNIT.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	ELEMENTARY SCHOOLS				HIGH SCHOOLS			
	NO	STUD	PROF	RATIO	NO	STUD	PROF	RATIO
CAYAMBE	5	2235	66	33.9	3	1390	81	17.1
CAYAMBE PER	12	909	30	30.0				
ASCAZUBI	2	387	12	32.3				
CANGAHUA	15	833	28	29.8				
CUSUBAMBA	3	373	11	33.9				
OLMEDO	9	1134	43	26.4				
OTON	4	251	9	27.9				
TOTAL		6122	199	30.8				

SOURCE: FIELD WORK INFORMATION

that only 67% of the children were attending school. This proportion was even smaller when considering only the rural areas (48.2%).

In some of the population subgroups the educational limitations were greater than the county averages. Twenty-five percent of the children had to travel to the township or county seats to attend school, because of the lack of a facility in the areas (Table 4.60). The distances that the children had to go averaged 4.7 Km (SD=2.78), and varied from 3.1 Km (SD=1.8) in the cooperatives, to 5.0 Km (SD=1.7) in the capitalist farms, to 6.8 Km (SD=2.7) in the peasant production (Table 4.61).

The distance that the children must go, most of the time walking, meant an additional physical effort and more exposure to environmental factors, with potential negative effects in their health status.

4.2.4.3 Sanitary Facilities.

As was stated earlier, the availability of sanitary facilities was limited in the rural areas of the county. Only the county seat had potable water, sewage systems, and means of collecting garbage. The main villages in the townships had distribution systems of "safe" water, while most of the population in the rural areas had no sanitary facilities available.

Most of the health services in the Cayambe county have been

CAYAMBE PROJECT

TABLE 4.60 LOCATIONS OF SCHOOLS BY TYPE OF AGRICULTURAL UNIT.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	SAME PLACE		TOWNSHIP		COUNTY		OTHER		TOTAL	
	NO	PCT	NO	PCT	NO	PCT	NO	PCT	NO	PCT
COOPERATIVES	54	75	3	4.16	6	8.33	9	12.5	72	42.1
CAPIT. FARMS	6	66.66	0	0	2	22.22	1	11.11	9	5.3
PEAS.PRODUCT	56	75.6	3	4.05	10	13.51	5	6.75	74	43.3
AGRO.INDUST.	12	75.0	0	0	3	18.75	1	6.25	16	9.35
TOTAL	128	74.8	6	3.5	21	12.28	16	9.35	171	100.00

CHI=4.880479 DF= 9

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.61 DISTANCE TO SCHOOLS BY TYPE OF
AGRICULTURAL UNIT (KM). STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	NUMBER	MEAN	STD.DEV.
COOPERATIVES	18	3.11	1.84
CAPIT. FARMS	3	5.00	1.73
PEAS.PRODUCT	13	6.84	2.67
AGRO.Industr.	34	4.70	2.78
TOTAL	68	4.71	2.38

SOURCE: FIELD WORK INFORMATION

established by the Ecuadorian government: a regional hospital, located in the county seat, one health center in the village of Ayora, and four subcenters in the villages of Ascazubi, Canguahua, Olmedo and Oton. One additional subcenter, with partial medical attendance, has been implemented in the Guachala area (Canguahua Township) by the Ecuadorian Institute of Social Security IESS. In addition to these there were 3 physicians with private practices in the city of Cayambe.

The availability of health personnel was limited according to official information of 1981, with 15 physicians, 6 dentists, 2 nurses, 29 nurse's assistants, 6 dental assistants (Table 4.62).

This health personnel was insufficient to meet the health needs of the population of Cayambe. At the county level, there was an inhabitants/physician ratio of 2277 and an inhabitant/dentist ratio of 5693. If we consider only the rural areas of the county those ratios were even larger, 3281/physician and 11,481/dentist (Table 4.63).

The services provided by those health units were also limited. In 1981, a total of 20,056 medical and 6,941 dental consultations were performed. This information yields averages of 0.6 medical and 0.2 dental consultations/ inhabitant.

Most of those health services were provided at the regional

CAYAMBE PROJECT

TABLE 4.62 HUMAN RESOURCES IN THE HEALTH SERVICES
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	M.D.	OD	NUR	AUX	DNT. AS	TOTAL	PCT
CAYAMBE	9	5	2	25	5	37	72.5
ASCAZUBI	1			1		2	3.9
CANGAHUA	3	1		1	1	4	7.8
OLMEDO	1			1		2	3.9
OTON	1			1		2	3.9
CUSUBAMBA						4	7.8
TOTAL	15	6	2	29	6	51	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.63 POPULATION/PHYSICIAN AND DENTIST RATIOS
BY TOWNSHIP
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	POPULAT.	PHYSICIANS		DENTISTS	
		NO.	RATIO	NO.	RATIO
CAYAMBE	16541	9	2067	5	3308.2
ASCAZUBI	1934	1	1934		
CANGAHUA	7660	3	2553	1	7660.0
OLMEDO	5254	1	5254		
OTON	1381	1	1381		
CUSUBAMBA	1392		1392		
TOTAL	34162	15	2277	6	5693.0

SOURCE: FIELD WORK INFORMATION

hospital, 12,350 (61.5%) medical and 4,258 (62.4%) dental consultations, so if we consider only the data for the rural areas the averages of consultations/inhabitant were even smaller (0.43 medical and 0.15 dental), which demonstrates the limited medical and dental coverage of the population by the health services in the county.

The distance to health services was not uniform, varying from 100 meters in Oton, up to 18 Km in Pisanvilla. The average distance to the health services was 6 Km for those families in agriculture, with minor differences for the different types of APU (Table 4.64).

An index of accesibility to the health services was calculated, using the same logic used in the calculation of the index of accesibility to the county seat. This accesibility index confirmed the previous findings, that the health services were more accesible for the families in agro-industry and less accesible for those in agricultural production. Among the latter, the families in the capitalist farms had a relatively greater accesibility than those in the cooperatives and peasant production (Table 4.65).

Besides the governmental health services, there is an informal health system of folk healing. Some folk healers provided medical care to several families in the area. According to the information provided by the study families, folk healers were known to 29% of them; the percentages were greater among the cooperatives (37.0%),

CAYAMBE PROJECT

TABLE 4.64 DISTANCE TO THE NEAREST HEALTH CENTER
BY TYPE OF AGRICULTURAL UNIT (KM)
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	NUMBER	MEAN	STD.DEV.
COOPERATIVES	108	6.32	5.78
CAPIT. FARMS	18	6.22	1.26
PEAS. PRODUCT	145	6.42	4.60
AGRO INDUST.	24	1.00	0
TOTAL	295	5.93	3.25

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 4.65 ACCESSIBILITY INDEX TO THE NEAREST
HEALTH CENTER BY THE FAMILIES BY TYPE
OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY. 1982

	MEAN INDEX	STD. DESV.
COOPERATIVES	1.1	0.9
CAPIT. FARMS	2.8	0.2
PEASANT PRODUCTION	1.3	1.2
AGRO INDUSTRY	5.0	0.0

SOURCE : FIELD WORK INFORMATION

and peasant production (30.3%) and lower among the agro-industry (7.1%) and capitalist farms (0%) (Table 4.66).

The study families used the services of both formal and folk health systems. So, of the families that reported illness in the last 12 months, 19.3% were treated by a folk healer, mostly at the cooperatives (28.3%) and peasant production (18.0%), and in a smaller percentage in the agro-industry (7.1%) (Table 4.67). Of the same group of families, 49.0% were treated by a physician, mainly in the agro-industry (78.6%) and capitalist farms (66.7%), and in a lesser proportion in the peasant production (49.4%), and cooperatives (37.0%) (Table 4.68). Cross-tabulating this information, it was possible to identify that 11% of those families used both types of health care, 38.1% used only physicians, 8.4% only folk healers, and 42.6% were not attended by any of them (Table 4.69).

The differences in the care provided by folk healers and physicians was reported by the families. They reported that the waiting time for the folk healer service had a mean of 20.8 minutes (SD=144), without significant differences among the study subgroups, according to the analysis of variance (Tables 4.70, 4.71), while the waiting time for the physician was 60 minutes (SD=225), with variations from 7.5 minutes for the families in capitalist farms, to 49.8 minutes among those in the peasant production, to 51.9 min. for those in agro-industry, and up to 89.0 for those in the cooperatives, differences that are mainly due to individual differences rather than

CAYAMBE PROJECT

TABLE 4.66 FAMILY KNOWLEDGE ABOUT LOCAL FOLK HEALERS
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT		KNOWLEDGE	
	ROW PCT	IND	YES	ROW TOTAL
	COL PCT			
COOP	29	17	46	
	63.0	37.0	29.7	
	26.4	37.8		
CAPITAL. FARM	6	0	6	
	100.0	0	3.9	
	5.5	0		
MINIFUNDIO	62	27	89	
	69.7	30.3	57.4	
	56.4	60.0		
AGRO- INDUSTRY	13	1	14	
	92.9	7.1	9.0	
	11.8	2.2		
COLUMN TOTAL	110	45	155	
	71.0	29.0	100.0	

RAW CHI SQUARE = 7.18582 WITH
CONTINGENCY COEFFICIENT = .21049

3 DEG. FREED.
SIGNIFICANCE = .0662

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.67 FOLK HEALER TREATMENT OF FAMILY BY TYPE OF AGRICULTURAL UNIT, STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	TREATED		ROW TOTAL
	COUNT		
	ROW PCT	COL PCT	
	NO	YES	
	33	13	46
COOP	71.7	28.3	29.7
	26.4	43.3	
	6	0	6
CAPITAL FARM	100.0	0	3.9
	4.8	0	
	73	16	89
PEASANT PROD	82.0	18.0	57.4
	58.4	53.3	
	13	1	14
AGRO- INDUSTRY	92.9	7.1	9.0
	10.4	3.3	
COLUMN TOTAL	125	30	155
	80.6	19.4	100.0

RAW CHI SQUARE = 5.22332 WITH
CONTINGENCY COEFFICIENT = .18056

3 DEG. FREED.
SIGNIFICANCE = .1562

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.68 MEDICAL TREATMENT OF FAMILY BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	TREATED		ROW TOTAL
	NO	YES	
	COUNT		
	ROW PCT		
	COL PCT		
	29	17	46
COOP	63.0	37.0	29.7
	36.7	22.4	
	2	4	6
CAPITAL FARM	33.3	66.7	3.9
	2.5	5.3	
	45	44	89
PEASANT PROD	50.6	49.4	57.4
	57.0	57.9	
	3	11	14
AGRO- INDUSTRY	21.4	78.6	9.0
	3.8	14.5	
COLUMN TOTAL	79	76	155
	51.0	49.0	100.0

RAW CHI SQUARE = 8.32482 WITH 3 DEG.FREED.
CONTINGENCY COEFFICIENT = .22577 SIGNIFICANCE = .0398

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.69 FAMILY TREATMENT BY PHYSICIANS AND BY FOLK HEALERS, STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

COUNT ROW PCT COL PCT FOLK HEALERS	PHYSICIANS		ROW TOTAL
	NO	YES	
NO	66 42.6	59 38.1	125 80.6
YES	13 8.4	17 11.0	30 19.4
COLUMN TOTAL	79 51.0	76 49.0	155 100.0

CORRECTED CHI SQUARE = .53013 WITH 1 DEGREE OF FREEDOM.
 CONTINGENCY COEFFICIENT = .07461 SIGNIFICANCE = .4666

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.70 FAMILY WAITING TIME FOR FOLK HEALER TREATMENT. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	WAITING TIME				ROW TOTAL
		LESS 15'	16-30'	31-60'	24-36 HR	
COOP	42 91.3 29.4	- 2 4.3 33.3	2 4.3 40.0	0 0 0	0 0 0	46 29.7
CAPITAL. FARM	6 100.0 4.2	0 0 0	0 0 0	0 0 0	0 0 0	6 3.9
PEASANT PROD	82 92.1 57.3	4 4.5 66.7	3 3.4 60.0	0 0 0	0 0 0	89 57.4
AGRO- INDUSTRY	13 92.9 9.1	0 0 0	0 0 0	1 7.1 100.0	1 0 0	14 9.0
COLUMN TOTAL	143 92.3	6 3.9	5 3.2	1 6	1 6	155 100.0

RAW CHI SQUARE = 11.83669 WITH
CONTINGENCY COEFFICIENT = .26636

9 DEG.FREED.
SIGNIFICANCE = .2227

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.71 WAITING TIME FOR FOLK HEALER
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	450.0000	9.7826	8.1960	3022.8261	(46)
2.	CAPITAL. FARM	45.0000	7.5000	0	0	(6)
3.	PEASANT PROD.	840.0000	9.4382	7.3735	4784.4101	(89)
4.	AGRO- INDUSTRY	1897.5000	135.5357	479.0658	2983552.2321	(14)
	TOTAL	3232.5000	20.8548	144.0101	3193792.9839	(155)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES   DEGREES OF FREEDOM   MEAN SQUARE
*
* BETWEEN GROUPS          .2024E+06                ( 3)          67477.8385
*
* WITHIN GROUPS           .2991E+07                (151)         19810.3276
*
* TOTAL                    .3194E+07                (154)
*
*****
*
* F = 3.4062   SIG. = .0193   ETA_SQRD = .0634
*
*****

```

SOURCE: CULTURAL QUESTIONNAIRE

to group variations, according to the analysis of variance (Tables 4.72, 4.73). The waiting times for both types of health agents did not significantly differ ($\chi^2=29,4$ DF=24 $p=.204$)(Table 4.74).

The families reported differences in respect to the payments made to the health agents. The families that were attended by the folk healers made payments ranging from 0 to 150 sucres, with a mean of 26.7 sucres/consultation, without significant differences among the study subgroups (Tables 4.75, 4.76). The families attended by the physicians paid up to 250 sucres, with a mean of 152 sucres/consultation, without differences among the study subgroups (Tables 4.77, 4.78).

The payments for the medication received from the folk healers averaged 86.2 sucres/treatment, without differences by type of APU (Tables 4.79, 4.80). The medicines given or prescribed by the physicians were more expensive, with a mean of 184 sucres/treatment; the different study subgroups reported different payments for medication. The families in the cooperatives paid a mean of 144 sucres/treatment, while those in the cooperatives paid 187 sucres/treatment, those in the capitalist farms, 208 sucres/treatment, and those in the agro-industry, 277 sucres/treatment. These differences proved statistically significant by analysis of variance (Table 4.81, 4.82).

The high expense of medical treatment probably militated against

CAYAMBE PROJECT

TABLE 4.72 FAMILY WAITING TIME FOR MD. TREATMENT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	WAITING TIME								ROW TOTAL
		LESS 15'	16-30'	31-60'	61-120'	2-3 HR	5-6 HR	6-12 HR	12-24 HR	
COOP	37 80.4 32.5	1 2.2 12.5	3 6.5 33.3	1 2.2 8.3	1 2.2 16.7	0 0 0	1 2.2 100.0	1 2.2 100.0	1 2.2 50.0	46 29.7
CAPITAL FARM	6 100.0 5.3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	6 3.9
PEASANT PROD	66 74.2 57.9	5 5.6 62.5	5 5.6 55.6	6 6.7 50.0	4 4.5 66.7	2 2.2 100.0	0 0 0	0 0 0	1 1.1 50.0	89 57.4
AGRO- INDUSTRY	5 35.7 4.4	2 14.3 25.0	1 7.1 11.1	5 35.7 41.7	1 7.1 16.7	0 0 0	0 0 0	0 0 0	0 0 0	14 9.0
COLUMN TOTAL	114 73.5	8 5.2	9 5.8	12 7.7	6 3.9	2 1.3	1 .6	1 .6	2 1.3	155 100.0

RAW CHI SQUARE = 31.83322 WITH 24 DEG.FREED. SIGNIFICANCE = .1312
CONTINGENCY COEFFICIENT = .41277

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.73 WAITING TIME FOR PHYSICIAN
 BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	4095.0000	89.0217	311.7235	4372718.4783	(46)
2.	CAPITAL FARM	45.0000	7.5000	0	0	(6)
3.	PEASANT PROD.	4432.5000	49.8034	196.3304	3392015.3090	(89)
4.	AGRO-INDUSTRY	727.5000	51.9643	46.8342	28514.7321	(14)
TOTAL		9300.0000	60.0000	225.8992	7858687.5000	(155)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES    DEGREES OF FREEDOM    MEAN SQUARE
*
* BETWEEN GROUPS          65438.9806             ( 3)          21812.9935
*
* WITHIN GROUPS           .7793E+07             (151)          51610.9173
*
* TOTAL                    .7859E+07             (154)
*
*****
*
* F = .4226    SIG. = .7370    ETA SQRD = .0083
*
*****
    
```

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.74 FAMILY WAITING TIME FOR TREATMENT BY MD. AND BY FOLK HEALER.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

WAIT. TIME	WAITING TIME FOR PHYSICIAN										
	COUNT	LESS 15'	16-30'	31-60'	61-120'	2-3 HR	5-6 HR	6-12 HR	12-24 HR	24-36 HR	ROW TOTAL
	ROW PCT COL PCT FOLK H.										
LESS 15'	107 74.8 93.9	7 4.9 87.5	7 4.9 77.8	11 7.7 91.7	6 4.2 100.0	2 1.4 100.0	1 .7 100.0	1 .7 100.0	1 .7 50.0	143 92.3	
16-30'	4 66.7 3.5	1 16.7 12.5	0 0 0	1 16.7 8.3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	6 3.9	
31-60'	2 40.0 1.8	0 0 0	2 40.0 22.2	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 20.0 50.0	5 3.2	
24-36 HR	1 100.0 .9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 .6	
COLUMN TOTAL	114 73.5	8 5.2	9 5.8	12 7.7	6 3.9	2 1.3	1 .6	1 .6	2 1.3	155 100.0	

RAW CHI SQUARE = 29.44124 WITH 24 DEG.FREED. SIGNIFICANCE = .2040
CONTINGENCY COEFFICIENT = .39953

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.75 PAYMENT FOR FOLK HEALER SERVICES BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	PAYMENT IN SUQUES							ROW TOTAL
		NOTHING	1-10	11-20	21-30	31-50	76-100	101-150S	
COOP	3 23.1 33.3	0 0 0	5 38.5 83.3	1 7.7 50.0	2 15.4 100.0	2 15.4 100.0	0 0 0	13 43.3	
PEASANT PROD	5 31.3 55.6	8 50.0 100.0	1 6.3 16.7	1 6.3 50.0	0 0 0	0 0 0	1 6.3 100.0	16 53.3	
AGRO- INDUSTRY	1 100.0 11.1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 3.3	
COLUMN TOTAL	9 30.0	8 26.7	6 20.0	2 6.7	2 6.7	2 6.7	1 3.3	30 100.0	

RAW CHI SQUARE = 18.97436 WITH 12 DEG.FREED. SIGNIFICANCE = .0891
CONTINGENCY COEFFICIENT = .62244

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.76 COST OF FOLK HEALER SERVICES
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	355.0000	35.5000	29.1738	7660.0000	(10)
3.	PEASANT PROD.	205.0000	18.6364	35.8532	12854.5455	(11)
	TOTAL	560.0000	26.6667	33.1694	22004.1667	(21)

```

* * * * * A N O V A   T A B L E * * * * *
*
*           SUM OF SQUARES   DEGREES OF FREEDOM   MEAN SQUARE
* BETWEEN GROUPS           1489.6212                ( 1)           1489.6212
* WITHIN GROUPS            20514.5455                ( 19)          1079.7129
* TOTAL                     22004.1667                ( 20)
*
* * * * *
* F = 1.3796   SIG. = .2547   ETA SQD = .0677
*
* * * * *

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SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.77 PAYMENT FOR PHYSICIAN SERVICES BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	PAYMENT IN SUCRES									ROW TOTAL
		NOTHING	1-10	21-30	31-50	51-75	76-100	101-150S	151-250S	251-350	
COOP		3	0	0	2	2	0	3	1	6	17
		17.6 7.3	0 0	0 0	11.8 40.0	11.8 50.0	0 0	17.6 75.0	5.9 33.3	35.3 54.5	22.4
CAPITAL FARM		3	0	0	0	0	1	0	0	0	4
		75.0 7.3	0 0	0 0	0 0	0 0	25.0 20.0	0 0	0 0	0 0	5.3
PEASANT PROD		28	2	1	3	2	3	0	1	4	44
		63.6 68.3	4.5 100.0	2.3 100.0	6.8 60.0	4.5 50.0	6.8 60.0	0 0	2.3 33.3	9.1 36.4	57.9
AGRO- INDUSTRY		7	0	0	0	0	1	1	1	1	11
		63.6 17.1	0 0	0 0	0 0	0 0	9.1 20.0	9.1 25.0	9.1 33.3	9.1 9.1	14.5
COLUMN TOTAL		41 53.9	2 2.6	1 1.3	5 6.6	4 5.3	5 6.6	4 5.3	3 3.9	11 14.5	76 100.0

RAW CHI SQUARE = 30.72085 WITH 24. DEG.FREED. SIGNIFICANCE = .1620
CONTINGENCY COEFFICIENT = .53653

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.78 COST OF PHYSICIAN SERVICES.
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	2580.0000	184.2857	111.7794	162430.3571	(14)
2.	CAPITAL. FARM	87.5000	87.5000	0	0	(1)
3.	PEASANT PROD.	1942.5000	121.4063	115.5926	200424.6094	(16)
4.	AGRO- INDUSTRY	712.5000	178.1250	93.7500	26367.1875	(4)
TOTAL		5322.5000	152.0714	111.8929	425681.0714	(35)

```

***** ANOVA TABLE *****
*
*          SUM OF SQUARES    DEGREES OF FREEDOM    MEAN SQUARE
*
* BETWEEN GROUPS          36458.9174                ( 3)          12152.9725
*
* WITHIN GROUPS           .3892E+06                ( 31)         12555.5534
*
* TOTAL                    .4257E+06                ( 34)
*
*****
*
* F = .9679    SIG. = .4203    ETA SQRD = .0856
*
*****

```

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.79 PAYMENT FOR FOLK HEALER MEDICATION BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	PAYMENT IN SUCRES					ROW TOTAL
		NOTHING	1-10	11-20	21-30	251-350	
		-	-	-	-	-	
COOP	10 76.9 45.5	1 7.7 50.0	0 0 0	1 7.7 50.0	1 7.7 50.0	13 43.3	
PEASANT PROD	11 68.8 50.0	1 6.3 50.0	2 12.5 100.0	1 6.3 50.0	1 6.3 50.0	16 53.3	
AGRO- INDUSTRY	1 100.0 4.5	0 0 0	0 0 0	0 0 0	0 0 0	1 3.3	
COLUMN TOTAL	22 73.3	2 6.7	2 6.7	2 6.7	2 6.7	30 100.0	

RAW CHI SQUARE = 2.18969 WITH 8 DEG.FREED. SIGNIFICANCE = .9746
CONTINGENCY COEFFICIENT = .26081

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.80 COST OF FOLK HEALER MEDICINES.
BY TYPE OF AGRICULTURAL UNIT, STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	330.0000	110.0000	164.8484	54350.0000	(3)
3.	PEASANT PROD.	360.0000	72.0000	127.6519	65180.0000	(5)
	TOTAL	690.0000	86.2500	132.1458	122237.5000	(8)

```

* * * * * A N O V A   T A B L E * * * * *
*
*          SUM OF SQUARES   DEGREES OF FREEDOM   MEAN SQUARE
*
* BETWEEN GROUPS           2707.5000                ( 1)           2707.5000
*
* WITHIN GROUPS            .1195E+06                ( 6)           19921.6667
*
* TOTAL                     .1222E+06                ( 7)
*
* * * * *
*
* F = .1359   SIG. = .7250   ETA SQD = .0221
*
* * * * *
    
```

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.81 PAYMENT FOR PHYSICIAN MEDICATION BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	COUNT ROW PCT COL PCT	PAYMENT IN SUCRES									ROW TOTAL
		NOTHING	1-10	11-20	21-30	51-75	76-100	101-150S	151-250S	251-350	
COOP		6	0	2	1	0	1	1	0	6	17
		35.3	0	11.8	5.9	0	5.9	5.9	0	35.3	22.4
CAPITAL FARM		20.7	0	50.0	33.3	0	33.3	20.0	0	31.6	
		1	0	0	0	0	0	1	1	1	4
PEASANT PROD		25.0	0	0	0	0	0	25.0	25.0	25.0	5.3
		3.4	0	0	0	0	0	20.0	11.1	5.3	
AGRO- INDUSTRY		20	2	2	2	2	2	3	6	5	44
		45.5	4.5	4.5	4.5	4.5	4.5	6.8	13.6	11.4	57.9
AGRO- INDUSTRY		69.0	100.0	50.0	66.7	100.0	66.7	60.0	66.7	26.3	
		2	0	0	0	0	0	0	2	7	11
AGRO- INDUSTRY		18.2	0	0	0	0	0	0	18.2	63.6	14.5
		6.9	0	0	0	0	0	0	22.2	36.8	
COLUMN TOTAL		29	2	4	3	2	3	5	9	19	76
		38.2	2.6	5.3	3.9	2.6	3.9	6.6	11.8	25.0	100.0

RAW CHI SQUARE = 25.13132 WITH 24 DEG.FREED. SIGNIFICANCE = .3987
CONTINGENCY COEFFICIENT = .49850

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.82 COST OF PHYSICIANS MEDICINES.
BY TYPE OF AGRICULTURAL UNIT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
1.	COOP	2067.5000	187.9545	132.5746	175760.2273	(11)
2.	CAPITAL FARM	625.0000	208.3333	87.7971	15416.6667	(3)
3.	PEASANT PROD.	3465.0000	144.3750	106.6263	261490.6250	(24)
4.	AGRO-INDUSTRY	2500.0000	277.7778	44.0959	15555.5556	(9)
TOTAL		8657.5000	184.2021	112.9641	587001.3298	(47)

```

* * * * * A N O V A   T A B L E * * * * *
*
*           SUM OF SQUARES   DEGREES OF FREEDOM   MEAN SQUARE
*
* BETWEEN GROUPS           .1188E+06                ( 3)           39592.7518
*
* WITHIN GROUPS            .4682E+06                ( 43)          10888.9087
*
* TOTAL                     .5870E+06                ( 46)
*
* * * * *
*
* F =           3.6361      SIG. = .0201      ETA SQRD = .2023
*
* * * * *
    
```

SOURCE: CULTURAL QUESTIONNAIRE

39.5% of the families, who receiving a medical prescription, buying the amount prescribed. No significant differences were noted in this phenomenon among the types of APUs (Table 4.83).

The general cost of medical attention was noted to have been at least three times as great as that of the folk healer. This situation was also reflected in the population opinion on those costs. Eighty-seven and a half percent of the families treated by the folk healers considered that the payment for services was fair (Table 4.84), only 52.4% of those attended by a physician had similar opinion (Table 4.85). The family's opinion that the cost of medication was expensive was 23% for the folk treatment, and 48.0% for the medical treatment (Tables 4.86, 4.87).

As presented earlier, only a limited proportion of the families was treated by a physician. Families indicated that the reasons for not having visited a physician were mainly that no significant sickness had occurred in the family (71.6%), economic limitations (13.4%), distrust of the physicians (6.0%), lack of time (7.5%), and accessibility (1.5%) (Table 4.88). From this information we reach two important conclusions: 1) the existence of a limited perception of the pathological process by the families, which will be better analysed in the chapter on morbidity, and, 2) the important influence of the economic factor on the access to the medical services.

CAYAMBE PROJECT

TABLE 4.83 ACQUISITION OF PHYSICIAN PRESCRIBED MEDICINES
 BY TYPE OF AGRICULTURAL PRODUCTIVE UNIT. STUDY POPULATION,
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT.	COUNT		ACQUISITION		ROW TOTAL
	ROW PCT	NO	PARTIAL	TOTAL	
	COL PCT				
COOP	41.2	7	5.9	52.9	17
	28.0		20.0	19.6	22.4
CAPITAL. FARM	25.0	1	0	3	4
	4.0		0	6.5	5.3
MINIFUNDIO	36.4	16	9.1	24	44
	4.60.0		80.0	54.5	57.9
AGRO- INDUSTRY	9.1	1	0	10	11
	4.0		0	90.9	14.5
				21.7	
COLUMN TOTAL	25	25	5	46	76
	32.9		6.6	60.5	100.0

RAW CHI SQUARE = 6.14512 WITH 6 DEG.FREED.
 CONTINGENCY COEFFICIENTE = .27351 SIGNIFICANCE = .407

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.84 FAMILY COMMENTS ON PAYMENTS FOR SERVICES OF
FOLK HEALERS BY AMOUNT OF PAYMENT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE 1982

AMOUNT PAYMENT	COUNT		FOLK HEALER SERVICES			ROW TOTAL
	ROW PCT COL PCT		VERY PENSIVE	EX-ADEQUATE	CHEAP	
NOTHING		0	2	1	3	
		0	66.7	33.3	12.5	
		0	25.0	7.7		
1-10 S		0	2	6	8	
		0	25.0	75.0	33.3	
		0	25.0	46.2		
11-20 S		0	2	4	6	
		0	33.3	66.7	25.0	
		0	25.0	30.8		
21-30 S		0	1	1	2	
		0	50.0	50.0	8.3	
		0	12.5	7.7		
31-50 S		1	0	1	2	
		50.0	0	50.0	8.3	
		33.3	0	7.7		
76-100 S		1	1	0	2	
		50.0	50.0	0	8.3	
		33.3	12.5	0		
101-150S		1	0	0	1	
		100.0	0	0	4.2	
		33.3	0	0		
COLUMN TOTAL		3	8	13	24	
		12.5	33.3	54.2	100.0	

RAW CHI SQUARE = 18.19231 WITH 12 DEG.FREED.
CONTINGENCY COEFFICIENTE = .65664 SIGNIFICANCE = .1100

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.85 FAMILY COMMENTS ON PAYMENTS FOR SERVICES OF PHYSICIANS BY AMOUNT OF PAYMENT. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

AMOUNT PAYMENT	PHYSICIAN SERVICES				ROW TOTAL
	COUNT	VERY PENSIVE	EX-ADEQUATE	CHEAP	
	ROW PCT COL PCT				
NOTHING	0 0 0	2 22.2 16.7	5 55.6 50.0	7 16.6	
1-10 S	2 50.0 10.0	2 50.0 16.7	0 0 0	4 9.6	
21-30 S	0 0 0	0 0 0	1 100.0 10.0	1 2.4	
31-50 S	2 40.0 10.0	1 20.0 8.3	2 40.0 20.0	5 11.9	
51-75 S	1 25.0 5.0	2 50.0 16.7	1 25.0 10.0	4 9.5	
76-100 S	1 33.3 5.0	2 66.7 16.7	0 0 0	3 7.1	
101-150S	3 75.0 15.0	1 25.0 8.3	0 0 0	4 9.5	
151-250S	3 100.0 15.0	0 0 0	0 0 0	3 7.1	
251-350	8 72.7 40.0	2 18.2 16.7	1 9.1 10.0	11 26.2	
COLUMN TOTAL	20 47.6	12 28.6	10 23.8	42 100.0	

CONTINGENCY COEFFICIENT = .61321 SIGNIFICANCE = .0645

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.86 FAMILY COMMENTS ON PAYMENT FOR MEDICATION PRESCRIBED BY
FOLK HEALERS BY AMOUNT OF PAYMENT. STUDY POPULATION,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

AMOUNT PAYMENT	COUNT ROW PCT COL PCT	COST OF MEDICATION			ROW TOTAL
		VERY PENSIVE	EX- ADEQUATE	CHEAP	
NOTHING	0	0	3	19	22
		0	13.6	86.4	73.3
		0	66.7	40.0	
1-10		0	0	2	2
		0	0	100.0	6.6
		0	0	8.7	
11-20		0	1	1	2
		0	50.0	50.0	6.6
		0	20.0	4.3	
21-30		0	1	1	2
		0	50.0	50.0	6.6
		0	20.0	4.3	
251-350		2	0	0	2
		100.0	0	0	6.6
		100.0	0	0	
COLUMN TOTAL		2	5	23	30
		6.6	16.6	76.6	100.0

RAW CHI SQUARE = 33.770751 WITH 8 DEG.FREED.
CONTINGENCY COEFFICIENT = .80388 SIGNIFICANCE = .0952

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.87 FAMILY COMMENTS ON PAYMENT FOR MEDICATION PRECIBED BY
PHYSICIAN BY AMOUNT OF PAYMENT. STUDY POPULATION
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

AMOUNT PAYMENT	COST OF MEDICATION			ROW TOTAL
	COUNT ROW PCT COL PCT	VERY EX- PENSIVE	ADEQUATE CHEAP	
NOTHING	0	3	19	22
	0	13.7	86.3	29.3
	0	20.0	76.0	
1-10	7	1	1	9
	77.7	11.6	11.6	11.8
	19.4	6.7	40.0	
11-20	1	1	2	4
	25.0	25.0	50.0	5.3
	2.8	6.7	8.0	
21-30	0	1	1	3
	0	33.3	66.6	4.0
	0	6.7	28.0	
51-75	1	1	0	2
	50.0	50.0	0	2.6
	2.8	6.7	0	
76-100	1	2	0	3
	33.3	66.7	0	4.0
	2.8	13.3	0	
101-150	2	3	0	5
	40.0	60.0	0	6.5
	5.6	20.0	0	
151-250	9	0	0	9
	100.0	0	0	11.8
	25.0	0	0	
251-350	15	3	1	19
	78.9	15.8	5.3	25.0
	41.7	20.0	24.0	
COLUMN TOTAL	36	15	25	76
	47.4	19.7	8.3	100.0

RAW CHI SQUARE = 50.029259 WITH 16 DEG. FREED.
CONTINGENCY COEFFICIENT = .68257 SIGNIFICANCE = .000

SOURCE: CULTURAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 4.88 FAMILY REASONS FOR NOT VISITING A PHYSICIAN. STUDY
POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CATEGORY LABEL	COUNT	PCT OF RESPONSES	PCT OF CASES
ECONOMIC LIMITATION	9	13.4	14.1
ACCESIBILITY	1	1.5	1.6
DISTRUST MD.	4	6.0	6.3
NO SICKNESS	48	71.6	75.0
LACK OF TIME	5	7.5	7.8
TOTAL RESPONSES	67	100.0	104.7

SOURCE: CULTURAL QUESTIONNAIRE

CHAPTER 5

HEALTH STATUS OF THE POPULATION SUBGROUPS.

The health status of the rural population in the Cayambe County was established by examining negative indicators, such as general mortality, infant mortality, natality trends, and a cross-sectional morbidity study on the different population subgroups, and by positive indicators, such as growth and development of children. The mortality and natality trends used vital statistics data, and the cross-sectional study and childrens development used the field observation data.

In the study of the indicator trends, the vital statistics information had a serious limitation. Because it is grouped at township and county levels, it was not possible to analyze it at specific community levels. For that reason we had to assume that the township information was the best, and perhaps the only one available to establish the health trends in the rural population of Cayambe. The possible effect of the implementation of health services on those trends was determined by comparing the slopes of regression before and after such implementation.

The cross-sectional study of morbidity provides specific information on the present health status of the study subgroups. It is considered as the actual result of the health trends.

The development and growth of the children, is perhaps the best positive health indicator, because it reflects the environment, which in turn determined the nutritional and health status of the study families. Therefore, it was also considered as the actual result of the same health trends.

The information on the health status of the different population subgroups was related to several variables in the processes of production and reproduction of the families and study subgroups in order to establish the degree of causality and determination that each one of those variables may have on the health status of the people. This component of the study allowed the systematization of the information, which was analyzed separately in the previous chapters, and to test the conceptual model and hypothesis formulated in the design of the project.

The three levels of study: a) Vital statistics trends, b) Present health status (morbidity and child development), and c) Determinants of the health status, are presented in this chapter.

5.1 GENERAL VITAL STATISTICS TRENDS

Since 1962, the indicators of natality and general and infant mortality have shown a declining trend at the national level, as well as, specifically, in Cayambe county and its township levels. There

are some specific characteristics that had to be studied, the most important being the trends before and after the implementation of the health services.

5.1.1 NATALITY TRENDS

The natality rates in the different townships of Cayambe county show a declining tendency. At the county seat level, the natality rates have gone down from 53.3 per thousand inhabitants in 1962, to 35.7 in 1978, with a slope of -0.77 (Beta coefficient) in a regression analysis (Table 5.1).

A similar situation was found in the several townships. In Ascazubi, the natality rates decreased from 42.4 per thousand in 1962, to 33.1 in 1978 (Beta= -0.54), without significant differences in the slopes of regression before and after the implementation of the health subcenter in 1970, according to the covariance analysis (Table 5.2). In Cangahua, the decline of the natality rates goes from 69.8 in 1962 to 36.7 in 1978 (Beta= -1.43), without statistical difference before and after the health subcenter, established in 1970 (Table 5.3). Cusubamba shows a limited decline, from 52.1 per thousand in 1962 to 50.6 in 1978 (Beta= -0.24). No subcenter existed during those years. It was constructed in 1980 (Table 5.4). In Oton, the natality rates decreased from 54.7 to 44.9 per thousand (Beta= -0.24), and no subcenter was available during the same period of time. It was also constructed in 1980 (Table 5.5). In Olmedo, the natality rates declined from 57.3 to 39.5 per thousand during the same period

CAYAMBE PROJECT

TABLE 5.1 NATALITY TRENDS IN THE TOWNSHIP OF CAYAMBE. 1982

YEAR	Nº	RATES
	X	Y
1962	1	53.34
1963	2	50.33
1964	3	48.14
1965	4	49.00
1966	5	50.60
1967	6	44.81
1968	7	52.79
1969	8	50.16
1970	9	50.14
1971	10	50.35
1972	11	51.23
1973	12	48.27
1974	13	45.66
1975	14	41.01
1976	15	37.72
1977	16	36.65
1978	17	35.70

REGRESSION LINE:

\bar{X}	9
\bar{Y}	46.82
γ	-0.77
α	54.57
β	-0.86
$Y_c = \alpha + \beta x$	54.57 - 0.86 X

CAYAMBE PROJECT

TABLE 5.2 ANALYSIS OF COVARIANCE OF NATALITY
IN THE TOWNSHIP OF ASCAZUBI. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	42.4	1971	1	40
	2	38		2	33
	3	35.5		3	38.5
	4	40.6		4	33.1
	5	37		5	32.5
	6	36.3		6	30.4
	7	40.1		7	31.2
	8	42.1		8	33.1
	9	31.3		0	0
	TOTAL X	45		36	
	TOTAL Y	343.3		271.8	
	MEAN X	5		4.5	
	MEAN Y	38.14		33.97	

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=285	XY=1689	Y2=13197			
C=225	1716	13095			
X2=60	-27	102			
X2=204	XY=1182	Y2=9316			
C=162	1223	9234			
X2=42	-41	82			
TOTAL					
X=81	X=4.76				
Y=615.1	Y=36				
X2=489	XY=2871	Y2=22513			
C=386	2931	22256			
X2=103	XY=-60	Y2=257			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG. C	DF	SS	MS
WITHIN	8	60	-27	102	-.45	7	90	13
GROUP	7	42	-41	82	-.98	6	42	7
POOLED, W	15	102	-68	184	-.67	14	132	10
DIFFERENCES OF SLOPES								
BETWEEN	1	1	8	73		1	7	7
W + B	16	103	-60	257		15	222	10
BETWEEN ADJUSTED MEANS								
						1	83	83

COMPARISON OF SLOPES : $F = 7/10 = .7$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 83/10 = 8.3$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.3 ANALYSIS OF COVARIANCE OF NATALITY
IN THE TOWNSHIP OF CANGAHUA, 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	69.8	1971	1	57.9
	2	65.3		2	57.1
	3	53.1		3	50
	4	56.3		4	50.5
	5	61		5	42.9
	6	54.1		6	42.4
	7	34.7		7	40.2
	8	58.6		8	36.7
	9	55.1		0	0
	TOTAL X	45	36		
	TOTAL Y	508	377.7		
	MEAN X	5	4.5		
	MEAN Y	56.44	47.21		

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=285	XY=2422	Y2=29447			
C=225	2540	28674			
X2=60	-118	773			
X2=204	XY=1568	Y2=18264			
C=162	1700	17832			
X2=42	-132	432			
	TOTAL				
X=81	X=4.76				
Y=885.7	Y=52				
X2=489	XY=3990	Y2=47711			
C=386	4220	46145			
X2=103	XY=-230	Y2=1566			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG. C	DF	SS	MS
WITHIN	8	60	-118	773	-1.97	7	541	77
GROUP	7	42	-132	432	-3.14	6	17	3
						13	558	43
POOLED, W	15	102	-250	1205	-2.45	14	592	42
						1	34	34
DIFFERENCES OF SLOPES								
BETWEEN	1	1	20	361				
W + B	16	103	-230	15		15	1052	
						1	460	460
BETWEEN ADJUSTED MEANS								

COMPARISON OF SLOPES : $F = 34/43 = .790697674$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 460/42 = 10.952381$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.4 NATALITY TRENDS IN THE
TOWNSHIP OF CUSUBAMBA. 1982

YEAR	N ^o	RATES
	X	Y
1962	1	52.17
1963	2	49.45
1964	3	52.32
1965	4	52.98
1966	5	45.49
1967	6	50.24
1968	7	63.43
1969	8	57.69
1970	9	57.45
1971	10	47.55
1972	11	79.56
1973	12	42.03
1974	13	46.70
1975	14	47.22
1976	15	47.03
1977	16	45.49
1978	17	50.67

REGRESSION LINES

\bar{X}	9
\bar{Y}	52.20
γ	-0.14
α	54.36
β	-0.24
$Y_c = \alpha + \beta x$	54.36 - 0.24 X

CAYAMBE PROJECT

TABLE 5.5 NATALITY TRENDS IN THE
TOWNSHIP OF OTON. 1982

YEAR	Nº X	RATES
1962	1	54.77
1963	2	53.68
1964	3	47.17
1965	4	57.72
1966	5	48.78
1967	6	54.95
1968	7	56.11
1969	8	49.06
1970	9	52.63
1971	10	51.36
1972	11	52.46
1973	12	57.08
1974	13	55.76
1975	14	50.39
1976	15	45.96
1977	16	52.63
1978	17	44.97

REGRESSION LINES

\bar{X}	9
\bar{Y}	52.05
γ	-0.32
α	54.23
β	-0.24
$Y_c = \alpha + \beta x$	54.23 - 0.24 X

(Beta=-.77), but the differences before and after the health subcenter are not statistically significant, according to the analysis of covariance (Table 5.6).

A comparison of the natality trends of the different townships showed that there was a greater decline in Olmedo, Cangahua and the county seat, although the levels were lowest in Ascazubi (Graph 5.1).

The implementation of health services in the study township did not have a significant effect on the natality decline, according to the before-after analysis of covariance, as presented in the corresponding tables.

No information on natality, or any other health indicator, was available for the different study subgroups, so we assume that their natality trends may be similar to the township ones.

5.1.2 GENERAL MORTALITY TRENDS

The general mortality rates also showed a decline. At the county seat, that decline goes from 23.4 per thousand in 1962 to 14.7 in 1978 (Beta=-.51)(Table 5.7).

At the township level, the mortality rate also showed a tendency to decline. In Ascazubi, the rates showed a very irregular decline, from 27.9 per thousand in 1963, to 13.4 in 1978 (Beta=-0.21)(Table 5.8). In Canguahua, the rates declined from 39.3 in 1962 to 20.0 in

CAYAMBE PROJECT

TABLE 5.6 ANALYSIS OF COVARIANCE OF NATALITY
IN THE TOWNSHIP OF OLMEDO. 1962-1978

REGRESSION 1		REGRESSION 2			
YEAR	RATES	YEAR	RATES		
1962	1	57.3	1974	1	52.5
	2	52.8		2	45.4
	3	54.9		3	43.5
	4	50.3		4	42.1
	5	55.8		5	39.5
	6	47.8		0	0
	7	63.1		0	0
	8	55.6		0	0
	9	50.8		0	0
	10	53.1		0	0
	11	62.4		0	0
	12	51.2		0	0
TOTAL X 78		15			
TOTAL Y 655.1		223			
MEAN X 6.5		3			
MEAN Y 54.59		44.6			

TABLE OF SUM OF SQUARES

REGRESSION 1		
X2=650	XY=4270	Y2=36002
C=507	4258	35763
X2=143	12	239
REGRESSION 2		
X2=55	XY=640	Y2=10042
C=45	669	9946
X2=10	-29	96
TOTAL		
X=93	X=5.47	
Y=878.1	Y=52	
X2=705	XY=4910	Y2=46044
C=509	4804	45356
X2=196	XY=106	Y2=688

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	R.C	DF	SS	MS
WITHIN	11	143	12	239	.08	10	238	24
GROUP	4	10	-29	96	-2.9	3	12	4
						13	250	19
POOLED, W	15	153	-17	335	-.11	14	333	24
DIFFERENCES OF SLOPE								
BETWEEN	1	43	123	353		1	83	83
W + B	16	196	106	688		15	631	
BETWEEN ADJUSTED MEANS								
						1	298	298

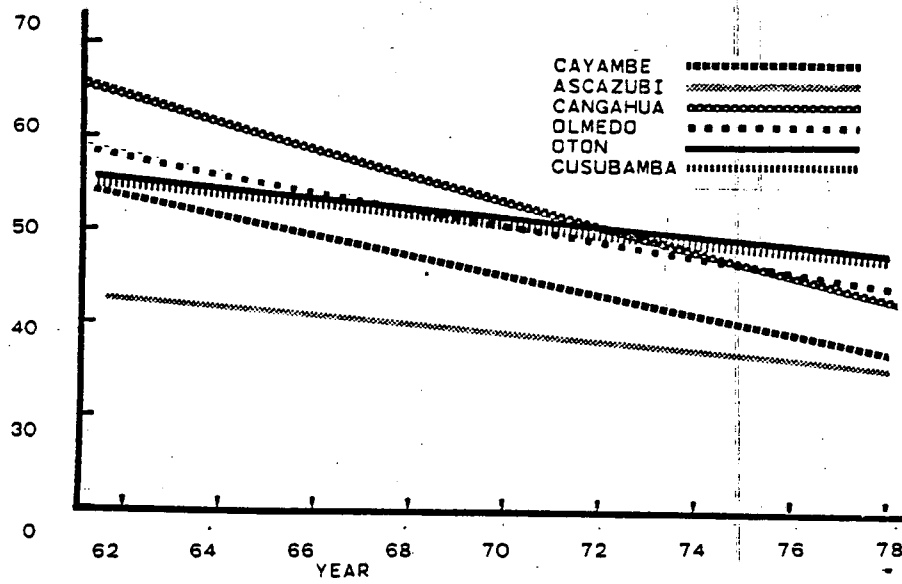
COMPARISON OF SLOPES : $F = 83/19 = 4.36842106$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 298/24 = 12.4166667$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

GRAPH 5.1 NATALITY TRENDS BY TOWNSHIP.
RURAL CAYAMBE COUNTY, 1982

RATES
PER 1000



SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.7 GENERAL MORTALITY TRENDS IN THE TOWNSHIP OF CAYAMBE, 1982

YEAR	Nº X	RATES Y
1962	1	23.47
1963	2	23.14
1964	3	21.68
1965	4	21.31
1966	5	22.33
1967	6	20.66
1968	7	23.28
1969	8	23.77
1970	9	19.91
1971	10	21.23
1972	11	23.47
1973	12	23.79
1974	13	19.38
1975	14	14.93
1976	15	14.96
1977	16	14.10
1978	17	14.75

REGRESSION LINES

\bar{X}	9
\bar{Y}	20.36
γ	-0.74
α	24.99
β	-0.51
$Y_c = \alpha + \beta x$	24.99 - 0.51 X

CAYAMBE PROJECT

TABLE 5.8 ANALYSIS OF COVARIANCE OF GENERAL MORTALITY
IN THE TOWNSHIP OF ASCAZUBI. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	9.6	1971	1	13.7
	2	27.9		2	15.7
	3	8.2		3	18.2
	4	10.9		4	12.4
	5	12.9		5	6.1
	6	9.9		6	9.5
	7	15.4		7	9.8
	8	11.4		8	13.4
	9	15.4		0	0
TOTAL X		45			36
TOTAL Y		121.6			98.8
MEAN X		5			4.5
MEAN Y		13.51			12.35

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=285	XY=595	Y2=1925			
C=225	608	1643			
X2=60	-13	282			
X2=204	XY=413	Y2=1322			
C=162	445	1220			
X2=42	-32	102			
TOTAL					
X=81	X=4.76				
Y=220.4	Y=13				
X2=489	XY=1008	Y2=3247			
C=386	1050	2857			
X2=103	XY=-42	Y2=390			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG.C	DF	SS	MS
WITHIN	8	60	-13	282	-.22	7	279	40
GROUP	7	42	-32	102	-.76	6	78	13
						13	357	27
POOLED, W	15	102	-45	384	-.44	14	364	26
DIFFERENCES OF SLOPES								
BETWEEN	1	1	3	6		1	7	7
W + B	16	103	-42	39		15	373	
BETWEEN ADJUSTED MEANS								
						1	9	9

COMPARISON OF SLOPES : $F = 7/27 = .259259259$ D.F.(1,13)
 COMPARISON OF ELEVATIONS : $F = 9/26 = .346153846$ D.F.(1,14)

SOURCE : VITAL STATISTICS

1978 (Beta=-0.94)(Table 5.9). The decline is also very irregular in Cangahua, from 17.3 in 1962 and 33.2 in 1963, to 0.3 in 1978 (Beta=-0.87)(Table 5.10). Similar declines were observed in Oton, from 30.0 to 18.1 per thousand (Beta=-2.09)(Table 5.11), and in Olmedo, from 26.5 to 16.7 per thousand (Beta=-0.36)(Table 5.12), during the same period of time.

In those townships where health subcenters were implemented during those years (Cangahua, Olmedo and Ascazubi), the analysis of covariance did not show statistical differences in the slopes before and after the respective years of implementation, with the exception of Cangahua. Graph 5.2 shows these trends. Oton and Cusubamba showed the greatest declines, although Ascazubi presented the lowest levels. The great year to year variations, due to problems of registering the vital data, do not allow reaching definite conclusions.

5.1.3 INFANT MORTALITY TRENDS

Infant mortality is probably the best indicator for detection of changes in the general living conditions of population groups. There was a declining tendency in this indicator in every township studied. At the county seat level, the infant mortality declined from 159.1 per 1000 live births in 1962 to 119.7 in 1978 (Beta=-3.77)(Table 5.13). At the township level the irregularities of the infant mortality rates were great from one year to another, although the regression analysis showed definite negative beta coefficients. In Ascazubi the beta coefficient was -4.8 (Table 5.14), in Cangahua -1.2

CAYAMBE PROJECT

TABLE 5.9 ANALYSIS OF COVARIANCE OF GENERAL MORTALITY
IN THE TOWNSHIP OF CANGAHUA, 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	39.3	1971	1	30.7
	2	33		2	31.8
	3	37.2		3	31.8
	4	35.1		4	29.6
	5	32.7		5	27.7
	6	29.6		6	23.8
	7	42.2		7	21.4
	8	35.8		8	20
	9	32		0	0
TOTAL X		45	36		
TOTAL Y		316.9	216.8		
MEAN X		5	4.5		
MEAN Y		35.21	27.1		

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=285	XY=1568	Y2=11281			
C=225	1585	11158			
X2=60	-17	123			
X2=204	XY=899	Y2=6033			
C=162	976	5875			
X2=42	-77	158			
X=81	TOTAL X=4.76				
Y=533.7	Y=31				
X2=489	XY=2467	Y2=17314			
C=386	2543	16755			
X2=103	XY=-76	Y2=559			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG. C	DF	SS	MS
WITHIN	8	60	-17	123	-.28	7	118	17
GROUP	7	42	-77	158	-1.83	6	17	3
						13	135	10
POOLED, W	15	102	-94	281	-.92	14	194	14
DIFFERENCES OF SLOPES								
BETWEEN	1	1	18	278		1	59	59
W + B	16	103	-76	559		15	503	
BETWEEN ADJUSTED MEANS								
						1	309	309

COMPARISON OF SLOPES : $F = 59/10 = 5.9$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 309/14 = 22.0714286$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.10 GENERAL MORTALITY TRENDS IN THE TOWNSHIP OF CUSUBAMBA. 1982

YEAR	Nº X	RATES Y
1962	1	17.39
1963	2	33.25
1964	3	21.94
1965	4	25.66
1966	5	20.31
1967	6	22.33
1968	7	18.79
1969	8	23.85
1970	9	20.41
1971	10	20.06
1972	11	23.95
1973	12	26.09
1974	13	14.37
1975	14	5.64
1976	15	15.21
1977	16	12.90
1978	17	9.33

REGRESSION LINES

\bar{X}	9
\bar{Y}	19.50
γ	-0.65
α	27.28
β	-0.87
$Y_c = \alpha + \beta x$	$27.28 - 0.87 X$

CAYAMBE PROJECT

TABLE 5.11 GENERAL MORTALITY TRENDS IN THE TOWNSHIP OF OTON, CAYAMBE COUNTY, 1962-1978

YEAR	N ^o X	RATES Y
1962	1	30.04
1963	2	94.37
1964	3	40.31
1965	4	29.71
1966	5	31.12
1967	6	28.31
1968	7	37.95
1969	8	35.16
1970	9	25.91
1971	10	40.93
1972	11	49.28
1973	12	35.97
1974	13	31.86
1975	14	14.90
1976	15	2.09
1977	16	21.87
1978	17	18.12

REGRESSION LINES

\bar{X}	9
\bar{Y}	33.41
γ	-0.55
α	55.20
β	-2.09
$Y_c = \alpha + \beta x$	52.20 - 2.09 X

CAYAMBE PROJECT

TABLE 5.12 ANALYSIS OF COVARIANCE OF GENERAL MORTALITY
IN THE TOWNSHIP OF OLMEDO. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	16.9	1974	1	19.7
	2	26.5		2	14
	3	22.1		3	13.6
	4	20.1		4	15.7
	5	23.2		5	16.7
	6	23.5		0	0
	7	17.3		0	0
	8	19		0	0
	9	16.1		0	0
	10	22.2		0	0
	11	18.7		0	0
	12	30.2		0	0
TOTAL X		78	TOTAL Y		79.7
TOTAL Y		255.8	TOTAL X		78
MEAN X		6.5	MEAN Y		15.94
MEAN Y		21.32	MEAN X		6.5

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=650	XY=1682	Y2=5645	X2=55	XY=235	Y2=1294
C=507	1663	5453	C=45	239	1270
X2=143	19	192	X2=10	-4	24
TOTAL			TOTAL		
X=93	X=5.47	Y=335.5	Y=42	XY=1917	Y2=6939
X2=705	1835	6621	X2=196	XY=82	Y2=318
C=509	1835	6621			
X2=196	XY=82	Y2=318			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG. C	DF	SS	MS
WITHIN	11	143	19	192	.13	10	189	19
GROUP	4	10	-4	24	-.4	3	22	7
POOLED. W	15	153	15	216	.1	14	215	15
DIFFERENCES OF SLOPES								
BETWEEN	1	43	67	102		1	4	4
W + B	16	196	82	318		15	284	19
BETWEEN ADJUSTED MEANS								
						1	69	69

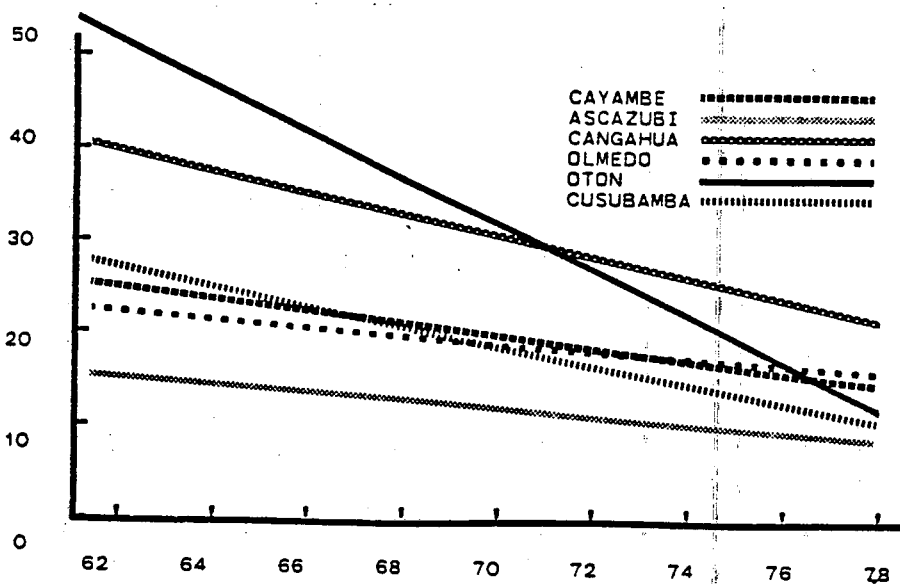
COMPARISON OF SLOPES : $F = 4/16 = .25$ D.F. (1,13)
 COMPARISON OF ELEVATIONS : $F = 69/15 = 4.6$ D.F. (1,14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

GRAPH 5.2 GENERAL MORTALITY TRENDS BY TOWNSHIP.
RURAL CAYAMBE COUNTY. 1982

RATES
PER 1000



SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.13 GENERAL MORTALITY TRENDS IN THE TOWNSHIP OF CAYAMBE. 1982

YEAR	Nº X	RATES Y
1962	1	159.21
1963	2	182.57
1964	3	155.46
1965	4	157.42
1966	5	156.48
1967	6	163.42
1968	7	159.75
1969	8	157.07
1970	9	123.70
1971	10	135.84
1972	11	143.83
1973	12	136.07
1974	13	116.67
1975	14	118.11
1976	15	121.38
1977	16	107.17
1978	17	119.75

REGRESSION LINES

\bar{X}	9
\bar{Y}	141.99
γ	-0.89
α	175.94
β	-3.77
$Y_c = \alpha + \beta x$	175.94 - 3.77 X

CAYAMBE PROJECT

TABLE 5.14 ANALYSIS OF COVARIANCE OF INFANT MORTALITY
IN THE TOWNSHIP OF ASCAZUBI. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	57.1	1971	1	92.1
	2	265.6		2	127
	3	65.7		3	135.1
	4	112.7		4	62.5
	5	196.9		5	93.7
	6	75.7		6	82
	7	95.9		7	31.2
	8	89.7		8	72.5
	9	135.6		0	0
TOTAL X		45	TOTAL X		36
TOTAL Y		1094.9	TOTAL Y		696.1
MEAN X		5	MEAN X		4.5
MEAN Y		121.66	MEAN Y		87.01

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=285	XY=5284	Y2=170952			
C=225	5475	133201			
X2=60	-191	37751			
REGRESSION 2					
X2=204	XY=2760	Y2=68503			
C=162	3132	60569			
X2=42	-372	7934			
TOTAL					
X=81	X=4.76				
Y=1791	Y=105				
X2=489	XY=8044	Y2=239455			
C=386	8534	188687			
X2=103	XY=-490	Y2=50768			

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG.C	DF	SS	MS
WITHIN	8	60	-191	37751	-3.18	7	37143	5306
GROUP	7	42	-372	7934	-8.86	6	4639	773
POOLED, W	15	102	-563	45685	-5.52	13	41782	3214
DIFFERENCES OF SLOPES								
BETWEEN	1	1	73	5083		1	42577	3041
W + B	16	103	-490	50768		14	42577	3041
BETWEEN ADJUSTED MEANS								
	1					1	795	795
						15	48437	3229
						1	5860	5860

COMPARISON OF SLOPES : $F = 795/3214 = .24735532$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 5860/3041 = 1.9269977$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

(Table 5.15), in Cusubamba -3.1 (Table 5.16). In the townships of Oton and Olmedo the regression coefficients (beta) were -14.5 and -5.9 respectively (Tables 5.17, 5.18).

Observing Graph 5.3, it can be seen that greater declines in infant mortality were present in Oton and Olmedo, although, as in the other indicator, Ascazubi presented the lowest levels. The analysis of covariance before-after the implementation of the health subcenters did not show statistically significant differences (Tables 5.14, 5.15, 5.18).

As was stated before, the serious limitations in the registration of the vital statistics, which yield large variations from one year to another, do not allow definite conclusions, and the health indicator trends should be considered as the best reasonable approximation to the changes in the health status of the population subgroups in the last two decades. For that reason, the identification of the health status of all the families in the study was of particular importance.

5.2 PRESENT POPULATION MORBIDITY.

The clinical study carried on among the family members showed a high prevalence of diseases in the majority of the population subgroups.

It was found that 51.8% of the individuals examined presented

CAYAMBE PROJECT

TABLE 5.15 ANALYSIS OF COVARIANCE OF INFANT MORTALITY
IN THE TOWNSHIP OF CANGAHUA. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	205.1	1971	1	198.5
	2	210.8		2	183.5
	3	229.7		3	176.9
	4	204.7		4	183.4
	5	136		5	223.1
	6	169.5		6	207.2
	7	259.1		7	166.1
	8	168.7		8	173.5
	9	169.3		0	0
TOTAL X		45	TOTAL X		36
TOTAL Y		1752.9	TOTAL Y		1512.2
MEAN X		5	MEAN X		4.5
MEAN Y		194.77	MEAN Y		189.03

TABLE OF SUM OF SQUARES

REGRESSION 1			
X2=285	XY=8519	Y2=352648	
C=225	8765	341406	
X2=60	-246	11242	
REGRESSION 2			
X2=204	XY=6739	Y2=288401	
C=162	6805	285844	
X2=42	-66	2557	
TOTAL			
X=81	X=4.76		
Y=3265.1	Y=192		
X2=489	XY=15258	Y2=641049	
C=386	15557	627110	
X2=103	XY=-299	Y2=13939	

COMPARISON OF THE REGRESSION LINES

	DF	X2	XY	Y2	REG.C	DF	SS	MS
WITHIN	8	60	-246	11242	-4.1	7	10233	1462
GROUP	7	42	-66	2557	-1.57	6	2453	409
						13	12686	976
POOLED, W	15	102	-312	13799	-3.06	14	12845	918
DIFFERENCES OF SLOPES								
BETWEEN	1	1	13	140		1	159	159
W + B	16	103	-299	13939		15	13071	
BETWEEN ADJUSTED MEANS								
	1					1	226	226

COMPARISON OF SLOPES : $F = 159/976 = .162909836$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 226/918 = .246187364$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

TABLE 5.16 INFANT MORTALITY TRENDS IN THE TOWNSHIP OF CUSUBAMBA

YEAR	Nº X	RATES Y
1962	1	83.33
1963	2	137.93
1964	3	161.29
1965	4	140.63
1966	5	107.14
1967	6	206.35
1968	7	123.46
1969	8	146.67
1970	9	144.74
1971	10	109.38
1972	11	129.03
1973	12	172.41
1974	13	76.92
1975	14	59.70
1976	15	102.94
1977	16	134.33
1978	17	52.63

REGRESSION LINES

\bar{X}	9
\bar{Y}	122.88
γ	- 0.39
α	150.99
β	- 3.12
$Y_c = \alpha + \beta x$	150.99 - 3.12 X

CAYAMBE PROJECT

TABLE 5.17 INFANT MORTALITY TRENDS IN THE TOWNSHIP OF OTON, 1982

YEAR	Nº X	RATES Y
1962	1	193.55
1963	2	854.84
1964	3	254.55
1965	4	117.65
1966	5	224.14
1967	6	151.52
1968	7	191.13
1969	8	183.33
1970	9	215.38
1971	10	109.38
1972	11	318.18
1973	12	191.78
1974	13	142.86
1975	14	140.85
1976	15	-
1977	16	116.88
1978	17	179.10

REGRESSION LINES

\bar{X}	8.63
\bar{Y}	224.07
γ	- 0.41
α	349.39
β	-14.53
$Y_c = \alpha + \beta x$	349.39 - 14.53 X

CAYAMBE PROJECT

TABLE 5.18 ANALYSIS OF COVARIANCE OF INFANT MORTALITY
IN THE TOWNSHIP OF OLMEDO. 1962-1978

REGRESSION 1			REGRESSION 2		
YEAR	RATES		YEAR	RATES	
1962	1	91.1	1974	1	68.8
	2	244.2		2	100.4
	3	175.4		3	80.3
	4	186.4		4	95.6
	5	185.1		5	121.9
	6	230		0	0
	7	118.1		0	0
	8	111.5		0	0
	9	115.2		0	0
	10	111.5		0	0
	11	124		0	0
	12	178.7		0	0
TOTAL X		78	TOTAL Y		467
MEAN X		6.5	MEAN Y		39.13
		155.93			93.4

TABLE OF SUM OF SQUARES

REGRESSION 1			REGRESSION 2		
X2=650	XY=11536	Y2=319998			
C=507	12163	291782			
X2=143	-627	28216			
REGRESSION 2			TOTAL		
X2=55	XY=1502	Y2=45261	X=93	X=5.47	
C=45	1401	43618	Y=2338.2	Y=138	
X2=10	101	1643	X2=705	XY=13038	Y2=365259
			C=509	12791	321599
			X2=196	XY=247	Y2=43660

COMPARISON OF THE REGRESSION LINES

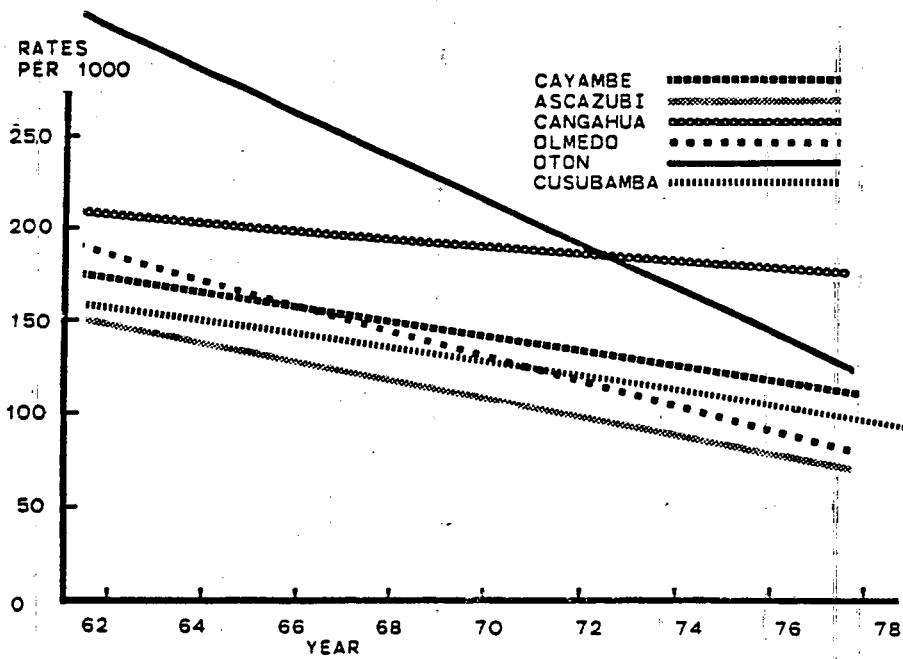
	DF	X2	XY	Y2	REG. C	DF	SS	MS
WITHIN	11	143	-627	28216	-4.38	10	25467	2547
GROUP	4	10	101	1643	10.1	3	623	208
POOLED, W	15	153	-526	29859	-3.44	14	26090	2007
DIFFERENCES OF SLOPES								
BETWEEN	1	43	773	13801		1	28051	2004
W + B	16	196	247	43660		15	1961	1961
BETWEEN ADJUSTED MEANS								
						1	43349	15298

COMPARISON OF SLOPES : $F = 1961/2007 = .977080219$ D.F. (1, 13)
 COMPARISON OF ELEVATIONS : $F = 15298/2004 = 7.63373254$ D.F. (1, 14)

SOURCE : VITAL STATISTICS

CAYAMBE PROJECT

GRAPH 5.3 INFANT MORTALITY TRENDS BY TOWNSHIP
RURAL CAYAMBE COUNTY. 1982



SOURCE : VITAL STATISTICS

some pathology at the physical exam, which is a high value for a cross-sectional study. Prevalence is influenced by the different factors causing the appearance of disease (incidence), as well as by those other factors, primarily the health services that try to decrease the time period of disease and to cure it. The health services play an important role, not so much by decreasing the incidence, but by decreasing the period of disease, and thus its prevalence in a population group.

The prevalence of disease among the study subgroups was not homogeneous, and it was higher among the families in the peasant production and cooperatives, 54.2 and 52.6% respectively. In a smaller proportion (46.6%) the families in the capitalist farms presented some pathology, and the lowest prevalence was present among the families in the agro industry, 41.9% (Table 5.19).

With this information, it was possible to calculate the relative risk of the agricultural groups versus those in agro industry. A 1.56 RR was found for the total group in agriculture, 1.67 for those in peasant production, 1.54 for those in the cooperatives, and 1.21 for those in the capitalist farms (Table 5.20).

The diseases of higher prevalence in the study population were mainly digestive representing, 64.6% of all the pathology found. It exceeded by far the respiratory (14.8%), nutritional (5.3%), dermatologic (5.0%), and other less frequent pathology (Table 5.21).

CAYAMBE PROJECT

TABLE 5.19 HEALTH STATUS OF THE FAMILY MEMBERS
BY TYPE OF AGRICULTURAL UNIT.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	HEALTH STATUS		ROW TOTAL
	COUNT		
	ROW PCT COL PCT	HEALTHY SICK	
COOPERATIVE	90 47.4 25.8	100 52.6 26.7	190 26.2
CAPITAL. FARM	47 53.4 13.5	41 46.6 10.9	88 12.2
PEASANT PRODUC.	169 45.4 48.4	203 54.6 54.1	372 51.4
AGRO- INDUSTRY	43 58.1 12.3	31 41.9 8.3	74 10.2
COLUMN TOTAL	349 48.2	375 51.8	724 100.0

RAW CHI SQUARE = 5.06171 WITH 3 DEG. OF FREED.
CONTINGENCY COEFFICIENT = .08332 SIGNIFICANCE = .1673

SOURCE: MEDICAL EXAMS QUESTIONNAIRE

CAYAMBE PROJECT
TABLE 5.20 RELATIVE RISK OF DEVELOPING
DISEASE IN INDIVIDUALS INSERTED
IN DIFFERENT TYPE OF AGRICULTURAL UNITS
STUDY POPULATION, RURAL CAYAMBE COUNTY. 1982

RELATIVE RISK	
AGRICULTURE	1.54
COOPERATIVES	1.54
CAPITALIST FARMS	1.21
PEASANT PRODUCTION	1.67
AGRO INDUSTRY	1.0

SOURCE : CLINICAL QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 5.21 MOST PREVALENT DISEASES IN THE FAMILIES.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

CATEGORY LABEL	COUNT	PCT OF RESPONSES	PCT OF CASES
DIGESTIVE	649	64.6	173.5
INFECTIOUS	18	1.8	4.8
PEDICULOSIS	41	4.1	11.0
NUTRITIONAL	53	5.3	14.2
RESPIRATORY	149	14.8	39.8
SKIN	50	5.0	13.4
OTHER	45	4.5	12.0

SOURCE: MEDICAL EXAMS QUESTIONNAIRE

The differences in proportional morbidity among the different population subgroups were minimal, and not statistically significant. In all the subgroups, the digestive diseases presented the highest prevalence (Table 5.22).

Among the different age groups differences in prevalences were not statistically significant, with variations from 48.6% in the 10-20 year age group, to 67.6% in the 50-59 group (Table 5.23).

Most of the diseases were of the acute type, with resolutions less than 30 days (66.8%). Smaller percentages of individuals presented pathology with a resolution from 1 to 3 months (18.1%), or were of the chronic type, with duration greater than 3 months (15.1%). This fact also applied to specific groups of diseases, with 65% of the digestive, 80% of the respiratory, 67% of the nutritional, and 82% of the dermatologic morbidity being acute. Nevertheless important percentages of the population showed a chronic character in the different disease groups. The differences are not statistically significant (Table 5.24).

A comparative study of the relative duration of the diseases among the different population groups, confirmed the higher proportion of acute diseases. This ranged from 36.7% in cooperatives to 64% in the agro-industry and peasant production, to 75.6% in the capitalist farms. The extended acute diseases (1-3 mo) showed a

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TABLE 5.22 MOST PREVALENT DISEASES BY TYPE OF AGRICULTURAL UNIT,
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	MOST PREVALENT DISEASES							TOTAL
	COUNT	DIGEST.	INFECT.	PEDICUL.	NUTRIT.	RESPIRAT SKIN	OTHER	
COOP	170	9	11	16	39	12	12	269
	63.2	83.3	4.1	5.9	14.5	4.5	4.5	26.8
	26.2	50.0	26.8	30.2	24.7	24.0	26.7	
CAPITAL. FARM	73	1	4	6	21	5	5	115
	63.5	.9	3.5	5.2	18.2	4.3	4.3	11.4
	11.2	5.5	9.7	11.3	13.3	10.0	11.1	
PEASANT. PRD.	347	7	26	31	79	30	25	545
	63.6	1.3	4.8	5.7	14.8	5.5	4.6	54.2
	53.5	38.9	63.4	58.4	53.0	60.0	55.5	
AGRO INDUSTRY	59	1	0	0	10	3	3	76
	77.6	1.3	0	0	13.2	3.5	3.9	7.6
	9.1	5.6	0	0	6.7	6.0	6.7	
COLUMN TOTAL	649	18	41	53	149	50	45	1005
	64.6	1.8	4.1	5.3	14.8	5.0	4.5	100.0

PERCENTS AND TOTALS BASED ON RESPONSES

RAW CHI SQUARE = 17.37345 WITH 18 DEG. FREED.
SIGNIFICANCE = .54374

374 VALID CASES

1 MISSING CASES

SOURCE: PHYSICAL EXAMS QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 5.23 HEALTH STATUS OF FAMILY MEMBERS BY AGE GROUP.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

AGE GROUP	COUNT ROW PCT COL PCT	HEALTHY	SICK	ROW TOTAL
		103	109	212
< 5 Y	48.6 29.5	51.4 29.1	29.2	
5-9 Y	65 47.1 18.6	73 52.9 19.5	138 19.1	
10-20 Y	57 51.4 16.3	54 48.6 14.4	111 15.3	
20-30 Y	41 48.2 11.7	44 51.8 11.7	85 11.7	
30-39 Y	37 49.3 10.6	38 50.7 10.1	75 10.4	
40-49 Y	26 57.8 7.4	19 42.2 5.1	45 6.2	
50-59 Y	11 32.4 3.2	23 67.6 6.1	34 4.7	
60-69 Y	5 41.7 1.4	7 58.3 1.9	12 1.7	
70 + Y	4 33.3 1.1	8 66.7 2.1	12 1.7	
	COLUMN TOTAL	349 48.2	375 51.8	724 100.0

RAW CHI SQUARE = 6.89992 WITH 8 DEG.FREED.
CONTINGENCY COEFFICIENT = .10357 SIGNIFICANCE = .5494

SOURCE: PHYSICAL EXAMS QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 5.24 MOST PREVALENT DISEASES BY DEGREE OF CHRONICITY.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

		MOST PREVALENT DISEASES							
	COUNT	DIGEST.	INFECT.	PEDICUL.	NUTRIT.	RESPIRAT	SKIN	OTHER	ROW TOTAL
ACUTE		413	9	31	36	118	41	7	655 66.8
LONG	ACUTE	118	4	8	14	17	9	7	177 18.1
CHRONIC		99	5	1	3	11	0	29	148 15.1
	COLUMN TOTAL	630 64.3	18 1.8	40 4.1	53 5.4	146 14.9	50 5.1	43 4.4	980 100.0

PERCENTS AND TOTALS BASED ON RESPONSES

364 VALID CASES

11 MISSING CASES

SOURCE: PHYSICAL EXAMS QUESTIONNAIRE

higher prevalence among those in agro industry (43.3%), than in those in the cooperatives (20.6%), peasant production (18.8%) and capitalist farms (7.3%). The percentages for chronic diseases (+3 mo) varied from 14.4% among the cooperatives, to 17% in the capitalist farms and peasant production, and to 20% in agro industry. The differences were statistically significant ($\chi^2=16.5$ DF=6 $p=.011$) (Table 5.25).

In summary, pathological processes were found highly prevalent. These pathological processes affected mainly the people directly or indirectly associated with agricultural production.

5.3 CHILDREN GROWTH AND DEVELOPMENT.

The growth and development of children 10 years of age or younger is the best positive indicator of the health status of a population, as was stated above. In the Cayambe county, of the 377 children examined, 53.1% presented a normal nutritional status, while all the rest of the children presented some deficiency in height or weight, according to the 50th percentile of the World Health Organization chart (223), and following the procedures developed by Tanner (224).

In the comparison of the children's growth by different types of APUs, it was found that the percentages of normal children were 42.6% in the cooperatives, 51.9% in the capitalist farms, 50.0% in the peasant production, and 83.8% in the agro industry. These differences

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TABLE 5.25 CHRONICITY OF PREVALENT DISEASES BY TYPE OF AGRICULTURAL UNIT, STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

TYPE OF AGRICULTURAL UNIT	COUNT	ACUTE	LONG ACUTE	CHRONIC	ROW TOTAL
	ROW PCT COL PCT				
COOP	63		20	14	97
	64.9		20.6	14.4	26.6
	27.3		27.4	23.0	
CAPITAL. FARM	31		3	7	41
	75.6		7.3	17.1	11.2
	13.4		4.1	11.5	
PEASANT PRODUCT.	126		37	34	197
	64.0		18.8	17.3	54.0
	54.5		50.7	55.7	
AGRO- INDUSTRY	11		13	6	30
	36.7		43.3	20.0	8.2
	4.8		17.8	9.8	
COLUMN TOTAL	231		73	61	365
	63.3		20.0	16.7	100.0

RAW CHI SQUARE = 16.56223 WITH 6 DEG. FREED.
 CONTINGENCY COEFFICIENT = .20834 SIGNIFICANCE = .0110

NUMBER OF MISSING OBSERVATIONS = 10

SOURCE: PHYSICAL EXAMS QUESTIONNAIRE

were statistically significant ($\chi^2=25.9$ DF-9 $p=.000$)(Table 5.26). In the same table, it may be noted that 1.3% of the children presented low weight and normal height, indicating that they had been recent cases of acute undernutrition, while 31.8% of the children presented low height and normal weight, indicating that they had previously been cases of undernutrition. An important percentage (13.8%) of the children were chronically undernourished, defined by their low weight and height.

The regression and analysis of covariance procedures of the height of the children, (controlling for their age, and the type of APU), showed important differences. It was found that the children of families in agro-industry had a faster gain in weight (Beta=191 gm/mo), than those families in agricultural production (Beta=90.3). Among the latter group the gain is greater among those in the peasant production (Beta=166.4) and capitalist farms (Beta=159.9) than in those in the cooperatives (Beta=51.5)(Table 5.27, Graph 5.4). These differences were statistically significant according to the analysis of covariance, which indicates that factors related to the type of APU, in addition to age, had important influences on the weight gain of the children 10 years of age or younger ($p=.001$) (Table 5.28).

The regression of height/age of the children showed differences among the study groups, similar to that of the weight/age relationship. It was found that among those children of families in the agro-industry, the gain in height was greater (Beta=.731 cm/mo),

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TABLE 5.26 NUTRITIONAL STATUS (BY WEIGHT AND HEIGHT) OF CHILDREN
10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

TYPE OF AGRICULTURAL UNIT	NUTRITIONAL STATUS					ROW TOTAL
	COUNT	INORMAL	LOW WGT	NOR WGT	LOW WGT	
	ROW PCT	COL PCT	NORM HGT	LOW HGT	LOW HGT	
COOPERATIVE	46	3	46	13	108	28.6
	42.6	2.8	42.6	12.0		
	23.1	60.0	38.3	25.0		
CAPITAL FARM	28	0	18	8	54	14.3
	51.9	0	33.3	14.8		
	14.0	0	15.0	15.4		
PEASANT PRODUCT	100	1	52	31	184	48.8
	54.3	.5	28.3	16.8		
	50.0	20.0	43.3	59.6		
AGRO-INDUSTRY	27	1	4	0	31	8.2
	87.0	3.2	12.9	0		
	13.3	20.0	3.3	0		
COLUMN TOTAL	201	5	120	52	377	100.0
	53.4	1.3	31.8	13.8		

RAW CHI SQUARE = 25.97236 WITH 9 DEG. OF FREED.. SIGNIFICANCE = .0003
CONTINGENCY COEFFICIENT = .29547

NUMBER OF MISSING OBSERVATIONS = 347

SOURCE : ANTHROPOMETRIC QUESTIONNAIRE

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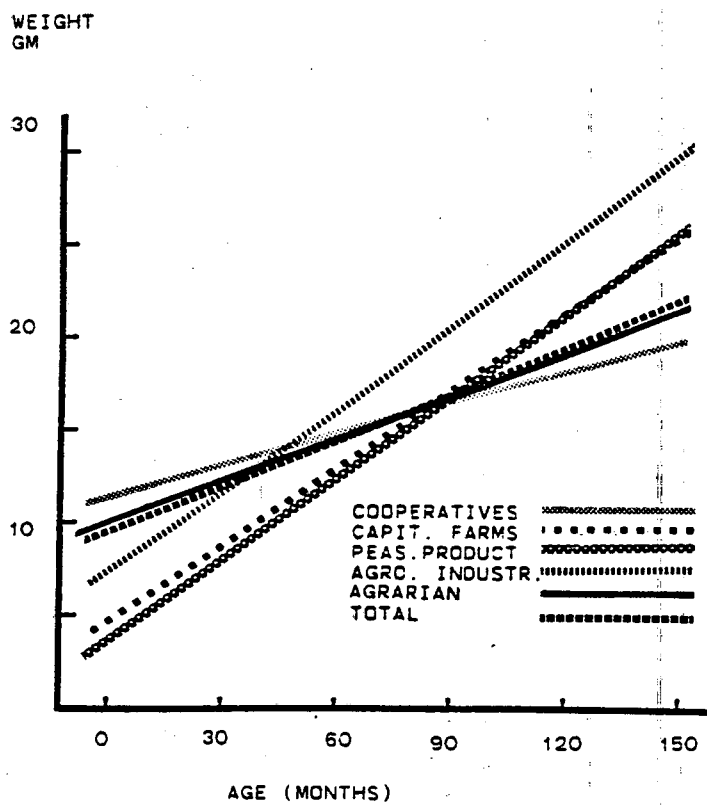
TABLE 5.27 REGRESSIONS WEIGHT BY AGE IN CHILDREN
 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT.
 STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	ALPHA	BETA	SD.BETA	SIG
TOTAL	10329	95.9	4.59	X
AGRARIAN	10341	90.3	4.39	X
COOPS.	12416	51.5	6.42	X
CAP.FARMS	6131	159.9	6.60	X
PEAS.PROD	5674	166.4	3.73	X
AGRO-INDUSTR	7392	191.9	22.28	X

SOURCE: ANTHROPOMETRIC QUESTIONNAIRE

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GRAPH 5.4 REGRESSIONS OF WEIGHT BY AGE IN CHILDREN 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT. RURAL CAYAMBE COUNTY, 1982



SOURCE : ANTHROPOMETRIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 5.28 ANALYSIS OF VARIANCE OF WEIGHT OF CHILDREN 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT, CONTROLLING FOR AGE. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	.114E+11	4	.285E+10	121.148	.001
TYPE OF APU	.841E+09	3	.280E+09	11.924	.001
AGE (COVAR)	.105E+11	1	.105E+11	448.818	.001
EXPLAINED	.114E+11	4	.285E+10	121.148	.001
RESIDUAL	.881E+10	375	.235E+08		
TOTAL	.202E+11	379	.533E+08		

COVARIATE REGRESSION COEFFICIENT ADJUSTED FOR FACTORS AND PRECEDING COVARIATES

SOURCE: ANTHROPOMETRY QUESTIONNAIRE

than in those groups in families in the agricultural production (Beta=.326 cm/mo). The gain in height was even lower among those children in the cooperatives (Beta=.124) than in those in the capitalist farms (Beta=.673) and peasant production (Beta=.722)(Table 5.29 and Graph 5.5). These differences were also statistically significant ($p=.011$) according to the analysis of covariance (Table 5.30). Thus, those factors depending on the type of APU also influence the gain in height of those children in the Cayambe region.

If we consider the weight/height relationship of the children, the differences found in the previous analysis are maintained. It was found that the weight/height relationship, controlling for age, increased more among those children of families in the agro-industry (Beta=206 gr/cm) than those of families in agricultural production (Beta=140 gm/cm) and, among the latter, those children in the capitalist farms showed greater increments (Beta=165) than those in peasant production (Beta=156) and in cooperatives (Beta=118)(Table 5.31, Graph 5.6). These differences were statistically significant according to the analysis of covariance ($p=.001$) (Table 5.32).

It may be concluded that there were factors, associated with the types of agricultural production in which the study families were involved, that played an important role in the growth and development of children 10 years of age or younger. At the same time, this positive indicator of the health status, child growth and development, agreed with the negative indicator, morbidity, in the

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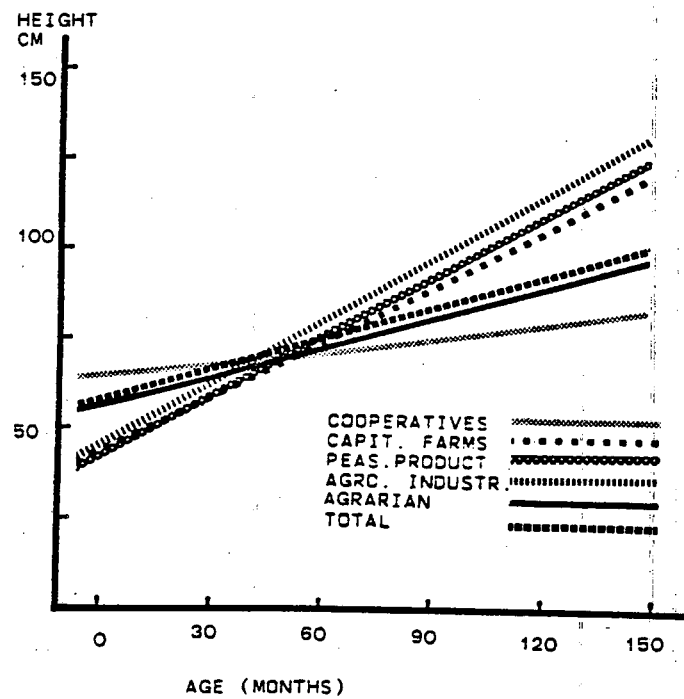
TABLE 5.29 REGRESSION HEIGHT BY AGE IN CHILDREN
 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT.
 STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	ALPHA	BETA	STD	SIG
TOTAL	63.49	.3478	.3099	X
AGRARIAN	63.91	.3264	.032	X
COOPS.	68.20	.1249	.050	X
CAP. FARMS	47.06	.6739	.0635	X
PEAS.PROD	42.30	.7225	.0397	X
AGRO-INDUSTR	46.88	.7316	.09049	X

SOURCE: ANTHROPOMETRIC QUESTIONNAIRE

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GRAPH 5.5 REGRESSION OF HEIGHT BY AGE IN CHILDREN 10 YEARS OF AGE OR YOUNGER, BY TYPE OF AGRICULTURAL UNIT, RURAL CAYAMBE COUNTY, 1982



SOURCE : ANTHROPOMETRIC QUESTIONNAIRE

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TABLE 5.30 ANALYSIS OF VARIANCE OF HEIGHT OF CHILDREN 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT, CONTROLLING FOR AGE. STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	671208.132		4167802.033	97.997	.001
TYPE OF APU	19144.766	3	6381.589	3.727	.011
AGE (COVAR)	652063.366		1652063.366	380.807	.001
EXPLAINED	671208.132		4167802.033	97.997	.001
RESIDUAL	1231158.558	719	1712.321		
TOTAL	1902366.691	723	2631.213		

COVARIATE REGRESSION COEFFICIENT ADJUSTED FOR
FACTORS AND PRECEDING COVARIATES

SOURCE: ANTHROPOMETRY QUESTIONNAIRE

CAYAMBE PROJECT

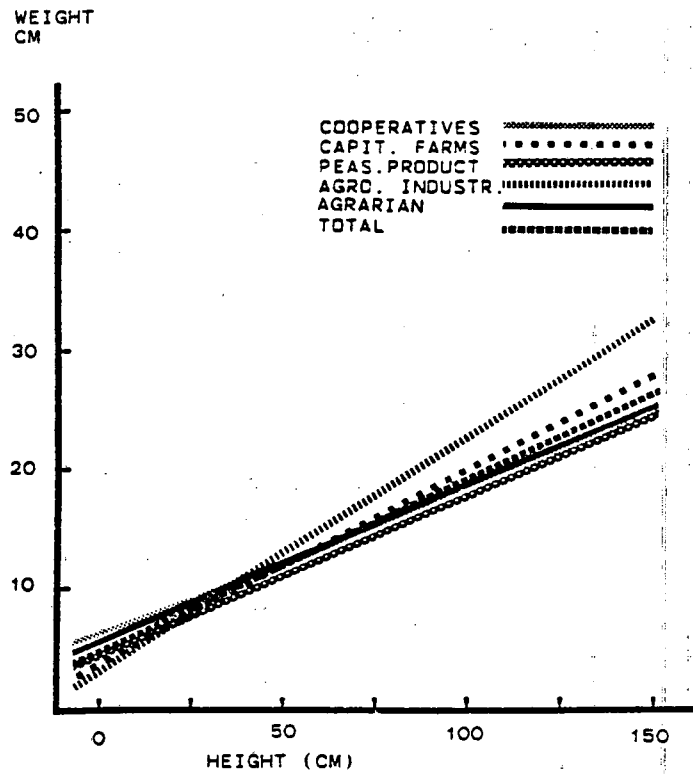
TABLE 5.31 REGRESSIONS WEIGHT BY HEIGHT IN CHILDREN
 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT.
 STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	ALFA	BETA	S.E. BETA
TOTAL	3990.97	146.94	6.6410
AGRARIAN	4238.19	140.0423	5.9621
COOPS.	6647.60	118.856	9.9606
CAP. FARMS	1864.90	165.257	16.7676
PEAS. PROD	2314.29	156.648	8.3476
AGRO-INDUSTR	593.269	206.569	28.52078

SOURCE: ANTHROPOMETRIC QUESTIONNAIRE

CAYAMBE PROJECT

GRAPH 5.6 REGRESSION WEIGHT BY HEIGHT IN CHILDREN 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT RURAL CAYAMBE COUNTY, 1982



SOURCE : ANTHROPOMETRIC QUESTIONNAIRE

CAYAMBE PROJECT

TABLE 5.32 ANALYSIS OF VARIANCE OF HEIGHT OF CHILDREN 10 YEARS OF AGE OR YOUNGER BY TYPE OF AGRICULTURAL UNIT, CONTROLLING FOR WEIGHT STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	357214.148	4	89303.537	157.306	.001
TYPE OF APU	20853.868	3	6951.289	12.245	.001
WEIGHT (COVAR)	336360.280	1	336360.280	592.489	.001
EXPLAINED	357214.148	4	89303.537	157.306	.001
RESIDUAL	212890.052	375	567.707		
TOTAL	570104.200	379	1504.233		

COVARIATE REGRESSION COEFFICIENT ADJUSTED FOR FACTORS AND PRECEDING COVARIATES

SOURCE: ANTHROPOMETRY QUESTIONNAIRE

recognition that there was a negative effect on the health status of the people, related to agricultural production, mainly in the cooperatives, and in a lesser extend in the capitalist farms and peasant production, as compared with those in the agro-industry.

5.4 DETERMINANTS OF THE HEALTH STATUS OF THE RURAL POPULATION IN CAYAMBE COUNTY.

In the previous chapters, the historical and socio-economic development in the area of Cayambe was presented. A review was also conducted of the existence of large numbers of people that have been marginalized from the use of natural resources, deposed from the main means of production: the land, and displaced to higher, hillier and less fertile, regions. It was also observed how the development of agricultural production in the Ecuadorian rural areas, with the incorporation of new types of relationships in production (capitalist), was stimulated by the process of land reform. However, it did not provide additional resources to the rural population, who had to sell their labor to other productive units.

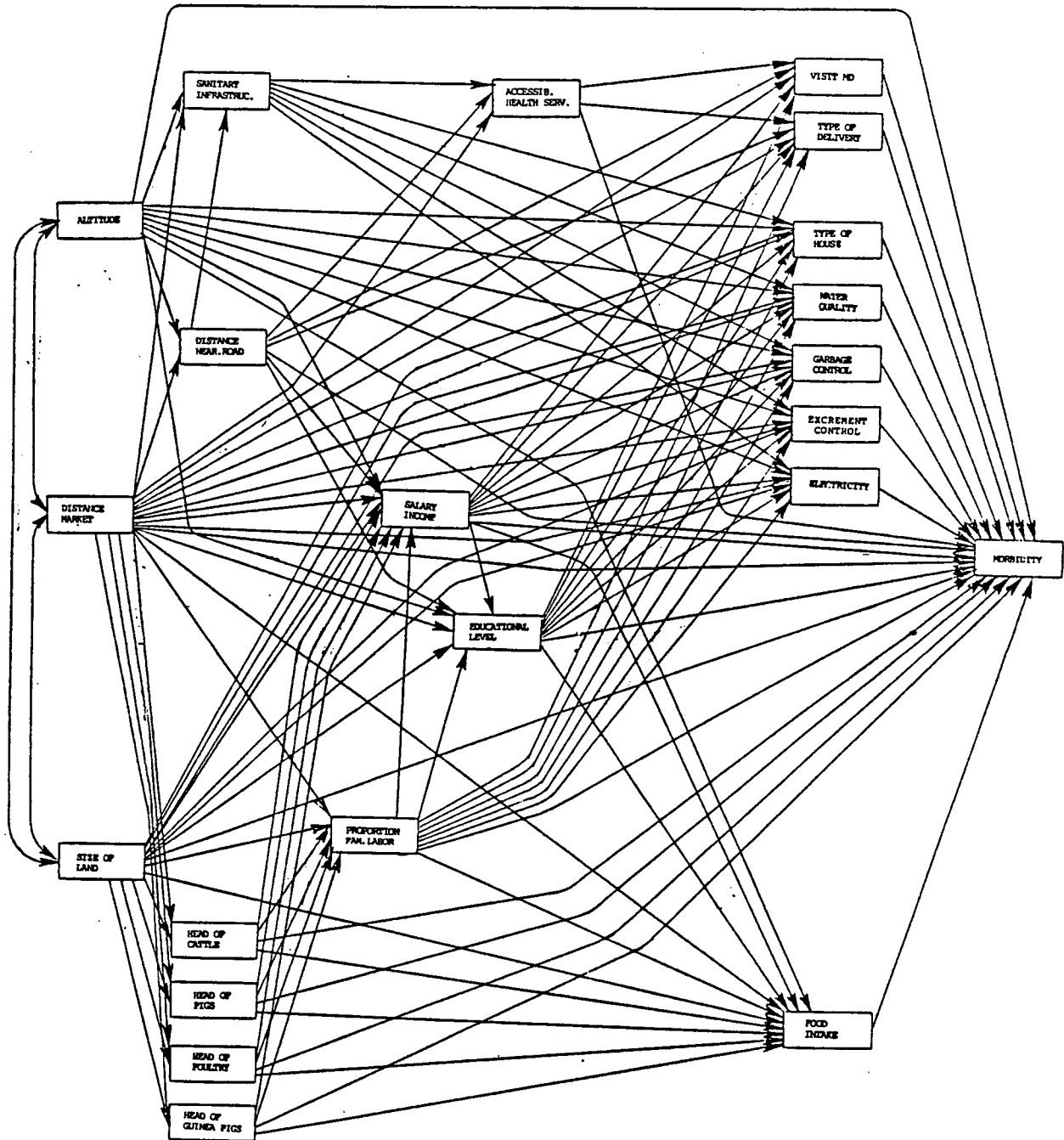
Also analyzed was how certain elements of family social reproduction are markedly scarce, leading large numbers of families to severe poverty conditions. It was also stated that morbidity, as well as retarded child growth and development, was more frequent among certain population subgroups, due to factors that may be related to the type of the family's involvement in the productive process.

It is necessary to integrate the most important variables considered in this study, in order to identify those that may have played, or are still playing, important roles in the determination of the health status of the studied rural population of the Cayambe county. This integration will provide the needed answer to the hypothesis and test of the holistic theoretical model followed in this research.

The most important variables were integrated in a general diagram, placing the most important relations existing among them. The diagram allows the recognition of subcomponents that may effect the other variables and the health status of the population subgroups. The procedures of path analysis were useful in the calculation of the correlation, path and determination coefficients, which provided important information of the contribution of each variable to the health-disease phenomena in the rural areas of the Cayambe county.

As was stated before, important groups of the population were displaced to higher and less accessible areas, and deprived of the use of the natural resources. The hypothetical model, as presented in Graph 5.7, considered as the independent variables the altitude above sea level, the general accessibility to the county seat (main market) and the ownership of the land. These variables must have played important roles in the determination of the intervening variables,

CAYAMBE PROJECT
GRAPH 5.7 RELATIONSHIPS OF VARIABLES IN THE
DETERMINATION OF THE HEALTH STATUS
OF POPULATION GROUPS



like those in the family's processes of production and social reproduction, and in the government works. Finally there was considered the general overall impact of these variables on the health status of the population.

In the path analysis of the distance to the road, it was found that accessibility to the county seat was the most important determining factor, according to the path and determination coefficients (PC=-.470, DC=.215). The geographic altitude did not show a direct effect, when accessibility was controlled, with small path and determination coefficients (PC=-.032, DC=.000)(Table 5.33, 5.34). This situation is more clearly observed in Graph 5.8, which means that governmental institutions have not provided the needed roads to those more isolated groups.

In the same manner, the distribution of sanitary facilities seems to have been influenced by geographic variables, since, according to the corresponding path diagram and coefficients, there was a limited endowment of those services in the more isolated groups. The path and determination coefficients of the sanitary facilities were higher for those variables of geographic displacements, like altitude above sea level (PC=-.503, DC=.305), and accessibility to the county seat (PC=.229, DC=.106), which means that the greater the altitude and the less accessibility of a population group, the less is the availability of sanitary facilities (Table 5.35, 5.36 and Graph 5.9).

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TABLE 5.33 DETERMINANTS OF THE DISTANCE TO THE NEAREST ROAD : COEFFICIENTS
DETAILED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ALTITUDE	-.0329	.1533	-5.04357E-03
ACCES. MARKET	-.4702	-.4572	.21500
	MR=.4582	F(2,140)=18.60382	
	R2=.20997	SIGNIFICANCE=.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.34 DISTANCE TO THE NEAREST ROAD: MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER		1..	VAR79 VAR105	ALTITUDE DIRECT ACCESIB TO COUNTY SEAT					
MULTIPLE R	.45822	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE		
R SQUARE	.20997	REGRESSION	2.	100.14956	50.07478	18.60382	.000		
ADJUSTED R SQUARE	.19868	RESIDUAL	140.	376.82946	2.69164				
STD DEVIATION	1.64062	COEFF OF VARIABILITY	63.8 PCT						

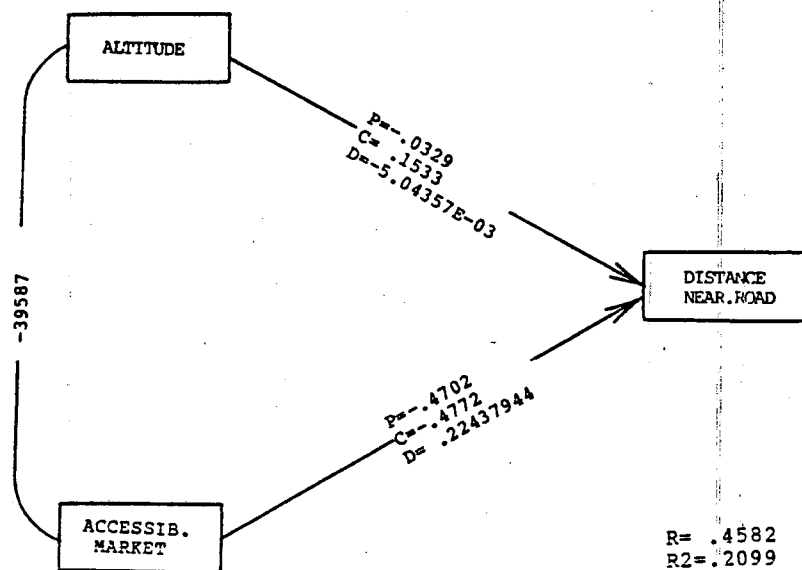
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR79	-.21285045E-01	.52921444E-01	.16176545 .688	-.0329013 -.24420
VAR105	-.13653529	.23751346E-01	33.045580 .000	-.4702483 -.34821
(CONSTANT)	4.0979403	1.6362437	6.2724225 .013	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.8 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE DISTANCE TO THE NEAREST ROAD RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.35 DETERMINANTS OF THE SANITARY INFRASTRUCTURE : COEFFICIENTS
DETAILED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ALTITUDE	-.5036	-.6062	.30528232
DISTANC. ROAD	-.0764	-.2586	.01975704
ACCES. MARKET	.2297	.464	.1065808
	MR=.6570	F(3,139)=35.1895	
	R2=.4316	SIGNIFICANCE=0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.36 SANITARY INFRASTRUCTURE : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER		1..	VAR79	ALTITUDE			
			VAR33	DISTANCE TO NEAREST ROAD			
			VAR105	DIRECT ACCESIB TO COUNTY SEAT			
MULTIPLE R	.65700	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.43165	REGRESSION	3.	25.44034	8.48011	35.18957	0
ADJUSTED R SQUARE	.41939	RESIDUAL	139.	33.49673	.24098		
STD DEVIATION	.49090	COEFF OF VARIABILITY	65.6 PCT				

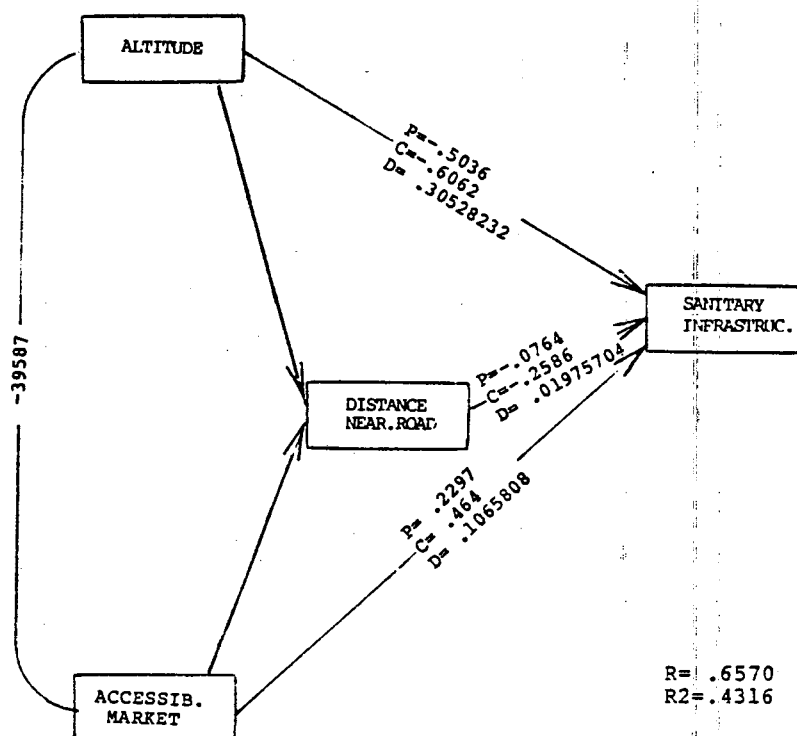
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	
			SIGNIFICANCE	BETA ELASTICITY
VAR79	-.11451964	.15844109E-01	52.242544	-.5035867
			0	-4.51871
VAR33	-.26843369E-01	.25288401E-01	1.1267598	-.0763647
			.290	-.09232
VAR105	.23448930E-01	.79011417E-02	8.8077779	.2297527
			.004	.20567
(CONSTANT)	4.0445678	.50043833	65.319536	
			0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.9 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE SANITARY INFRASTRUCTURE RURAL CAYAMBE COUNTY, 1982



A similar situation is found in the analysis of the distribution of health services, and consequently their relative accessibility to the different population groups. Such relative accessibility presents a similar situation to that stated in relation to the road and sanitary facilities. According to the path analysis, the relationship with the sanitary facilities was great, presenting high path and determination coefficients (PC=.668, DC=.486), and with the accessibility to the market place (PC=.257, DC=-.118) (Tables 5.37, 5.38 and Graph 5.10). This situation emphasizes the conclusion that the health services did not adequately cover those more isolated groups.

In a previous chapter, the limited ownership of land by the study families was analyzed. It is important to consider what other factors may be influencing the ownership of other means of production. The path and determination coefficients of certain variables, like cattle (Tables 5.39, 5.40), pigs (Tables 5.41, 5.42), poultry (Tables 5.43, 5.44) and guinea pigs (Tables 5.45, 5.46, Graph 5.11) did not show adequate relationships with the size of the APU owned by the family, nor with the relative accessibility to the county seat. The availability of those resources must be determined by other factors not considered in the present investigation, even though, as was stated before, their contribution to family reproduction seems to have been limited.

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TABLE 5.37 DETERMINANTS OF THE ACCESSIBILITY TO THE HEALTH SERVICES : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
SANIT. INFRST	.6683	.7278	.48638874
DISTANC. ROAD	.232	-.0586	-.0135952
ACCES. MARKET	.2576	.4617	.11893392
	MR=.76926	F(3,139)=67.1609	
	R2=.59176	SIGNIFICANCE=0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.38 ACCESSIBILITY TO HEALTH SERVICES : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

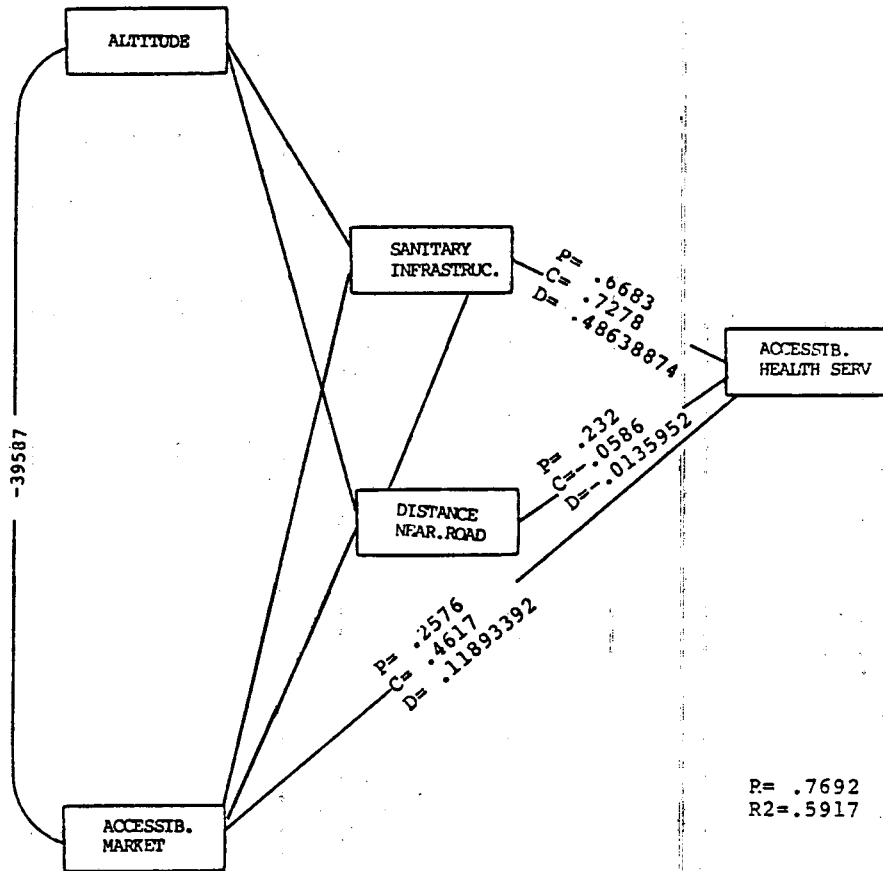
VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR83 VAR33 VAR105	SANITARY INFRASTRUCTURE DISTANCE TO NEAREST ROAD DIRECT ACCESIB TO COUNTY SEAT
MULTIPLE R	.76926	ANALYSIS OF VARIANCE	DF
R SQUARE	.59176	REGRESSION	3.
ADJUSTED R SQUARE	.58295	RESIDUAL	139.
STD DEVIATION	10.27775	COEFF OF VARIABILITY	86.9 PCT
		SUM OF SQUARES	21283.06402
		MEAN SQUARE	7094.35467
		F	67.16093
		SIGNIFICANCE	0

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR83	16.508780	1.5139519	118.90656	.6682878
VAR33	2.0143726	.53006658	14.441715	1.04461
VAR105	.64956558	16783100	14.979649	.2319764
(CONSTANT)	-9.9744243	2.3362191	18.228400	.43837
			.000	.2576376
			.000	.36051
			.000	

SOURCE: FIELD WORK INFORMATION

GRAPH 5.10 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE ACCESSIBILITY TO HEALTH SERVICES RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.39 DETERMINANTS OF NUMBER OF CATTLE OWNED : COEFFICIENTS
DETAILED PATH ANALYSIS
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC	
AGRICULTURAL UNIT SIZE	.1367		.1759	.02404553
ALTITUDE	-.1452	-.1822	.02645544	
	MR=.2247	F(2,140)=3.72460		
	R2=.05052	SIGNIFICANCE=.027		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.40 NUMBER OF FAMLILY CATTLE : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR12 VAR105	SIZE OF APU DIRECT ACCESIB TO COUNTY SEAT					
MULTIPLE R	.22477	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE	
R SQUARE	.05052	REGRESSION	2.	146.04574	73.02287	3.72460	.027	
ADJUSTED R SQUARE	.03696	RESIDUAL	140.	2744.77944	19.60557			
STD DEVIATION	4.42782	COEFF OF VARIABILITY	225.3	PCT				

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR12	.27948950	.17484098	2.5553154	.1367189
VAR105	-.10384325	.61134355E-01	2.8852660	.27849
(CONSTANT)	2.0993082	.69959881	9.0043898	-.1452778
			.092	-.34683
			.003	

SOURCE:--FIELD WORK--INFORMATION

CAYAMBE PROJECT

TABLE 5.41 DETERMINANTS OF NUMBER OF PIGS OWNED : COEFFICIENTS
DETAILED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC	
AGRICULTURAL UNIT SIZE	-.0703		-.0405	2.84715E-03
ALTITUDE	-.1105	-.0915	.01011075	
	MR=.11381	F(1,140)=.91857		
	R2=.01295	SIGNIFICANCE=.401		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.42 NUMBER OF FAMILY PIGS : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR12 VAR105	SIZE OF APU DIRECT ACCESIB TO COUNTY SEAT					
MULTIPLE R	.11381	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE	
R SQUARE	.01295	REGRESSION	2.	13.84399	6.92199	.91857	.401	
ADJUSTED R SQUARE	0	RESIDUAL	140.	1054.98119	7.53558			
STD DEVIATION	2.74510	COEFF OF VARIABILITY	134.9 PCT					

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR12	-.87360464E-01	.10839565	.64954034	-.0702806
VAR105	-.48015962E-01	.37901288E-01	1.6049568	-.1104751
(CONSTANT)	2.5211503	.43372824	33.787967	-.15486
			.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.43 DETERMINANTS OF NUMBER OF POULTRY OWNED : COEFFICIENTS
DETAILED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC	
AGRICULTURAL UNIT SIZE	.0954		.0202	1.92708E-03
ALTITUDE	.2788	.2531	.07056428	
	MR ² = .26925	F(2, 140) = 5.5711		
	R ² = .07249	SIGNIFICANCE = .005		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.44 NUMBER OF FAMILY POULTRY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER		1..	VAR12 VAR105	SIZE OF APU DIRECT ACCESIB TO COUNTY SEAT				
MULTIPLE R	.26925	ANALYSIS OF VARIANCE		DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.07249	REGRESSION		2.	163.00315	81.50158	5.47118	.005
ADJUSTED R SQUARE	.05924	RESIDUAL		140.	2085.51433	14.89653		
STD DEVIATION	3.85960	COEFF OF VARIABILITY		92.0 PCT				

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR12	.17209152	.15240391	1.2750486	.0954521
VAR105	.17578009	.53289077E-01	10.880853	.2788390
(CONSTANT)	2.7051934	.60982037	19.678536	.27495
			.000	

SOURCE: FIELD-WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.45 DETERMINANTS OF NUMBER GUINEA PIGS OWNED : COEFFICIENTS
DETAILED PATH ANALYSIS,
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	PATH COEFFICIENT	CORRELAT. COEF.	DETERMIN. COEFFIC	
AGRICULTURAL UNIT SIZE	-.2236		-.2188	.04892368
ALTITUDE	-.0178	.0425	-7.565E-04	
	MR=.21948	F(2,140)=3.54265		
	R2=.04817	SIGNIFICANCE=.032		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.46 NUMBER OF FAMILY GUINEA PIGS : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR12 VAR105	SIZE OF APU DIRECT ACCESIB TO COUNTY SEAT						
MULTIPLE R	.21948			ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.04817			REGRESSION	2.	543.51615	271.75808	3.54265	.032
ADJUSTED R SQUARE	.03457			RESIDUAL	140.	10739.46287	76.71045		
STD DEVIATION	8.75845			COEFF OF VARIABILITY	123.0 PCT				

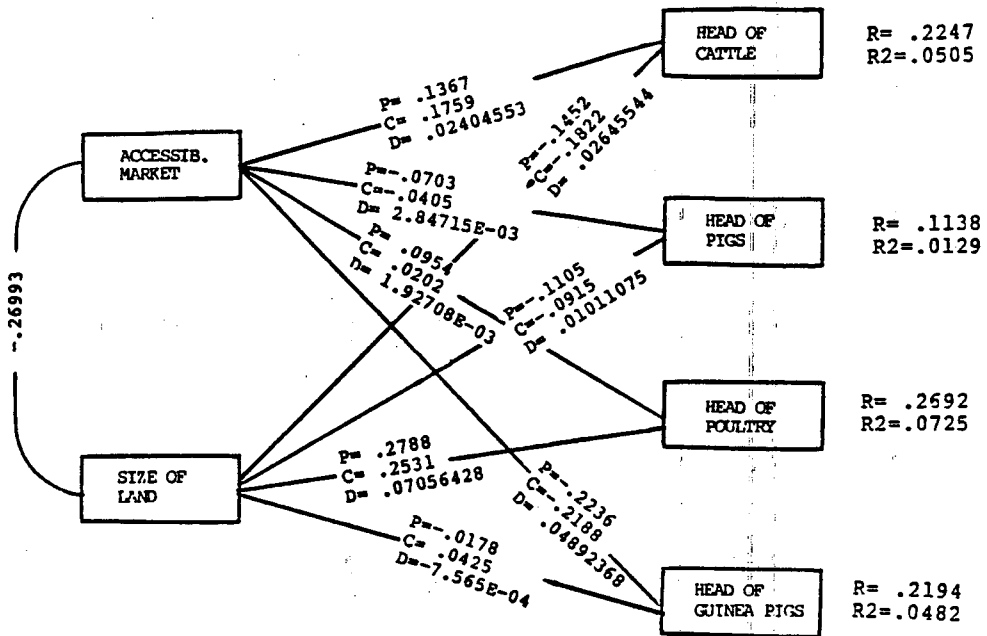
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR12	-.90313776	.34584443	6.8194343	-.2236233
			.010	-.24841
VAR105	-.25202743E-01	.12092689	.43436003E-01	-.0178471
			.835	-.02323
(CONSTANT)	9.0526728	1.3838424	42.793756	
			.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.11 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE NUMBER OF FARM ANIMALS RURAL CAYAMBE COUNTY, 1982



It has been hypothesized that in the process of production there must be important negative factors in the individual's health. In the path analysis, we found that the consumption of the family's labor force does not seem to have been related to the size of the agricultural productive unit, not even with accessibility to the county seat or ownership of farm animals, as demonstrated by the small path and determination coefficients (Tables 5.47, 5.48 and Graph 5.12). Notwithstanding, the participation of one or several family members in the productive process selling their labor force in other APUs was greater with proximity to the county seat (PC=.3941, DC=.1437) and to roads (PC=.1125, DC=-.0117) and less with altitude above sea level of the geographic area of residence (PC=-.1939, DC=.0746), according to the corresponding path analysis (Tables 5.49, 5.50 and Graph 5.13). In addition, the path and determination coefficients were high for the pig ownership (PC=.3074, DC=.0892); no adequate explanation has been constructed for this association with the family labor force in salaried relations.

One may conclude from the previous observations that involvement in salary relations is greater with more accessibility to the county seat (market place) and to roads, which means that the process of transformation from precapitalist social relations into capitalist ones takes place mainly in those areas close to the main market, allowing some relations of precapitalist character to persist in the more distant and less accessible areas.

CAYAMBE PROJECT

TABLE 5.47 DETERMINANTS OF THE FAMILY LABOR FORCE : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ACCES. MARKET	-.0887	-.1083	9.60621E-03
GUINEA PIGS	.0723	.1325	9.57975E-03
CATTLE	-.0518	.0501	2.59518E-03
POULTRY	.0309	.0438	1.35342E-03
A.P.U. SIZE	.0566	.1348	7.62968E-03
PIGS	.2689	-.046	-.0123694
	MR=.31338	F(6,136)	
	R2=.09821	SIGNIFICANCE=.027	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.48 LABOR FORCE IN THE FAMILY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR20	NUMBER OF GUINEA PIGS
		VAR16	NUMBER OF CATTLE
		VAR19	NUMBER OF POULTRY
		VAR12	SIZE OF APU
		VAR18	NUMBER OF PIGS

	MULTIPLE R	.31338	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.09821		REGRESSION	6.	.89375	.14896	2.46843	.027
ADJUSTED R SQUARE	.05842		RESIDUAL	136.	8.20696	.06035		
STD DEVIATION	.24565		COEFF OF VARIABILITY	45.0 PCT				

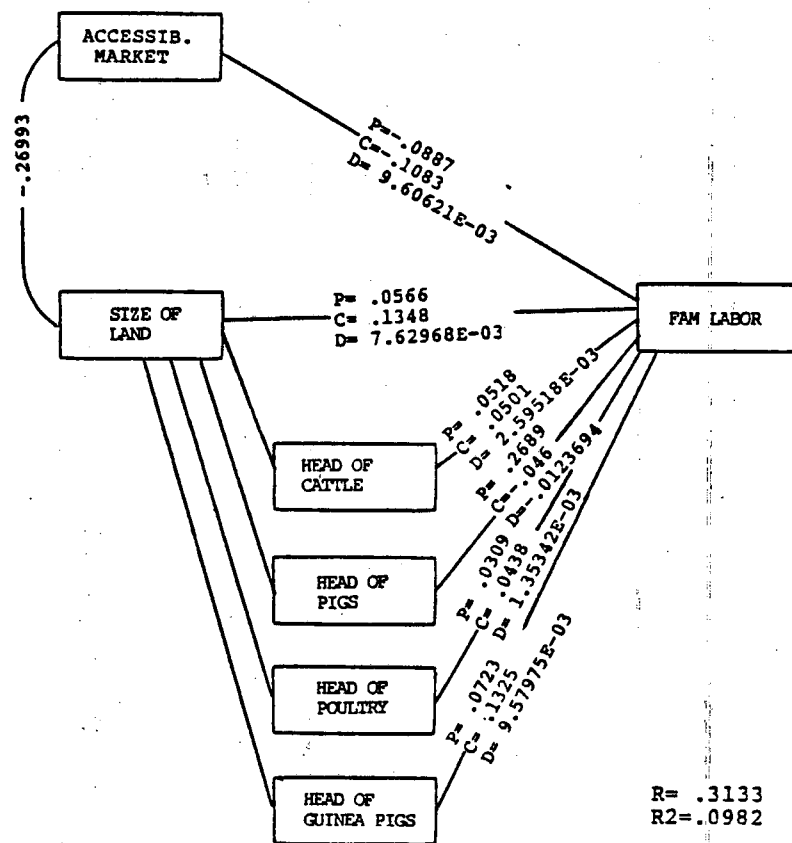
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR105	-.35586484E-02	.36202451E-02	.96626052	-.0887318
			.327	-.04280
VAR20	.20538197E-02	.24936162E-02	.67836809	.0723164
			.412	.02679
VAR16	-.29081273E-02	.49219180E-02	.34910662	-.0518307
			.556	-.01047
VAR19	.19679119E-02	.55905468E-02	.12390897	.0309326
			.725	.01513
VAR12	.64919801E-02	.10091266E-01	.41386917	.0565996
			.521	.02329
VAR18	.24809968E-01	.82219633E-02	9.1054487	.2688698
			.003	.09251
(CONSTANT)	.48872524	.47842603E-01	104.35180	
			0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.12 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE SIZE OF THE FAMILY LABOR FORCE RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.49 DETERMINANTS OF THE SALARY INCOME : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ALTITUDE	-.1939	-.3848	.07461272
CATTLE	.087	.0578	5.06906E-03
FAMILY LABOR	.0842	.1463	.01231846
GUINEA PIGS	-.1842	-.0139	2.56038E-03
DISTANC. ROAD	.1125	-.1047	-.01177875
POULTRY	-.0282	.1628	-4.59096E-03
PIGS	.3074	.2905	.0892996999
A.P.U. SIZE	-.0501	-.176	8.8176E-03
ACCES. MARKET	.3941	.3648	.14376768

MR=.5657
 R2=.32006

F(9,133)=6.9562
 SIGNIFICANCE=0

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.50 FAMILY SALARY INCOME : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR79	ALTITUDE
		VAR16	NUMBER OF CATTLE
		VAR88	FAMILY LABOR INDEX
		VAR20	NUMBER OF GUINEA PIGS
		VAR33	DISTANCE TO NEAREST ROAD
		VAR19	NUMBER OF POULTRY
		VAR18	NUMBER OF PIGS
		VAR12	SIZE OF APU
		VAR105	DIRECT ACCESIB TO COUNTY SEAT

MULTIPLE R	.56574	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.32006	REGRESSION	9.	1489.34802	165.48311	6.95625	0
ADJUSTED R SQUARE	.27405	RESIDUAL	133.	3163.95159	23.78911		
STD DEVIATION	4.87741	COEFF OF VARIABILITY	96.2 PCT				

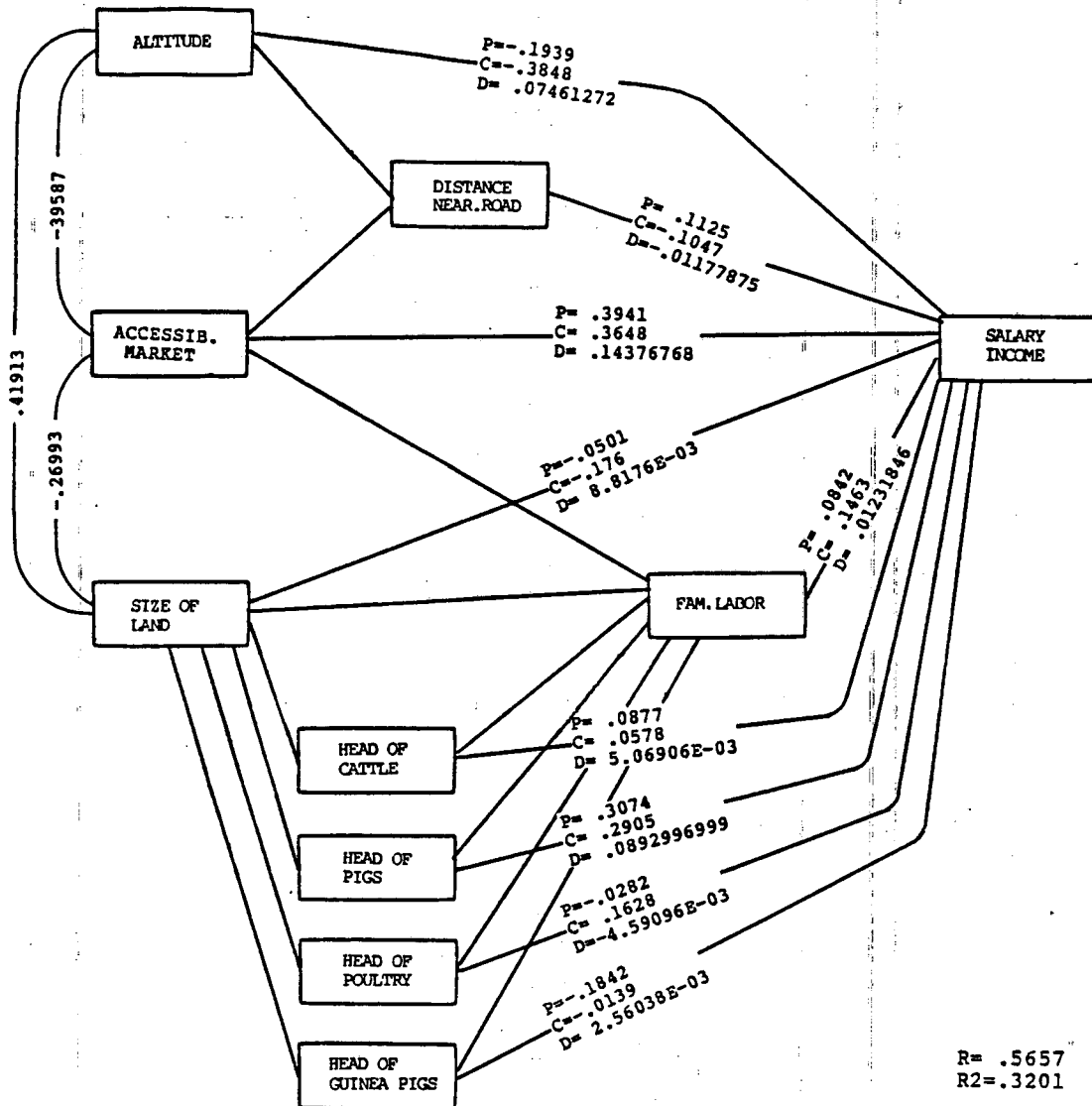
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F		BETA
			SIGNIFICANCE	ELASTICITY	
VAR79	-.39178502	.17927188	4.7760771	.031	-.1938902
VAR16	.11121852	.97878139E-01	1.2911681	.258	-.28067
VAR88	1.9031652	1.7316098	1.2079610	.274	.0876612
VAR20	-.11826641	.49822575E-01	5.6346962	.019	.04309
VAR33	.35134672	.25826588	1.8507072	.176	.0841654
VAR19	-.40538315E-01	.11424164	.12591647	.723	.20478
VAR18	.64139458	.17196630	13.912044	.000	-.1841589
VAR12	-.12985447	.21620759	.36072145	.549	-.16600
VAR105	.35742523	.82829823E-01	18.620740	.000	-.1124877
(CONSTANT)	12.093010	5.8333571	4.2976566	.040	-.05013
					.3941274
					.46251

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.13 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE FAMILY SALARY INCOME RURAL CAYAMBE COUNTY, 1982



In the study of peasant reality, it is necessary to recognize the different elements that directly intervene in the determination of family reproduction elements. One of the elements present in the productive as well as in the reproductive processes is education. It was stated that educational levels were very limited for the rural population in the study. Observing the different variables in the path analysis, one may conclude that geographic altitude has an important effect on the determination of the number of years of education achieved among the study families (PC=-.2356, DC=.062). Such an effect of altitude was of negative nature, leading to limited educational facilities in the rural areas of the county. On the contrary, the involvement of the families in salaried relations, favored the educational level (PC=.1094, DC=.0206), as can be observed in Tables 5.51, 5.52 and Graph 5.14.

Other important elements in family reproduction are housing and food. As was noted in the previous section, there were some differences among the study subgroups in relation to the type of housing and the availability of services, like potable water, sewer and electric systems, etc. In the path analysis of the corresponding component, presented in Tables 5.53, 5.54 and Graph 5.15, the geographic altitude of the residence of the study families (PC=-.3112, DC=.1631) and the size of the agricultural units (PC=-.1751, DC=.0671) played a negative role in the general characteristics of housing. At the same time, the greater accessibility to the county seat (PC=.2478, DC=.1082), the higher

CAYAMBE PROJECT

TABLE 5.51 DETERMINANTS OF THE FAMILY LEVEL OF EDUCATION : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ALTITUDE	-.2356	-.2732	.0620099201
FAMILY LABOR	.0169	.0706	1.19314E-03
DISTANC. ROAD	.0306	-9E-04	-2.754E-05
SALARY INCOME	.1094	.1883	.02060002
ACCES. MARKET	-.0304	.087	-2.6448E-03

MR=.28485
 R2=.08114

F(5,137)=2.41947
 SIGNIFICANCE=.039

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.52 FAMILY LEVEL OF EDUCATION : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR79	ALTITUDE					
		VAR88	FAMILY LABOR INDEX					
		VAR33	DISTANCE TO NEAREST ROAD					
		VAR87	SALARIES [INCOME] PER CAPITA					
		VAR105	DIRECT ACCESIB TO COUNTY SEAT					
MULTIPLE R	.28485	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE	
R SQUARE	.08114	REGRESSION	5.	45.53437	9.10687	2.41947	.039	
ADJUSTED R SQUARE	.04760	RESIDUAL	137.	515.66843	3.76400			
STD DEVIATION	1.94010	COEFF OF VARIABILITY	170.2	PCT				

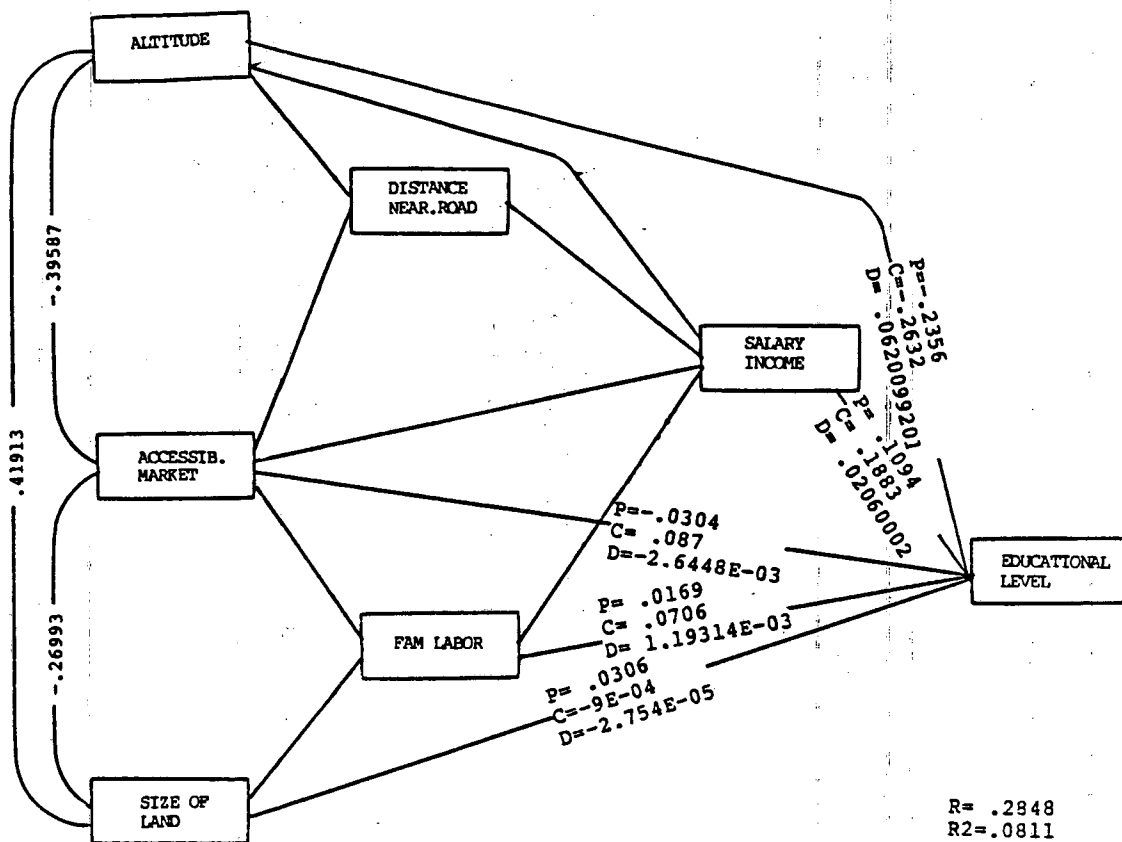
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR79	-.16535262	.65869557E-01	6.3016265	-.2356349
			.013	-4.28294
VAR88	.13234009	.66881537	.39153479E-01	.0168527
			.843	.06336
VAR33	.33214094E-01	.10044824	.10933524	.0306205
			.741	.07499
VAR87	.38000924E-01	.32278142E-01	1.3860256	.1094245
			.241	.16909
VAR105	-.95740866E-02	.32704584E-01	.85699331E-01	-.0303997
			.770	-.05513
(CONSTANT)	5.7342126	2.1682144	6.9942821	
			.009	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.14 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE LEVEL OF EDUCATION OF THE FAMILY RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.53 DETERMINANTS OF TYPE OF FAMILY HOUSE : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.0168	.1622	2.72496E-03
FAMILY LABOR	.0769	.0939	7.22091E-03
ACCES. MARKET	.2478	.437	.1082886
A.P.U. SIZE	-.1751	-.3836	.06716836
SALARY INCOME	.0701	.3255	.02281755
ALTITUDE	-.3112	-.5242	.16313104

MR=.60945
 R2=.37143

F(6, 136)=13.39394
 SIGNIFICANCE=.000

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.54 FAMILY HOUSE (TYPE) : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR73	YEARS OF STUDY
		VAR88	FAMILY LABOR INDEX
		VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR12	SIZE OF APU
		VAR87	SALARIES [INCOME] PER CAPITA
		VAR79	ALTITUDE

MULTIPLE R	.60945	ANALYSIS OF VARIANCE	DF.	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.37143	REGRESSION	6.	46.23378	7.70563	13.39394	.000
ADJUSTED R SQUARE	.34370	RESIDUAL	136.	78.24175	.57531		
STD DEVIATION	.75849	COEFF OF VARIABILITY	31.5 PCT				

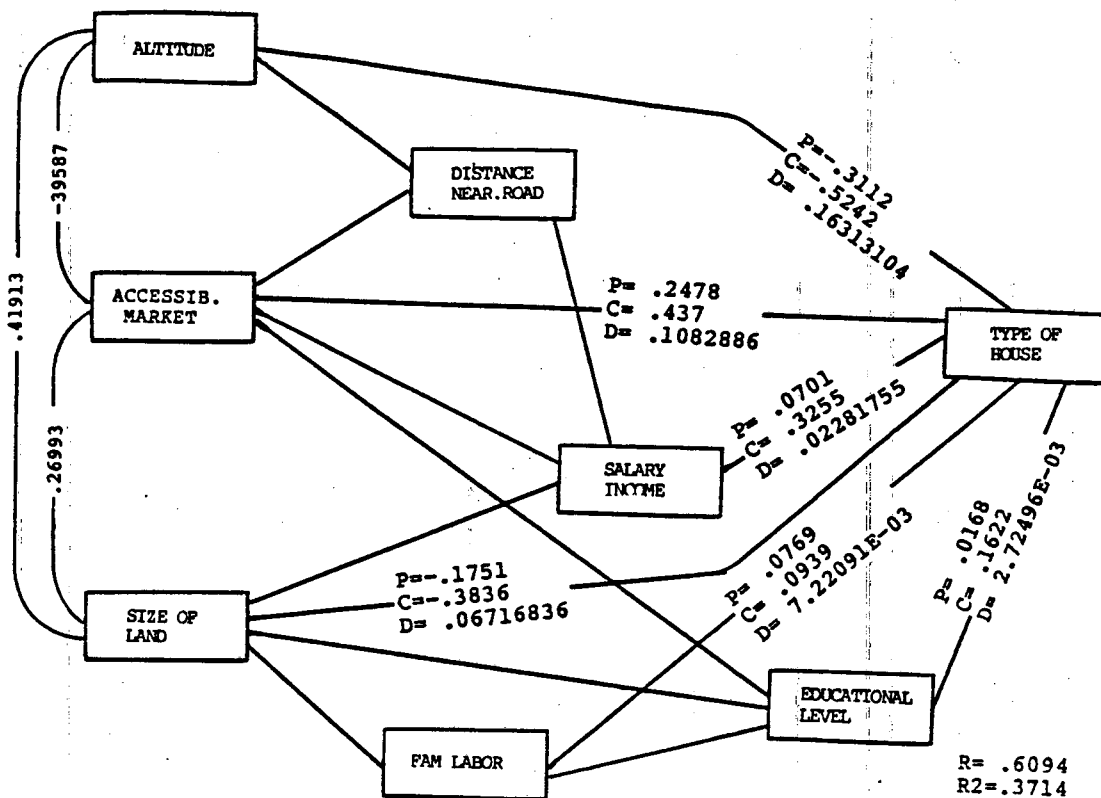
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR73	.79036852E-02	.33405853E-01	.55977580E-01	.0167821
			.813	.00375
VAR88	.28448118	.26188908	1.1799737	.0769217
			.279	.06454
VAR105	.36759020E-01	.11674035E-01	9.9148431	.2478300
			.002	.10029
VAR12	-.74302882E-01	.32163745E-01	5.3367652	-.1751611
			.022	-.06048
VAR87	.11466260E-01	.12665210E-01	.81963175	.0701068
			.367	.02418
VAR79	-.10287056	.28008238E-01	13.489958	-.3112702
			.000	-1.26256
(CONSTANT)	5.1246167	.88906415	33.224356	
			.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.15 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE TYPE OF FAMILY HOUSE RURAL CAYAMBE COUNTY. 1982



proportion of family members in productive activities (PC=.0769, DC=.0072), and greater proletarianization of the families (PC=.0701, DC=.0228) had a positive impact on the types of houses of the study families. This analysis showed the fact that houses with better characteristics were located closer to the county seat, and when the families sold their labor force and, consequently, were located at lower altitudes. For this reason, those more displaced and marginalized groups had poorer housing.

The utilization of better quality drinking water was determined mainly by the existence of sanitary facilities (PC=.3099, DC=.1366) and greater accessibility to the county seat (PC=.2861, DC=.1107) (Tables 5.55, 5.56, Graph 5.16). A similar conclusion was found in relation to the garbage disposal mechanisms of the study families, which is mainly determined by the existence of sanitary facilities (PC=.3616, DC=.0486), and by the altitude of the residence site (PC=.2973, DC=.0289). Other less important determinants were salaried income (PC=-.1942) and proximity to the county seat (PC=.1705) (Tables 5.57, 5.58, Graph 5.17).

Excrement disposal was positively influenced by the existence of relevant sanitary facilities (PC=.2086, DC=.056), the family educational level (PC=.2797, DC=.0861), and accessibility to the county seat (PC=.1119, DC=.0214), and negatively influenced by the altitude of the site of residence (PC=-.1159, DC=-.019) (Tables 5.59, 5.60 and Graph 5.18). This situation agreed with the other sanitary

CAYAMBE PROJECT

TABLE 5.55 DETERMINANTS OF QUALITY OF DRINKING WATER : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.1403	.2197	.03082391
FAMILY LABOR	.3411	.2802	.09557
ACCES. MARKET	.2861	.3871	.11074931
A.P.U. SIZE	-.2356	-.3613	.08512228
SALARY INCOME	.0559	.3133	.01751347
ALTITUDE	.2578	-.2446	-.06305788
SANIT. INFRST	.3099	.4408	.13660392

MR=.64291
 R2=.4133

F(7,135)=13.58739
 SIGNIFICANCE=0

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.56 QUALITY OF THE DRINKING WATER : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR73	YEARS OF STUDY
		VAR88	FAMILY LABOR INDEX
		VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR12	SIZE OF APU
		VAR87	SALARIES [INCOME] PER CAPITA
		VAR79	ALTITUDE
		VAR83	SANITARY INFRASTRUCTURE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
MULTIPLE R	.64291	REGRESSION	7.	58.88919	8.41274	13.58739	0
R SQUARE	.41333	RESIDUAL	135.	83.58634	.61916		
ADJUSTED R SQUARE	.38291	COEFF OF VARIABILITY	49.4 PCT				
STD DEVIATION	.78687						

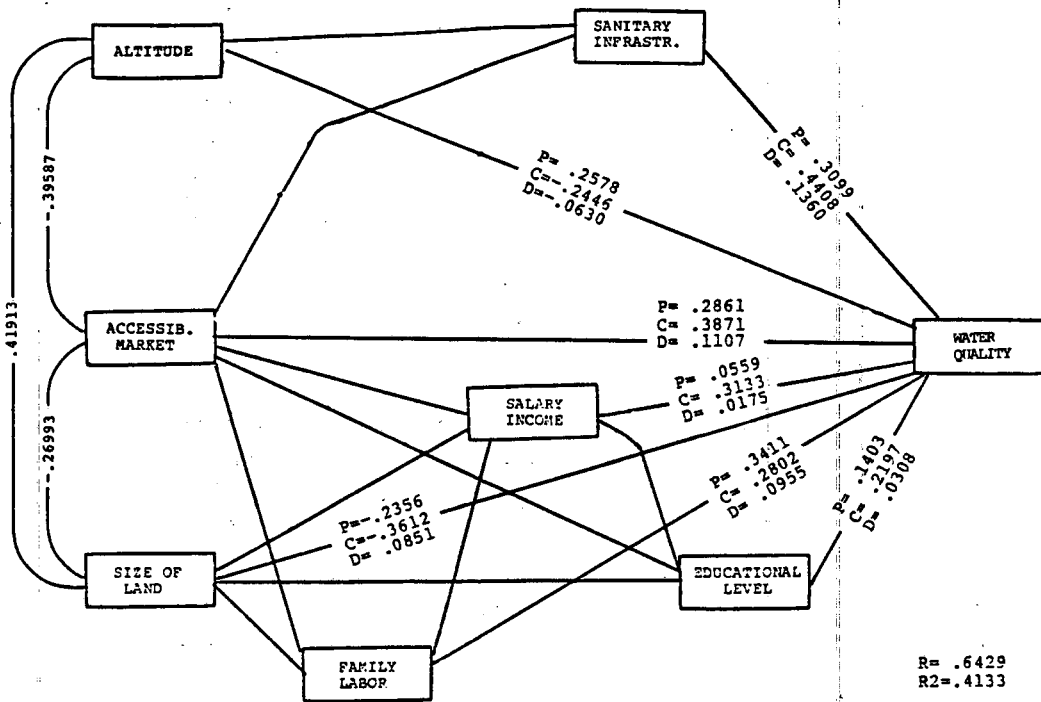
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F		BETA
			SIGNIFICANCE	ELASTICITY	
VAR73	.70698913E-01	.34656682E-01	4.1615155	.043	.1403145
VAR88	1.3498020	.27260542	24.517215	.000	.3411438
VAR105	.45405224E-01	.12393717E-01	13.421731	.000	.46201
VAR12	-.10690293	.34637278E-01	9.5255852	.002	.2861328
VAR87	.97728374E-02	.13512395E-01	.52309029	.471	.18690
VAR79	.91175939E-01	.31569183E-01	8.3413014	.005	.2355556
VAR83	.48186105	.14467164	11.093711	.001	-.13128
(CONSTANT)	-2.4135282	1.0349432	5.4384075	.021	.0558510
					.2578687
					1.68835
					.3099174
					.22614

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.16 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF QUALITY OF THE DRINKING WATER RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.57 DETERMINANTS OF TYPE OF GARBAGE CONTROL : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.0402	3.2E-03	1.2864E-04
FAMILY LABOR	.1537	.0711	.01092807
ACCES. MARKET	.1705	.1092	.0186186
A.P.U. SIZE	.1017	.0487	4.95279E-03
SALARY INCOME	-.1942	-.0773	.01501166
ALTITUDE	.2973	.0975	.02898675
SANIT. INFRST	.3616	.1344	.04859904
	MR=.35673	F(7,135)=2.8121	
	R2=.12726	SIGNIFICANCE=.009	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.58 TYPE OF GARBAGE CONTROL : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR73	YEARS OF STUDY
		VAR88	FAMILY LABOR INDEX
		VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR12	SIZE OF APU
		VAR87	SALARIES [INCOME] PER CAPITA
		VAR79	ALTITUDE
		VAR83	SANITARY INFRASTRUCTURE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
MULTIPLE R	.35673	REGRESSION	7.	62.13718	8.87674	2.81211	.009
R SQUARE	.12726	RESIDUAL	135.	426.14254	3.15661		
ADJUSTED R SQUARE	.08200	COEFF OF VARIABILITY	80.1	PCT.			
STD DEVIATION	1.77669						

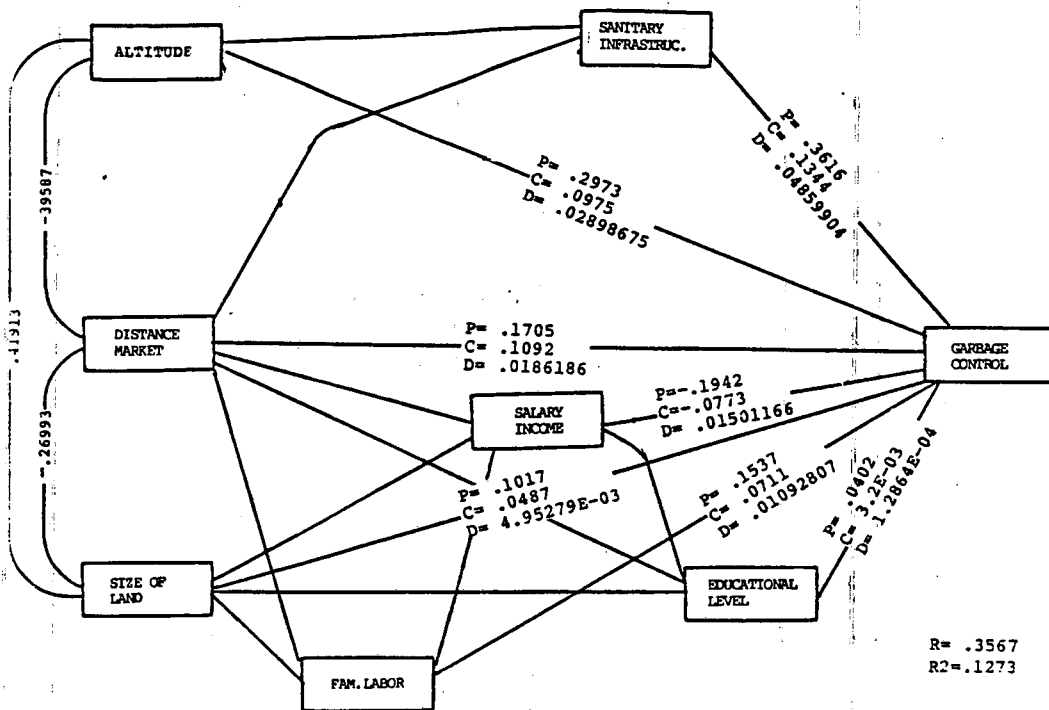
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F		BETA
			SIGNIFICANCE	ELASTICITY	
VAR73	.37519728E-01	.78252241E-01	.22989302		.0402240
			.632		.01929
VAR88	1.1255728	.61552301	3.3439411		.1536657
			.070		.27710
VAR105	.50101109E-01	.27984101E-01	3.2053241		.1705473
			.076		.14833
VAR12	.85522878E-01	.78208429E-01	1.1957971		.1017940
			.276		.07554
VAR87	-.62899690E-01	.30509996E-01	4.2502329		-.1941756
			.041		-.14391
VAR79	.19466176	.71280894E-01	7.4578737		.2973958
			.007		2.59262
VAR83	1.0409786	.32665792	10.155405		.3616610
			.002		.35137
(CONSTANT)	-5.1436990	2.3368256	4.8450527		
			.029		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.17 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF TYPE OF GARBAGE CONTROL RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.59 DETERMINANTS OF TYPE OF EXCREMENT CONTROL : COEFFICIENTS
 DETAILED PATH ANALYSIS
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.2797	.3079	.08611963
FAMILY LABOR	-.0766	-.0561	4.29726E-03
ACCES. MARKET	.1119	.1909	.02136171
A.P.U. SIZE	.0991	.2041	.02022631
SALARY INCOME	.0403	-.1278	-5.15034E-03
ALTITUDE	-.1159	.1644	-.01905396
SANIT. INFRST	.2086	.2685	.0560091
	MR=.40475	F(7,135)=3.77653	
	R2=.16383	SIGNIFICANCE=.001	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.60 TYPE OF EXCREMENT CONTROL : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR73	YEARS OF STUDY
		VAR88	FAMILY LABOR INDEX
		VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR12	SIZE OF APU
		VAR87	SALARIES [INCOME] PER CAPITA
		VAR79	ALTITUDE
		VAR83	SANITARY INFRASTRUCTURE

MULTIPLE R	.40475	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.16383	REGRESSION	7.	2.17901	.31129	3.77853	.001
ADJUSTED R SQUARE	.12047	RESIDUAL	135.	11.12169	.08238		
STD DEVIATION	.28702	COEFF OF VARIABILITY	14.9 PCT				

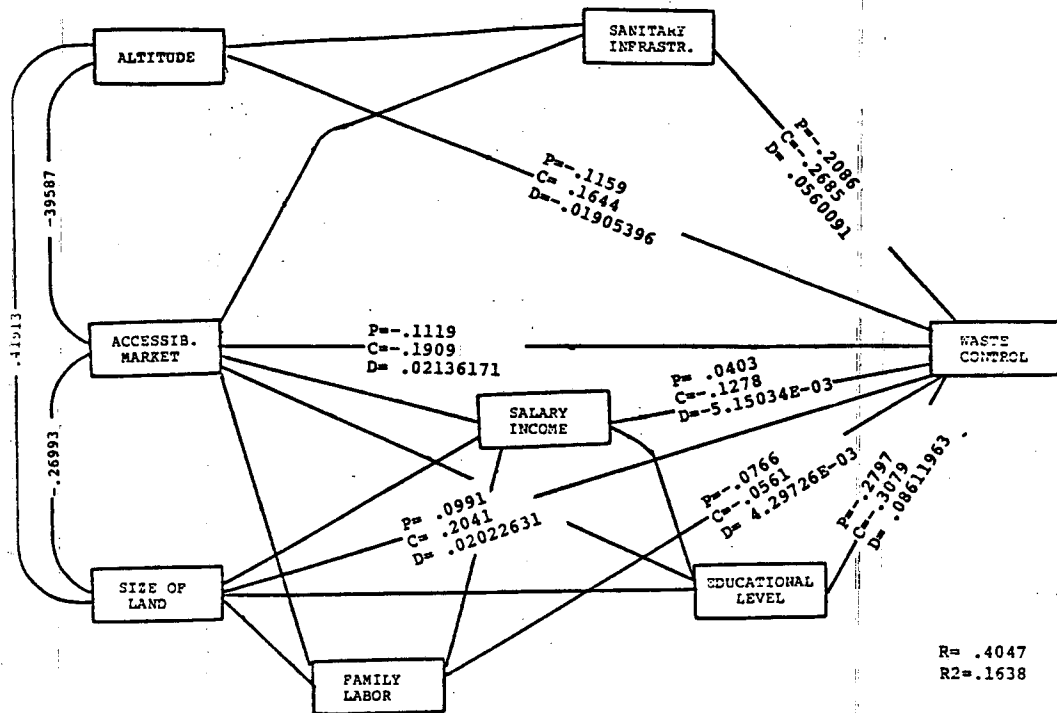
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	
			SIGNIFICANCE	BETA ELASTICITY
VAR73	.43065822E-01	.12641680E-01	11.605286	.2797405
			.001	.02543
VAR88	-.92570553E-01	.99437986E-01	.86664468	-.0765726
			.354	-.02617
VAR105	.54260222E-02	.45208426E-02	1.4405368	.1119119
			.232	.01845
VAR12	.13746708E-01	.12634603E-01	1.1837888	.0991369
			.279	.01395
VAR87	.21571347E-02	.49289018E-02	.19153766	.0403479
			.662	.00567
VAR79	-.12521237E-01	.11515457E-01	1.1823121	-.1159040
			.279	-.19154
VAR83	.99093743E-01	.52771716E-01	3.5260626	.2085947
			.063	.03842
(CONSTANT)	2.4712614	.37751510	42.851768	
			0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.18 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE TYPE OF WASTE CONTROL RURAL CAYAMBE COUNTY, 1982



elements considered above, and verified the obviously important role of the sanitary facilities, as well as its distribution close to the county seat.

From the observation of Tables 5.61, 5.62 and Graph 5.19, one can gather that the elements that played the most important roles in the determination of the use of electricity by the study families were the accessibility to the country seat (PC=.2863, DC=.1223), the existence of sanitary facilities (PC=.1764, DC=.0741), the size of the APU (PC=.1302, DC=.0411) and the educational level of the family (PC=.1073, DC=.0217). It is important to recognize the association of the use of electricity with the existence of sanitary facilities, which probably explains the fact that the installation of energy lines followed the same patterns as the sanitary facilities, thus being available mainly for those families closer to the county seat. Thus, as was stated in the previous paragraphs, those families close to the county seat had available several facilities such as roads and sanitary facilities also had access to electrical service.

Food consumption of the families was very much influenced by ownership of poultry (PC=.168, DC=.0258), guinea pigs (PC=.1296, DC=.0206), the size of the agricultural plot of the family (PC=.1089, DC=.0175) and the proportion of family members in productive activities (PC=.102, DC=.0095) (Tables 5.63, 5.64, Graph 5.20). These findings show the important influence of poultry and guinea pigs, even though their numbers were small, in the family's daily

CAYAMBE PROJECT

TABLE 5.61 DETERMINANTS OF USE OF ELECTRICITY : COEFFICIENTS
 DETAILED PATH ANALYSIS
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.1073	.2025	.02172825
FAMILY LABOR	.0967	.0745	7.20415E-03
ACCES. MARKET	.2863	.4272	.12230736
A.P.U. SIZE	.1302	.3158	.04111716
SALARY INCOME	.0465	.2926	.0136059
ALTITUDE	.0201	.3537	7.10937E-03
SANIT. INFRST	.1764	.4203	.07414092
	MR=.53595	F(7,135)=7.77233	
	R2=.28725	SIGNIFICANCE=0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.62 USE OF ELECTRICITY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1.	VAR73	YEARS OF STUDY
		VAR88	FAMILY LABOR INDEX
		VAR105	DIRECT ACCESIB TO COUNTY SEAT
		VAR12	SIZE OF APU
		VAR87	SALARIES [INCOME] PER CAPITA
		VAR79	ALTITUDE
		VAR83	SANITARY INFRASTRUCTURE

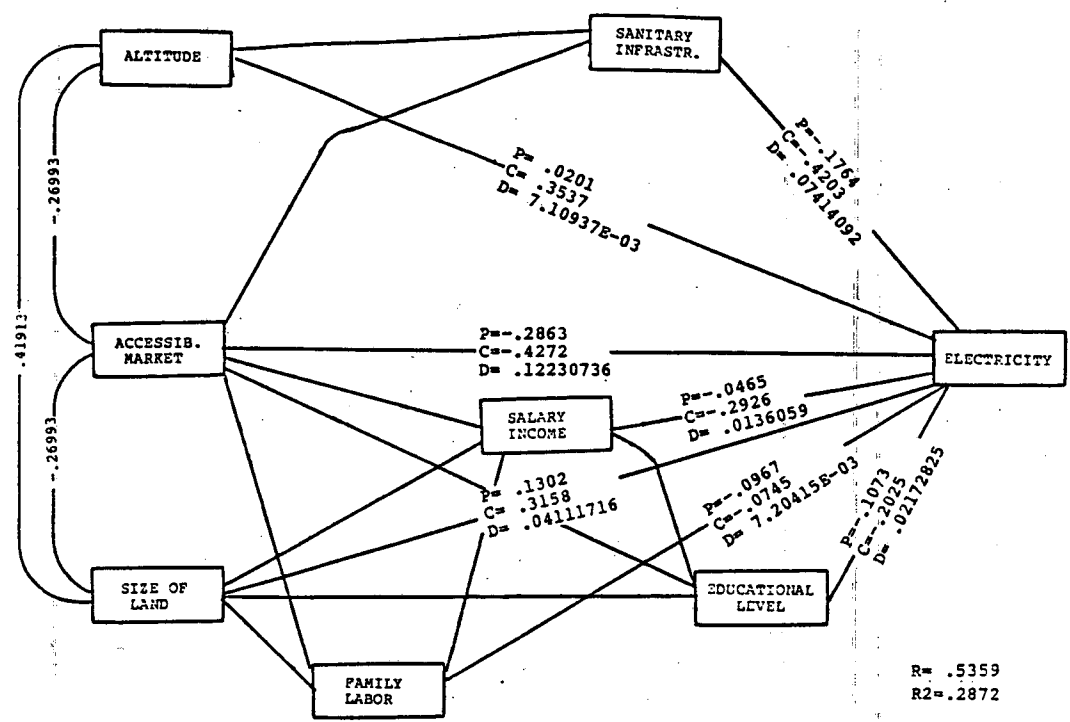
MULTIPLE R	.53595	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.28725	REGRESSION	7.	8.52098	1.21728	7.77233	0
ADJUSTED R SQUARE	.25029	RESIDUAL	135.	21.14336	.15662		
STD DEVIATION	.39575	COEFF OF VARIABILITY	23.2 PCT				

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR73	.24664836E-01	.17430359E-01	2.0023676	.1072805
			.159	.01648
VAR88	.17453257	.13710517	1.6204860	.0966711
			.205	.05582
VAR105	.20733802E-01	.62333414E-02	11.064099	.2863476
			.001	.07975
VAR12	.26970294E-01	.17420600E-01	2.3968737	.1302394
			.124	.03095
VAR87	.37116699E-02	.67959738E-02	.29828767	.0464871
			.586	.01103
VAR79	.32403143E-02	.15877521E-01	.41649413E-01	.0200844
			.839	.05607
VAR83	.12520319	.72761684E-01	2.9609104	.1764787
			.088	.05490
(CONSTANT)	1.9297636	.52051811	13.744740	
			.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT
 GRAPH 5.19 PATH DIAGRAM AND COEFFICIENTS IN THE
 DETERMINATION OF THE USE OF ELECTRICITY
 RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.63 DETERMINANTS OF FREQUENCY OF DIFFERENT FOOD INTAKE : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
EDUCAT. LEVEL	.0209	.0443	9.2587E-04
PIGS	-.0216	-.0115	2.484E-04
ACCES. MARKET	-.0344	-.0313	1.07672E-03
A.P.U. SIZE	.1089	.1607	.01750023
FAMILY LABOR	.102	.0938	9.5676E-03
CATTLE	-.0408	5.6E-03	-2.2848E-04
GUINEA PIGS	.1296	.1589	.02059344
POULTRY	.168	.1536	.0258048
SALARY INCOME	.0486	.0345	1.6767E-03
ALTITUDE	.0565	.0547	3.09055E-03

MR=.2833
 R2=.08026

F(10,132)=1.15189
 SIGNIFICANCE=.329

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.64 FAMILY FOOD INTAKE : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR73	YEARS OF STUDY				
		VAR18	NUMBER OF PIGS				
		VAR105	DIRECT ACCESIB TO COUNTY SEAT				
		VAR12	SIZE OF APU				
		VAR88	FAMILY LABOR INDEX				
		VAR16	NUMBER OF CATTLE				
		VAR20	NUMBER OF GUINEA PIGS				
		VAR19	NUMBER OF POULTRY				
		VAR87	SALARIES [INCOME] PER CAPITA				
		VAR79	ALTITUDE				
MULTIPLE R	.28330	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.08026	REGRESSION	10.	.07745	.00774	1.15189	.329
ADJUSTED R SQUARE	.01058	RESIDUAL	132.	.88752	.00672		
STD DEVIATION	.08200	COEFF OF VARIABILITY	56.4 PCT				

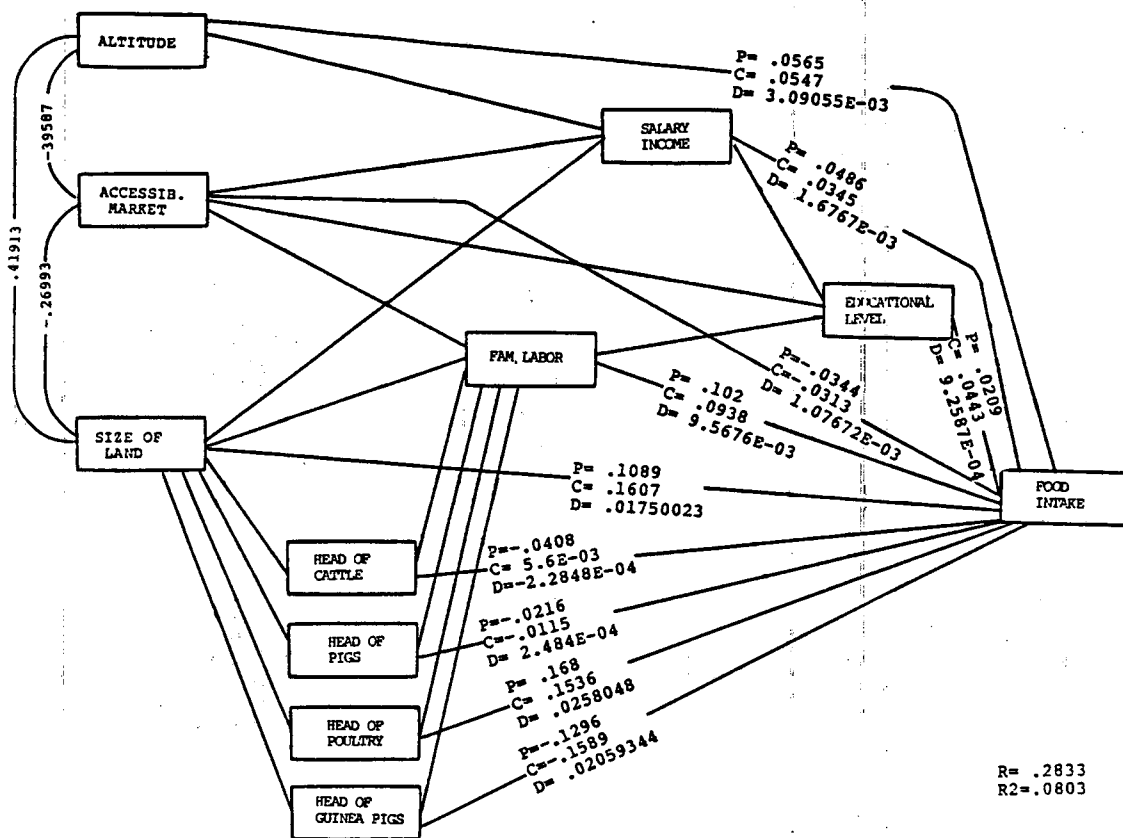
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR73	.87020955E-03	.37662578E-02	.53386027E-01	.0209858
VAR18	-.65058451E-03	.30175738E-02	.46482731E-01	.00683
VAR105	-.44894475E-03	.13629089E-02	.10850560	.00911
VAR12	.40687018E-02	.36341394E-02	1.2534531	.0343769
VAR88	.33227178E-01	.29128093E-01	1.3012563	.02028
VAR16	-.74472575E-03	.16709979E-02	.19862822	.1089362
VAR20	.11988701E-02	.85228126E-03	1.9786928	.05484
VAR19	.34794110E-02	.19692181E-02	3.1219348	.1020407
VAR87	.69928914E-03	.14643148E-02	.22805765	.12482
VAR79	.16456515E-02	.30974721E-02	.28226756	.0407614
(CONSTANT)	.65723729E-01	.99207759E-01	.43888740	.01007

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.20 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF FREQUENCY OF DIFFERENT FOOD INTAKE RURAL CAYAMBE COUNTY, 1982



intake. This was also true for the size of the property, which was the basis of subsistence of most of the families. Therefore, ownership of the means of production had a direct influence on the food intake of the families.

Another important element that relates to the social reproduction of the families is health service. In previous chapters, it was stated that the distribution and accessibility of health services varied for the different study groups. But it is also important to measure the degree of use of those services, so two indicators were selected: the type of attention during deliveries of children, and the length of time since the last visit to a physician. In Tables 5.65, 5.66 and Graph 5.21, it can be observed that the elements that have greater influence on the type of care during childbirth were the accessibility to health services (PC=.3442, DC=.1693), to the county seat (PC=.2456, DC=.0971) and the family salary income (PC=.1243, DC=.0385). Thus, the geographic and economic accessibility to health services seemed to be the most important determinants for the type of care at childbirth used by the study families.

In the same way, the elements that had important roles in the use of health services, measured by the time span since the last visit to a physician, were educational level (PC=-.1797, DC=.0384) and salary income (PC=-.1532, DC=.0303) (Tables 5.67, 5.68, Graph 5.22). Even though this variable may have been influenced by the

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TABLE 5.65 DETERMINANTS OF TYPE OF CARE AT DELIVERY : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ACC. H.CENTER	.3442	.4921	.16938082
DISTANC. ROAD	-.1242	.0213	-2.64546E-03
EDUCAT. LEVEL	.0269	.1262	3.39478E-03
SALARY INCOME	.1243	.31	.038533
ACCES. MARKET	.2456	.3954	.09711024

MR=.55298
 R2=.30578

F(5,137)=12.06892
 SIGNIFICANCE=0

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.66 TYPE OF CARE AT CHILDBIRTH : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER 1. VAR106 DIRECT ACCESIB TO HEALTH CENTER
VAR33 DISTANCE TO NEAREST ROAD
VAR73 YEARS OF STUDY
VAR87 SALARIES [INCOME] PER CAPITA
VAR105 DIRECT ACCESIB TO COUNTY SEAT

MULTIPLE R	.55298	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.30578	REGRESSION	5.	55.93901	11.18780	12.06892	0
ADJUSTED R SQUARE	.28045	RESIDUAL	137.	126.99805	.92699		
STD DEVIATION	.96280	COEFF OF VARIABILITY	31.9 PCT				

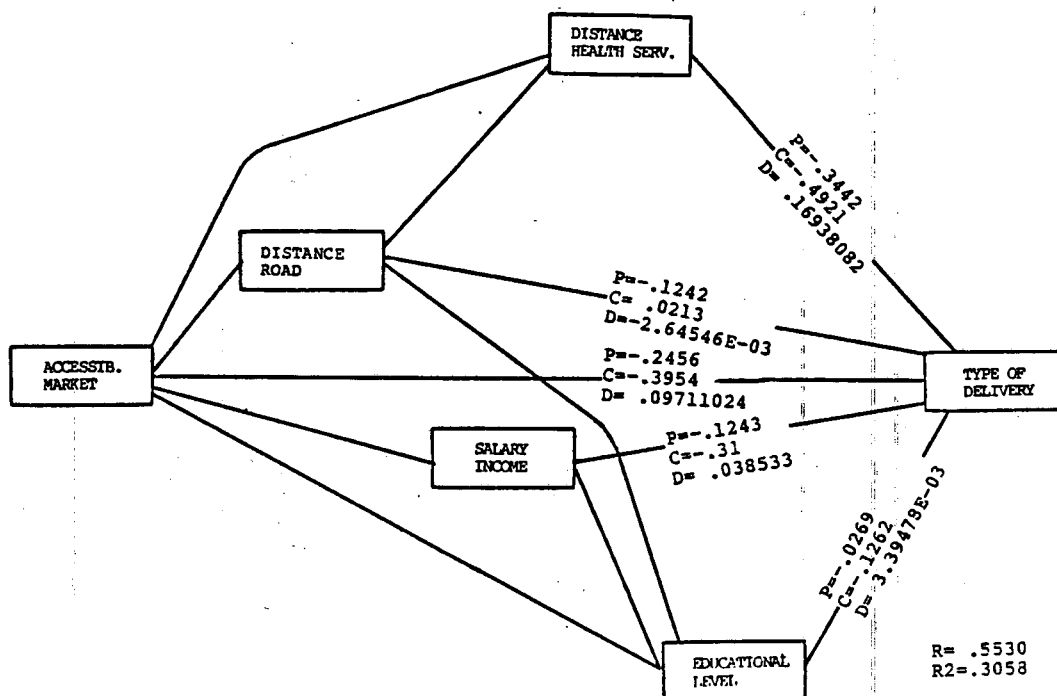
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR106	.24547323E-01	.59339787E-02	17.112612	.3441906
			.000	.09609
VAR33	-.76955531E-01	.50576854E-01	2.3151336	-.1242621
			.130	-.06555
VAR73	.15359846E-01	.41644858E-01	1.3603509	.0269027
			.713	.00580
VAR87	.24647500E-01	.15552801E-01	2.5114729	.1243090
			.115	.04138
VAR105	.44163141E-01	.17075086E-01	6.6895068	.2456072
			.011	.09594
(CONSTANT)	3.9416572	.21139041	347.68595	
			0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.21 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF TYPE OF CARE AT DELIVERY RURAL CAYAMBE COUNTY. 1982



CAYAMBE PROJECT

TABLE 5.67 DETERMINANTS OF LAST VISIT TO A PHYSICIAN : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ACC. H.CENTER	6.1E-03	-.0944	-5.7584E-04
DISTANC. ROAD	-.1222	-.0738	9.01836E-03
EDUCAT. LEVEL	-.1797	-.2137	.03840189
SALARY INCOME	-.1532	-.1984	.03039488
ACCES. MARKET	-.0713	-.0841	5.99633E-03
	MR=.28853	F(5,157)= 2.48822	
	R2=.08325	SIGNIFICANCE = .034	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.68 LAST VISIT TO A PHYSICIAN : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR106 DIRECT ACCESIB TO HEALTH CENTER
VAR33 DISTANCE TO NEAREST ROAD
VAR73 YEARS OF STUDY
VAR87 SALARIES [INCOME] PER CAPITA
VAR105 DIRECT ACCESIB TO COUNTY SEAT

MULTIPLE R	.28853	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.08325	REGRESSION	5.	62.52888	12.50578	2.48822	.034
ADJUSTED R SQUARE	.04979	RESIDUAL	137.	688.56203	5.02600		
STD DEVIATION	2.24187	COEFF OF VARIABILITY	137.0 PCT				

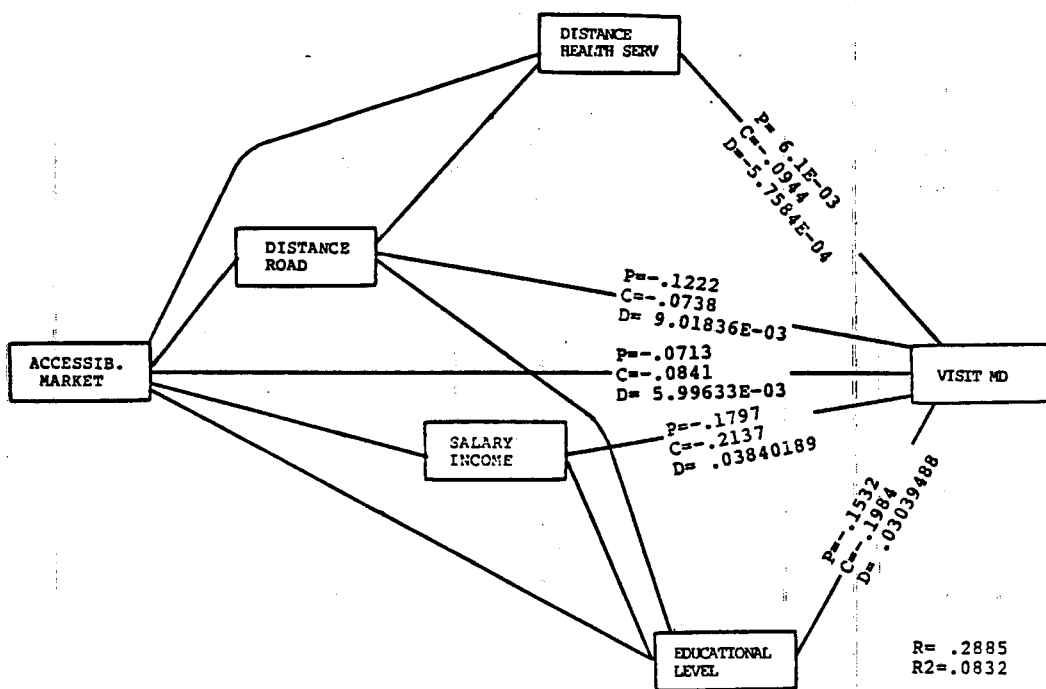
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F		BETA
			SIGNIFICANCE	ELASTICITY	
VAR106	.88623081E-03	.13817167E-01	.41139187E-02	.0061326	.00640
VAR33	-.15343402	.11776733	1.6974370	-.1222714	-.24130
VAR73	-.20789900	.96969329E-01	4.5965925	-.1797074	-.14482
VAR87	-.61566086E-01	.36214429E-01	2.8901462	-.1532413	-.19082
VAR105	-.25981931E-01	.39759042E-01	.42704242	-.0713111	-.10421
(CONSTANT)	2.7404855	.49221891	30.998339		

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.22 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF TIME SPAN SINCE LAST VISIT TO A PHYSICIAN RURAL CAYAMBE COUNTY, 1982



presence or absence of disease, this analysis has allowed the identification of the important effects of the educational level and salaried income in the utilization of the health services.

The integral path analysis of all the different subcomponents studied in the previous paragraphs was the most important component of the study, because it initiated the synthesis of all the most important data, and the corresponding effects of each one of the variables on the determinations of the health status of the rural population of Cayambe. It allowed the integration of historical, ecological, and socio-economic variables in the explanation of the health-disease phenomenon.

The principal and central component of the present investigation was the establishment of the main determinants of health status. According to the path analysis and the complete path diagram, the different variables were integrated and their degree of determination of the health variable measured. According to Tables 5.69, 5.70 and Graphs 5.23, 5.24 the variables that had the greatest roles in the determination of the morbidity of the families were the accessibility to health services (PC=.3269, DC=.1293), which had a diminishing effect on the family's morbidity, and the consumption of the family's labor force (PC=.316, DC=.1181), which had an incremental effect on the family's morbidity. A lesser determinant effect on the health status of the families was shown by the utilization of better quality

CAYAMBE PROJECT

TABLE 5.69 DETERMINANTS OF MORBIDITY : COEFFICIENTS
 DETAILED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
ALTITUDE	-.1789	-.05593	.010005877
CATTLE	-.1795	-.1371	.02460945
FOOD CONSUMT.	.1399	.649	.02306951
GARBAGE CONTR	-.0507	-.1458	7.39206E-03
FAMILY LABOR	.316	.3738	.1181208
GUINEA PIGS	-.1735	-.0868	.0150598
EDUCAT. LEVEL	.0206	.0559	1.15154E-03
EXCRMENT CNTR	-.3174	-.0542	.01720308
SALARY INCOME	.2302	.1484	.03416168
PIGS	.1756	.2791	.04900996
A.P.U. SIZE	-.1203	-7.4E-03	8.9022E-04
ELECTRICITY	-.2238	-.1939	.04339482
POULTRY	-.2332	-.1434	.03344088
CARE DELIVERY	.0553	.1769	9.78256999E-03
LAST MD VISIT	.0418	-.074	-3.0932E-03
ACCES. MARKET	-.1507	-.305	.0459635
ACC. H.CENTER	-.3269	-.3958	.12938702
TYPE HOUSING	.0293	-.0953	-2.79229E-03
WATER QUALITY	-.1314	-.1536	.02018304

MR=.7600
 R2=.5776

F(19,123)=8.85285
 SIGNIFICANCE=0

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.70 FAMILY GENERAL MORBIDITY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR79	ALTITUDE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
		VAR16	NUMBER OF CATTLE	19.	78238.07510	4117.79343	8.85285	0
		VAR90	FOOD INTAKE INDEX	123.	57211.90270	465.13742		
		VAR29	GARBAGE DISPOSAL					
		VAR88	FAMILY LABOR INDEX					
		VAR20	NUMBER OF GUINEA PIGS					
		VAR73	YEARS OF STUDY					
		VAR30	EXCREMENT DISPOSAL					
		VAR87	SALARIES [INCOME] PER CAPITA					
		VAR18	NUMBER OF PIGS					
		VAR12	SIZE OF APU					
		VAR31	USE OF ELECTRICITY					
		VAR19	NUMBER OF POULTRY					
		VAR76	TYPE OF ATTENTION AT DELIVERY.					
		VAR38	LAST VISIT TO MD					
		VAR105	DIRECT ACCESIB TO COUNTY SEAT					
		VAR106	DIRECT ACCESIB TO HEALTH CENTER					
		VAR25	TYPE OF HOUSE					
		VAR27	DRINKING WATER: QUALITY					
MULTIPLE R	.76001	ANALYSIS OF VARIANCE						
R SQUARE	.57762	REGRESSION						
ADJUSTED R SQUARE	.51237	RESIDUAL						
STD DEVIATION	21.56704	COEFF OF VARIABILITY	43.0 PCT					

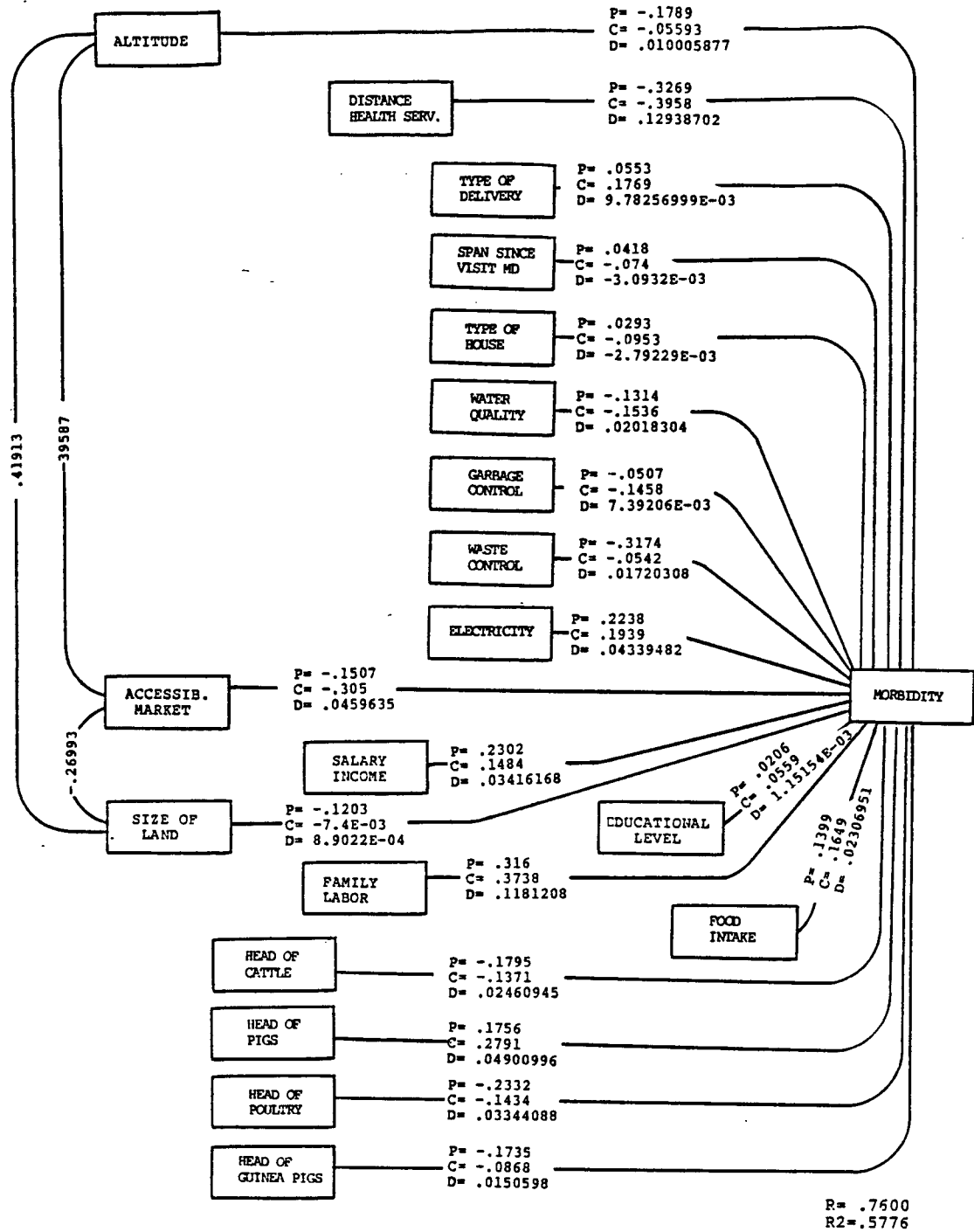
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR79	-1.9512175	.92575526	4.4424137	-.1789801
VAR16	-1.2289762	.50125427	6.0113330	-1.14877
VAR90	-52.425664	26.255835	3.9869080	-.1795415
VAR29	-.84472926	1.1952806	4.9945383	-.04816
VAR88	38.548228	8.9064858	18.732514	-.1399304
VAR20	-.60119730	.24133559	6.2057073	-.15188
VAR73	.32052649	1.0328723	.96301835E-01	-.0507180
VAR30	-32.031844	9.2738176	11.930174	-.03734
VAR87	1.2424433	.41891452	8.7963462	-.3159749
VAR18	1.9772925	.89915496	4.8358493	-.41950
VAR12	-1.6834639	1.0769212	2.4436541	-.1735180
VAR31	-15.123416	6.0962645	6.1542084	-.08534
VAR19	-1.8106307	.61572613	8.6473810	-.0206317
VAR76	1.5054888	2.1237206	5.0252805	-.00729
VAR38	.56185412	1.0926721	2.6440362	-.3174167
VAR105	-.73764607	.39328971	3.5177980	-1.23282
VAR106	-.63446477	1.7871395	12.603702	-1.23282
VAR25	.96449393	2.9573644	1.0636269	-.2302860
VAR27	-4.0509769	3.4267078	1.3975436	-.12566
(CONSTANT)	134.90752	38.441647	12.315962	-.1756446

SOURCE: FIELD WORK INFORMATION

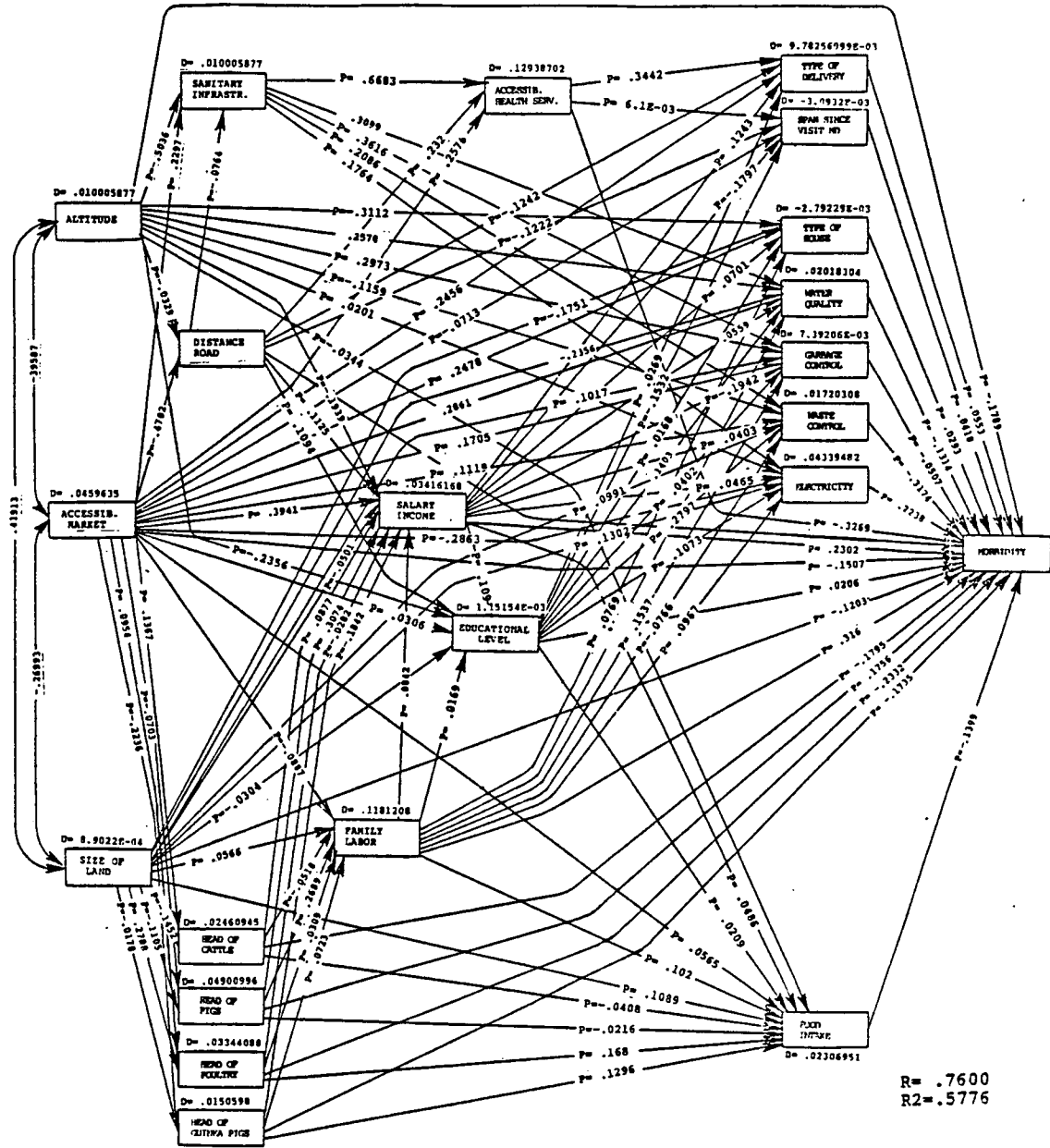
CAYAMBE PROJECT

GRAPH 5.23 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF MORBIDITY IN THE FAMILIES RURAL CAYAMBE COUNTY. 1982



CAYAMBE PROJECT

GRAPH 5.24 DETAILED PATH DIAGRAM AND COEFFICIENTS IN THE OVERALL DETERMINATION OF THE FAMILY MORBIDITY RURAL CAYAMBE COUNTY, 1982



of drinking water (PC=-.1314, DC=.0202), better control of excrement disposal (PC=-.3174, DC=.0172) and use of electricity (PC=-.2238, DC=.0434), all of which also diminished the family's morbidity. On the contrary, the variable that seemed to increase morbidity was the sale of the labor force (proletarianization of the population) (PC=.2303, DC=.0343). Other variables had a smaller effect, like the accessibility to the market place (county seat) (PC=-.1507, DC=.0459) and the ownership of poultry (PC=-.2332, DC=.0433) with decreasing effects on morbidity, and the ownership of pigs (PC=.1756, DC=.0490) with an incremental effect. The rest of the variables in the study seemed to have had little effect on the determination of the health status of the families.

The set of variables considered in the path diagram and analysis explain more than half of the variability of the family morbidity (Mult $r=.7600$, $r^2=.5776$). This situation shows the great importance of socio-economic variables in the determination of the pathological processes. The rest of the variability of the family morbidity must be determined by other ecologic, socio-economic and biological variables which have not been considered in the present study.

The integral path diagram used in this study of the determinants of morbidity is quite complex, and for that reason a synthesis of some variables was developed, creating more complex variables that may allow a simplification of the diagram. The grouping of similar variables was accomplished according to the theoretical relationships

among them by using the principal components (with interactions) of the factor analysis. The factor coefficients were used to construct new variables, following the procedure in the following formula:

$$\begin{aligned} \text{Integral} &= \text{Factor 1} \times (\text{Variable 1} - \text{Mean}) / \text{S.D.} + \\ \text{Variable} &\quad \text{Factor 2} \times (\text{Variable 2} - \text{Mean}) / \text{S.D.} + \dots \\ &\quad \text{Factor N} \times (\text{Variable N} - \text{Mean}) / \text{S.D.} \end{aligned}$$

The variable "Means of Production" integrated the size of the agricultural unit and the number of the different farm animals, using the principal component coefficients presented in Table 5.71.

In a similar manner, the variable "Family Social Reproduction" included these similar variables, type of housing, area of construction, type of drinking water, control of garbage and waste disposal, electricity, and food consumption, using the principal component coefficients in Table 5.72 .

The variables of geographic localization, such as accessibility to the county seat, the altitude of the place of residence and the distance to the nearest road were integrated into the new variable "Geographic Displacement", using the same procedure and the coefficients in Table 5.73.

Finally, the variable "Availability of Health Services" integrated the variables of sanitary facilities, direct accessibility

CAYAMBE PROJECT

TABLE 5.71 PRINCIPAL COMPONENTS WITH ITERATIONS
(FACTORIAL ANALYSIS) IN THE CONSTRUCTION
OF THE COMPLEX VARIABLE MEANS OF PRODUCTION

	MEAN	STD.DESV.	FACTOR	
CATTLE	1.6280	3.7682	.57406	
PIGS	1.6896	2.6124	.43321	
POULTRY	4.3991	6.8877	.32550	
GUINEA PIGS	5.9041	9.1447	.42164	
SIZEAGRICULTURAL UNIT		2.2375	2.4776	.11891

SOURCE : FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.72 PRINCIPAL COMPONENTS WITH ITERATIONS
(FACTORIAL ANALYSIS) IN THE CONSTRUCTION
OF THE COMPLEX VARIABLE FAMILY
SOCIAL REPRODUCTION

	MEAN	STD.DESV.	FACTOR
HOUSE TYPE	2.3327	.9196	.56153
QUAL. WATER	1.6673	1.1101	.85800
GARBAGE CNTR.	2.5866	2.2485	.34683
EXCREM. CNTR.	1.9882	.3380	.01505
ELECTRICITY	1.7382	.4401	-.73017
FOOD INTAKE	.1588	.0957	.09652

SOURCE : FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.73 PRINCIPAL COMPONENTS WITH ITERATIONS
(FACTORIAL ANALYSIS) IN THE CONSTRUCTION
OF THE COMPLEX VARIABLE GEOGRAPHIC DISPLACEMENT

	MEAN	STD.DESV.	FACTOR
ALTITUDE	29.8204	2.9161	.65561
DIST.ROAD	3.1333	2.2891	.55605
ACC. MARKET	6.3847	5.9751	-.67955

SOURCE : FIELD WORK INFORMATION

to health services, and time span since a visit to a physician, using the principal component coefficients in Table 5.74.

With the new variables, new path diagrams and analyses were implemented following the same logic of the previous analysis. It was possible to identify the influence of each variable on the morbidity of the families in the study.

The involvement of family members in productive activities was poorly explained by either geographic displacement (PC=.0367, DC=.0013) or by magnitude of the means of production owned by the family (PC=.206, DC=.0424). Only 5% of the variability of the proportion of family members involved in production could be explained by these (Tables 5.75, 5.76, Graph 5.25). Other variables, not considered in the present research, may provide a better statistical explanation.

On the other hand, the sale of the family labor force, under salaried capitalist relations, was negatively determined by geographic displacement (PC=-.4118, DC=.1671) and by the ownership of more means of production (PC=-.1332, DC=.0208). To a lesser extent, it was directly influenced by the proportion of family members in productive activities (PC=.1347, DC=.0197), as presented in Tables 5.77, 5.78 and Graph 5.26. These findings agreed with the previous findings that the sale of the family labor force was greater among those groups living closer to the county seat (market place), and

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TABLE 5.74 PRINCIPAL COMPONENTS WITH ITERATIONS
(FACTORIAL ANALYSIS) IN THE CONSTRUCTION
OF THE COMPLEX VARIABLE INDEX OF HEALTH SERVICES.

	MEAN	STD.DESV.	FACTOR
SAN. INFRSTR.	.8809	.7061	.89541
ACCS.H.CENTER	17.5443	19.1155	.89329
TIME VISIT MD	1.3574	2.2053	-.20647
CARE DELIVERY	2.7660	1.2371	-.55316

SOURCE : FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.75 DETERMINANTS OF THE FAMILY LABOR FORCE : COEFFICIENTS
PARTIALLY SIMPLIFIED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	.0367	.038	1.3946E-03
MEANS PRODUCT	.206	.2062	.0424772
	MR=.20948	F(2,140)=3.21259	
	R2=.04388	SIGNIFICANCE=.043	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.76 FAMILY LABOR FORCE : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM./
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER		1..	VAR111 VAR108	GEOGRAPHIC DISPLACEMENT MEANS OF PRODUCTION				
MULTIPLE R	.20948	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE	
R SQUARE	.04388	REGRESSION	2.	.39934	.19967	3.21259	.043	
ADJUSTED R SQUARE	.03022	RESIDUAL	140.	8.70137	.06215			
STD DEVIATION	.24930	COEFF OF VARIABILITY	45.7 PCT					

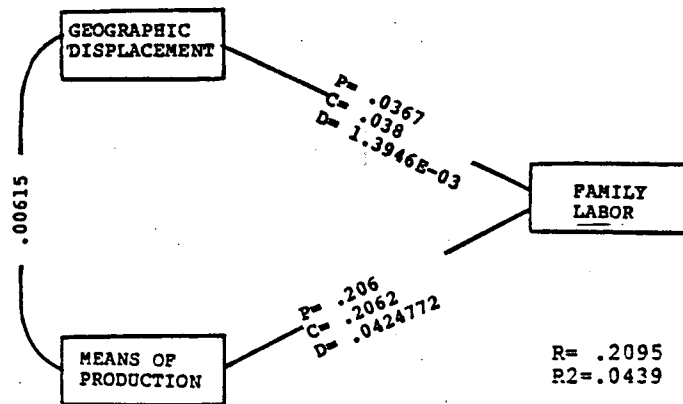
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY
VAR111	.68235902E-02	.15338557E-01	.19790505 .657	.0367645 -.00279
VAR108	.46084244E-01	.18487926E-01	6.2133894 .014	.2059988 .01196
(CONSTANT)	.54072686	.21290435E-01	645.04029 0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.25 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE FAMILY LABOR FORCE (PARTIALLY SIMPLIFIED DIAGRAM) RURAL CAYAMBE COUNTY. 1982



CAYAMBE PROJECT

TABLE 5.77 DETERMINANTS OF THE SALARY INCOME : COEFFICIENTS
PARTIALLY SIMPLIFIED PATH ANALYSIS
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	-.4118	-.4058	.16710844
MEANS PRODUCT	-.1322	-.1574	.02080828
FAMILY LABOR	.1347	.1463	.01970661
	MR=.4556	F(3,139)=1214207	
	R2=.20764	SIGNIFICANCE=0	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.78 FAMILY SALARY INCOME : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE.. 1982

VARIABLE(S) ENTERED ON STEP NUMBER 1..		VAR111 VAR108 VAR88	GEOGRAPHIC DISPLACEMENT MEANS OF PRODUCTION FAMILY LABOR INDEX				
MULTIPLE R	.45568	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.20764	REGRESSION	3.	966.23001	322.07667	12.14207	0
ADJUSTED R SQUARE	.19054	RESIDUAL	139.	3687.06960	26.52568		
STD DEVIATION	5.15031	COEFF OF VARIABILITY	101.5 PCT				

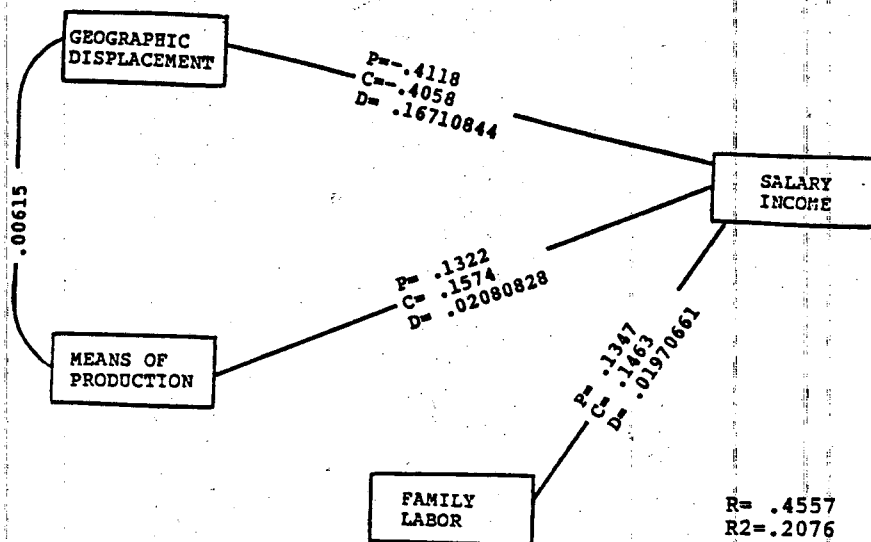
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR111	-1.7282706	.31709896	29.705292	-.4117984
VAR108	-.66877516	.39032046	2.9357403	-.1322054
VAR88	3.0449526	1.7459812	3.0414589	.1346597
(CONSTANT)	2.9302763	1.0415259	7.9154760	.32764

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.26 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE SALARY INCOME OF FAMILIES (PARTIALLY SIMPLIFIED DIAGRAM) RURAL CAYAMBE COUNTY, 1982



having smaller pieces of land.

The general conditions of family reproduction were generally deteriorated by the geographic displacement of the families (PC=-.4383, DC=.2136), and were improved, although in lesser amounts, by the greater proportion of family members involved in productive activities (PC=.1946, DC=.0372) and by the salaried income of the families (PC=.1385, DC=.047)(Tables 5.79, 5.80 and Graph 5.27).

The study of the main determinants of the availability of health services showed that the geographic displacement of the families had an important negative effect (PC=-.4814, DC=.2803), while the salaried income of the families had a positive influence (PC=.2456, DC=.1064), as presented in Tables 5.81, 5.82 and Graph 5.28.

The integration of these new path analysis subcomponents in new diagrams shows the relative importance of these variables on the determination of the health status of the people, as presented in Tables 5.83, 5.84 and Graph 5.29. The variables with an incremental effect on the morbidity were mainly the consumption of the labor force, both as general laborers (PC=.3825, DC=.1430) as well as proletariats (PC=.3101, DC=.0406), while decreasing effects on morbidity were found in association with the availability of health services (PC=-.3277, DC=.0976), larger means of production (PC=-.1495, DC=.004) and better family social reproduction (PC=-.1437, DC=.027). This path diagram and analysis allows

CAYAMBE PROJECT

TABLE 5.79 DETERMINANTS OF FAMILY SOCIAL REPRODUCTION : COEFFICIENTS
 PARTIALLY SIMPLIFIED PATH ANALYSIS.
 RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	-.4383	-.4873	.21358359
MEANS PRODUCT	.0344	.0249	8.5656E-04
FAMILY LABOR	.1946	.1911	.03718806
SALARY INCOME	.1385	.3394	.0470069
	MR=.54493	F(4,138)=14.57183	
	R2=.29695	SIGNIFICANCE=.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.80 FAMILY SOCIAL REPRODUCTION : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR111 VAR108 VAR88 VAR87	GEOGRAPHIC DISPLACEMENT MEANS OF PRODUCTION FAMILY LABOR INDEX SALARIES [INCOME] PER CAPITA				
MULTIPLE R	.54493	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.29695	REGRESSION	4	145.07172	36.26793	14.57183	.000
ADJUSTED R SQUARE	.27657	RESIDUAL	138	343.46924	2.48891		
STD DEVIATION	1.57763	COEFF OF VARIABILITY	4905.2 PCT				

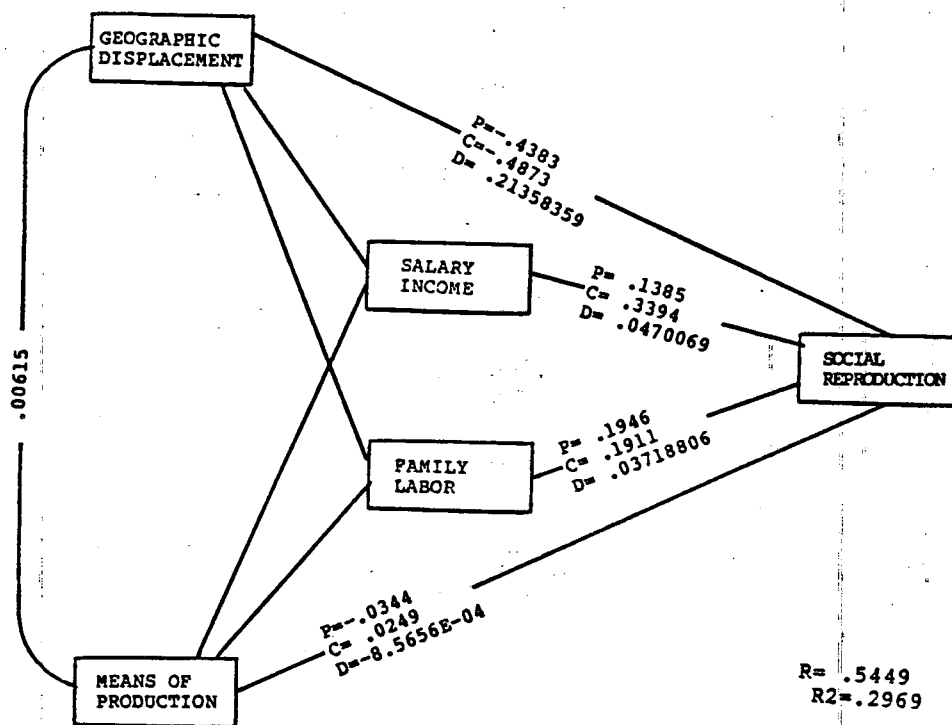
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR111	-.59606777	.10700963	31.027410	-.4383274
			.000	-4.13026
VAR108	.56374782E-01	.12081780	.21772482	.0343941
			.642	.24821
VAR88	1.4261048	.54064331	6.9579490	.1946429
			.009	-24.19845
VAR87	.44861195E-01	.25981469E-01	2.9813589	.1384525
			.086	-7.07449
(CONSTANT)	-1.1628175	.32799524	12.568633	
			.001	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.27 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE FAMILY SOCIAL REPRODUCTION (PARTIALLY SIMPLIFIED DIAGRAM) RURAL CAYAMBE COUNTY, 1982



CAYAMBE PROJECT

TABLE 5.81 DETERMINANTS OF USE OF HEALTH SERVICES : COEFFICIENTS
PARTIALLY SIMPLIFIED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	-.4814	-.5822	.28027108
MEANS PRODUCT	-.0253	5.4E-03	-1.3662E-04
FAMILY LABOR	-.0246	-.0122	3.0012E-04
SALARY INCOME	.2456	.4334	.10644304
	MR=.62202	F(4, 138)=21.77184	
	R2=.38690	SIGNIFICANCE=.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.82 ACCESSIBILITY TO HEALTH SERVICES : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

MEAN RESPONSE	-.57558	STD. DEV.	1.79836				
VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR111 VAR108 VAR88 VAR87	GEOGRAPHIC DISPLACEMENT MEANS OF PRODUCTION FAMILY LABOR INDEX SALARIES [INCOME] PER CAPITA				
MULTIPLE R	.62202	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.38690	REGRESSION	4.	177.68240	44.42060	21.77184	.000
ADJUSTED R SQUARE	.36913	RESIDUAL	138.	281.55827	2.04028		
STD DEVIATION	1.42838	COEFF OF VARIABILITY	248.2 PCT				

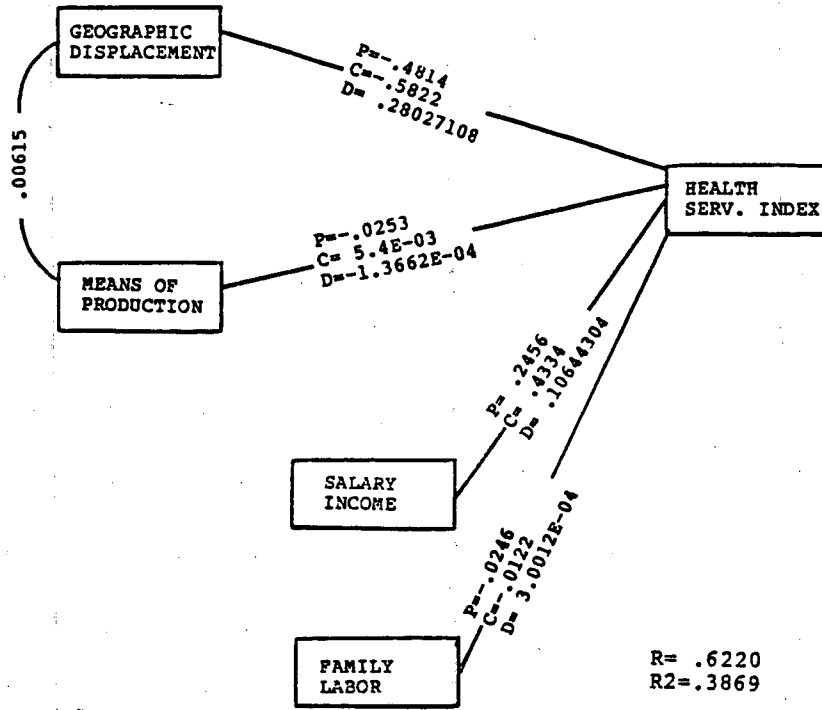
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR111	-.63473164	.96886464E-01	42.919444 .000	-.4814192 -.24576
VAR108	-.40173566E-01	.10938837	.13487719 .714	-.0252796 .00988
VAR88	-.17444001	.48949815	.12699601 .722	-.0245563 .16539
VAR87	.77161966E-01	.23523608E-01	10.759664 .001	.2456199 -.67993
(CONSTANT)	-1.0075041	.29696671	11.510073 .001	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.28 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE USE OF HEALTH SERVICES (PARTIALLY SIMPLIFIED DIAGRAM) RURAL CAYAMBE COUNTY. 1982



CAYAMBE PROJECT

TABLE 5.83 DETERMINANTS OF MORBIDITY : COEFFICIENTS
PARTIALLY SIMPLIFIED PATH ANALYSIS
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE, 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	.008	.1566	1.2528E-03
MEANS PRODUCT	-.1495	-.0271	4.05145E-03
FAMILY LABOR	.3825	.3738	.1429785
SALARY INCOME	.3101	.1484	.04601884
FAM. REPRODUC	-.1437	-.1882	.02704434
H. SERV. INDX	-.3277	-.2978	.09758906
	MR=.56475	F(6136)=10.6147	
	R2=.31894	SIGNIFICANCE=.000	

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.84 FAMILY GENERAL MORBIDITY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR111 VAR108 VAR88 VAR87 VAR110 VAR112	GEOGRAPHIC DISPLACEMENT MEANS OF PRODUCTION FAMILY LABOR INDEX SALARIES [INCOME] PER CAPITA FAMILY SOCIAL REPRODUCTION HEALTH SERVICES INDEX				
MULTIPLE R	.56475	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.31894	REGRESSION	6.	43200.24752	7200.04125	10.61473	.000
ADJUSTED R SQUARE	.28889	RESIDUAL	136.	92249.73028	678.30684		
STD DEVIATION	26.04432	COEFF OF VARIABILITY	51.9 PCT				

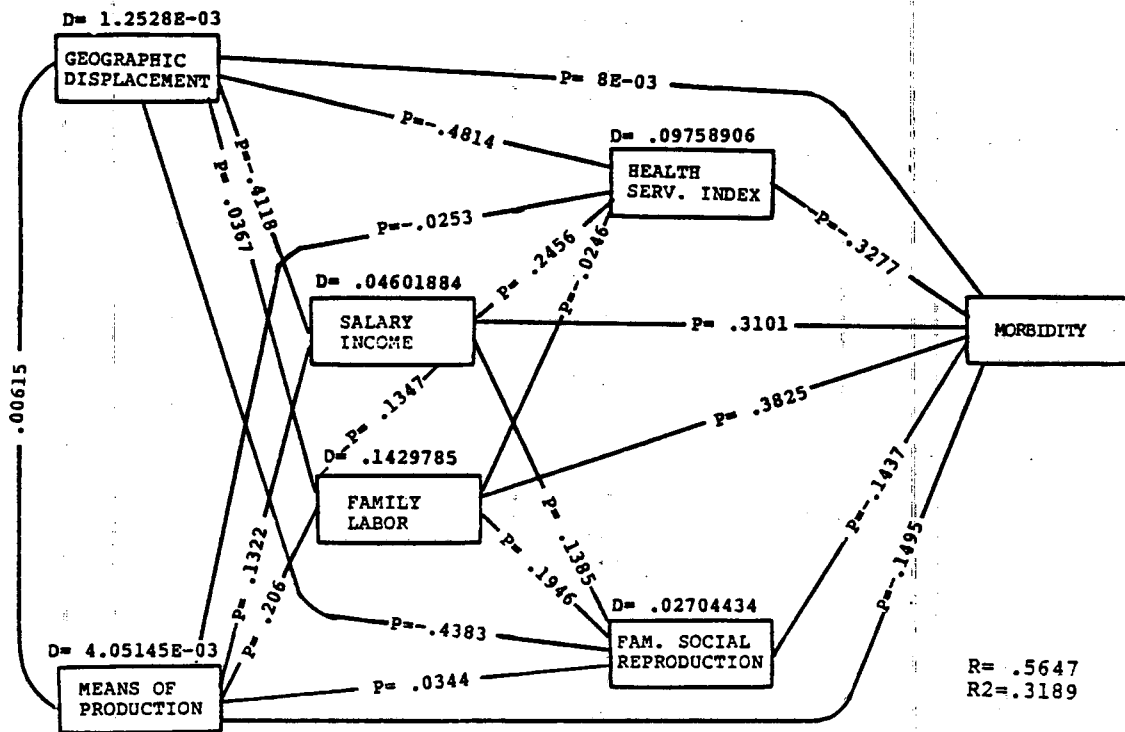
----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	BETA
			SIGNIFICANCE	ELASTICITY
VAR111	.18126073	2.0575783	.77605896E-02	.0080051
VAR108	-4.0802276	1.9962482	4.1777236	-.1495012
VAR88	46.663158	9.2781451	25.294491	.3824919
VAR87	1.6728163	.44532347	14.110595	.3100554
VAR110	-2.3932220	1.6502417	2.1031529	-.1437289
VAR112	-5.6274687	1.8226670	9.5326028	-.3276754
(CONSTANT)	13.500455	5.7165594	5.5773434	.06459

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

GRAPH 5.29 PATH DIAGRAM AND COEFFICIENTS IN THE DETERMINATION OF THE FAMILY MORBIDITY (PARTIALLY SIMPLIFIED DIAGRAM) RURAL CAYAMBE COUNTY. 1982



verification of the hypothesized negative influence of the consumption of the labor force, due to the presence of countervalues, and the positive influence of the means of production, elements of simple and extended family social reproduction, due to the presence of values, on the health status of the population.

This situation is even more clear with the development of a combined variable which integrates the proportion of family members in productive activities and the sale of the family's labor force (proletarianization), by using the same principal components procedures presented in Table 5.85. The new path diagram and analysis shows the important influence of the consumption of the labor force (PC=.5248, DC=.1705) on the morbidity of the families, and the important reducing effect of the availability of health services (PC=-.3636, DC=.1082), more means of production (PC=-.1457, DC=.003) and better means of family reproduction (PC=-.1186), DC=.0223) on morbidity (Tables 5.86, 5.87, Graph 5.30). This agrees with findings in the previous path analysis.

CAYAMBE PROJECT

TABLE 5.85 PRINCIPAL COMPONENTS WITH ITERATIONS
(FACTORIAL ANALYSIS) IN THE CONSTRUCTION
OF THE COMPLEX VARIABLE CONSUMPTION OF THE LABOR FORCE.

	MEAN	STD.DEV.	FACTOR
SALARY INCOME	4.8249	5.8819	.53689
FAM. LABOR F.	.5847	.3325	.53689

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.86 DETERMINANTS OF MORBIDITY : COEFFICIENTS
SIMPLIFIED PATH ANALYSIS.
RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

	PATH COEFFICIENT	CORRELAT. COEFFIC	DETERMIN. COEFFIC
GEOGR. DISPLZ	.0335	.1566	5.2461E-03
MEANS PRODUCT	-.1457	-.0271	3.94847E-03
CONSUMP. LABOR	.5248	.3249	.17050752
FAM. REPRODUC	-.1186	-.1882	.02232052
H. SERV. INDX	-.3636	-.2978	.10828008

MR=.5570
R2=.31031

F(5,137)=12.32765
SIGNIFICANCE= .000

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT

TABLE 5.87 FAMILY GENERAL MORBIDITY : MULTIPLE REGRESSION AND PATH COEFFICIENTS
SIMPLIFIED DIAGRAM-2.
STUDY POPULATION, RURAL CAYAMBE COUNTY, PICHINCHA PROVINCE. 1982

VARIABLE(S) ENTERED ON STEP NUMBER	1..	VAR111	GEOGRAPHIC DISPLACEMENT
		VAR108	MEANS OF PRODUCTION
		VAR113	CONSUMPTION OF LABOR FORCE
		VAR110	FAMILY SOCIAL REPRODUCTION
		VAR112	HEALTH SERVICES INDEX

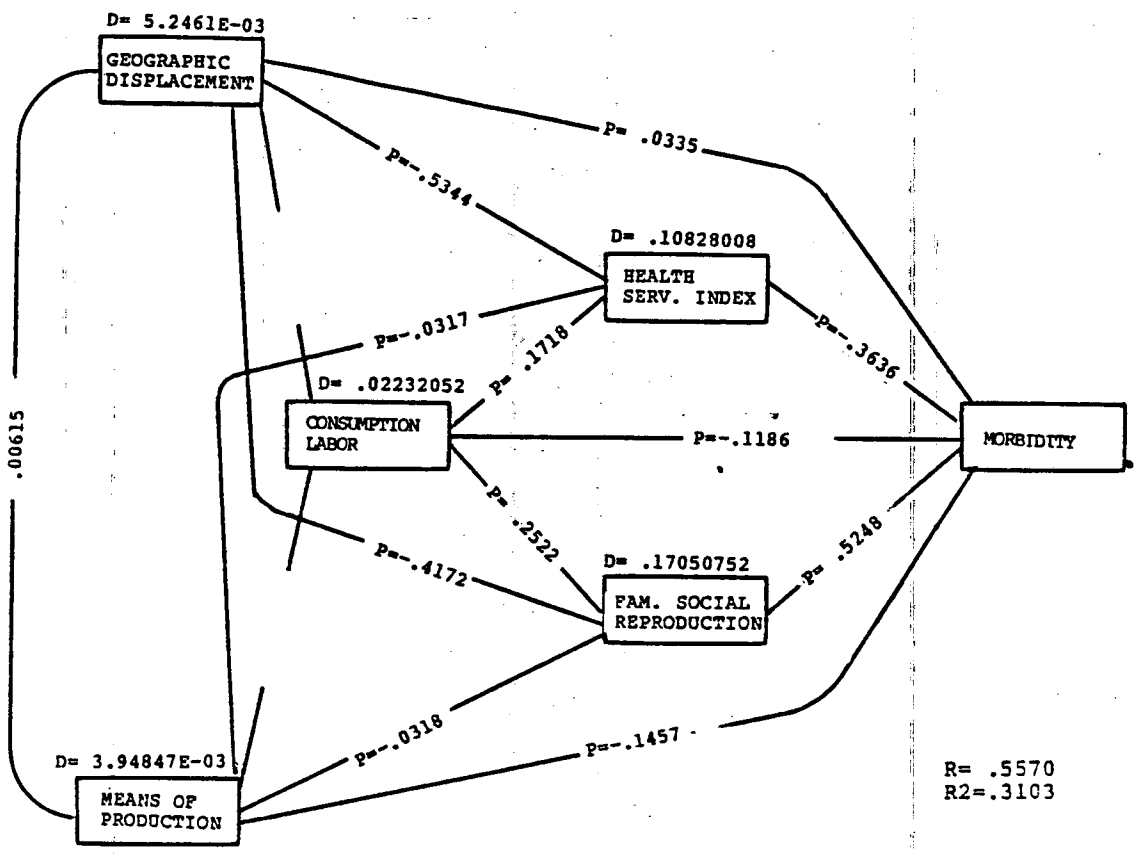
MULTIPLE R	.55705	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.31031	REGRESSION	5.	42031.13820	8406.22764	12.32785	0
ADJUSTED R SQUARE	.28514	RESIDUAL	137.	93418.83960	681.88934		
STD DEVIATION	26.11301	COEFF OF VARIABILITY	52.1	PCT			

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	
			SIGNIFICANCE	BETA
VAR111	.75867370	2.0153232	.14171657	.0335057
VAR108	-3.9762561	1.9999372	3.9529013	-.00337
VAR113	22.861574	3.4543191	43.801333	-.1456916
VAR110	-1.9742294	1.6233569	1.4789967	-.01123
VAR112	-6.2445114	1.7656702	12.507708	-.01841
(CONSTANT)	48.145743	2.5337304	361.07297	-.1185656

SOURCE: FIELD WORK INFORMATION

CAYAMBE PROJECT
 GRAPH 5.30 PATH DIAGRAM AND COEFFICIENTS IN THE
 DETERMINATION OF THE FAMILY MORBIDITY
 (SIMPLIFIED DIAGRAM)
 RURAL CAYAMBE COUNTY. 1982



CHAPTER 6

CONCLUSIONS

The historical study of the development of the mode of production in the Cayambe Region in Ecuador, and the values of determination obtained in the path analysis have shown the tremendous importance of social elements in the determination of the health status of one rural population in the Andean Region of Ecuador. The social and economic variables considered in this study could explain 57.7% of the variability of morbidity in the study populations (Multiple R Square, Table 5.70). It means that more than half of the morbidity is explained by some of the variables of socio-economic development in the area.

It has been shown that the feudal production system of the hacienda, established during colonial times, has maintained itself as an effective unit in the middle part of this century by means of a self-reproducing mechanism. The Spanish colonists and their Creole descendants have been able to keep control of most of the natural resources through economic coercion and use of force. Such a system made most of the natural resources unavailable to most of the population, and forced them to more distant, less accessible and less fertile lands.

Land ownership, at the present time, reflects this development:

it is concentrated in very few hands, especially those lands in the best ecologic and commercial environments, while most of the population have small agricultural units, insufficient to meet a family's subsistence needs. The last Agrarian Census, 1974, shows that over 82.4% of the agricultural units are smaller than five hectares (Table 4.23); the field work information in this study reflects the same situation, since 89.5% of the study families have units smaller than five hectares (Tables 4.26 and 4.28).

This development process has displaced most of the people to more isolated areas. At the present time, we find several population groups with serious problems of accessibility, determined mainly by the limited roads available. This situation reflects the greater emphasis by the national and sectional governments on the construction of facilities in those areas where the concentration of land and accumulation of wealth are greater than in those areas less integrated to the market economy.

This process of geographic development has increased the family requirements for additional family labor, forcing a higher proportion of family members to become involved in productive activities (Table 5.47). This additional consumption of the family labor force has played a negative role in the health status of the families (Table 5.70). Notwithstanding, this process of geographic displacement has allowed some of the families to maintain a greater number of farm animals, such as cattle, pigs and guinea pigs (Tables 5.40, 5.42,

5.44 and 5.46), due to the availability of the use of grassland in the high part of the mountains. This has augmented the family food intake.

This geographic displacement has had negative effects on the living conditions of the families, from the quality of housing (Table 5.54) to the availability of sanitary facilities (Table 5.36), potable water supplies and garbage and excrement control (Tables 5.56, 5.58 and 5.60). In a similar way, accessibility to health services is also reduced for those more isolated groups (Table 5.38), leading to less medical care (Table 5.68), such as care at childbirth (Table 5.66).

As was presented in the previous chapter, the variables that have the greatest importance in the determination of health status of the families were the consumption of the family labor force, having a negative effect, with the accessibility to health services, accessibility to the market (county seat) and the size of the agricultural unit having positive effects (Table 5.70). Of these variables, accessibility to health services has one of the most significant roles, since accessibility may reduce significantly the prevalence of disease by reducing the duration of pathological processes. In the same way, greater accessibility to the market has a significant influence, directly and indirectly through other variables, in reducing population morbidity.

A new important element in the socio-economic development of the Cayambe region is the incorporation of new social relationships by the introduction of wage labor. Land reform laws generated an additional separation of most of the population from the natural resources controlled by the big farms and the insertion of the middle income and poor farmers into the market economy, through the selling of their agricultural products and, most importantly, through the selling of their labor force for a salary. Therefore in the Cayambe region an economic process took place that favored capital accumulation in the big farms and the proletarianization of most of the population. This general process has mainly taken place in those areas with closer proximity to the county seat or to the valley where the capitalist farms are located. Thus, it was found that salaried income becomes greater with accessibility to the market place (Table 5.50), which means a progressive dependency for family subsistence on what the family can buy, rather than on what the family produces in their agricultural units. The general salary situation, as an additional indicator of consumption of the labor force, is also shown as directly increasing morbidity in the study families (Table 5.70), in the same way that the general consumption of the family labor force affects the health status of the people.

The global visualization of the situation of the rural population in Cayambe County has led us to reject the initial hypothetical consideration that there is no association of the health status of the population with the development of the modes of

production, with the utilization of health services, and with the position of the head of the household in the process of production. At the same time, the hypothesis that the greater concentration of ownership of the land in the more fertile regions did not produce a greater geographic displacement of the families, a greater insertion into a market economy, a greater salaried income, or more utilization of health services by the rural families were also rejected. All of this gives important evidence for the existence of a strong relationship between socio-economic development and the health status of population groups.

The visualization of the whole methodological approach followed in this study allows the identification of the adequacy of the epidemiological model used in the interpretation of reality, since it was able to identify the contribution of diverse historical, socio-economic and service variables in the determination of the health status of a rural population. Notwithstanding, it is important to recognize some of the limitations of the study.

This study tried to integrate a historical component of the development of the agricultural production in a certain region, but it was not able to collect diachronic information of the most important variables, both social and biological, mainly because of the non-existence of records for specific groups, specially in the rural areas. The study was able to collect information only through a cross-sectional approach and, using a methodological design, tried to

infer the effect of that social development on the health status of the population. This was the most important shortcoming of the study: the impossibility of accomplishing a longitudinal study.

The last previously noted limitation was of great significance when trying to determine the components of causality of the health status of the population. The cross-sectional approach identified disease prevalence but not disease incidence, so a more accurate determination of the contribution of the different variables (causality) on the health status of the population was not possible.

It is also important to recognize that path analysis and its diagrams only allowed the unidirectional study of the effects of some variables on others, posing a severe limitation on the recognition of some possible retroactive (feed back effect) impacts of the different variables. The dialectical relationships among the variables were not identifiable because of this limitation.

But although these limitations were recognized from the beginning, they could not be eliminated because of the lack of adequate diachronic data that may provide information of past changes and because of limited resources to conduct the research with a prospective methodology. So, under the circumstances in which the study was conducted, the methodological approach used was one of the

few possible ones that may provide a way to integrate social and economic variables, with historical considerations, in the explanation of the health-disease phenomena in specific populations.

The finding of the present study also provide some guidance for the implementation of specific actions oriented to the improvement of the general living and health conditions of the people. Some of those actions may be implemented in a short period of time and with available government and community resources. It has been generally recognized that the improvement in the sanitary conditions (water, sewer and garbage control facilities) have important roles in reducing the morbidity and mortality of population groups. This study also recognizes the importance of the accessibility of the population to the health services in reducing the prevalence of disease. Therefore, devoting additional resources to implement sanitary facilities and health services to the isolated population groups will improve their health status. The implementation of ambulatory health services, which might visit the less accessible groups regularly, could provide treatment for most of the chronic and long-term acute cases, which constitute 36.7% of the morbidity found, as well as a great number of acute cases. Such services must also integrate and organize the population groups in their search for integral solutions, as well as integrate them with higher levels of the formal medical system, through an active referral system. It would mean a better allocation of state resources into the health sector.

It is important to take into account that the important contribution of the health services is mainly in the reduction of prevalence of disease, with limited effect on the incidence of disease, which may be mainly determined by social and economic factors beyond the control of traditional medical care. For this reason, the main solution to the difficult situation of the rural population will come from long-term actions, directed to the root of health and social inequalities: the enjoyment and use of natural resources. This means not only the implementation of a system that may provide improvements in the production and commercialization of products, but mainly in the redistribution of the natural resources, through the implementation of an integral land reform, which would constitute one of the most important steps in the reduction of incidence of disease. This social improvement is a must, since it would not only provide the means for an adequate and equitable use of natural resources but also restore the dignity and improve the living status of the rural families, as well as make viable a more democratic and just society.

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ANEX (QUESTIONNAIRES)

NACIDOS VIVOS Y DEFUNCIONES, SEGUN TIPO DE ATENCION Y TASAS

CUESTIONARIO 1

PROVINCIA		CANTON		PARROQUIA		CRECIMIENTO INTERCENSAL		SUPERFICIE		DENSIDAD			
AÑOS	POBLAC.	NACIDOS VIVOS				DEFUNCIONES				TASAS			
		TOTAL	Con atenc. Profes.		Sin atenc. Profes.		TOTAL	Con atenc. médica		Sin atenc. médica	-1 AÑO	Nata-1 lidad	fortal dad gr
			No.	%	No.	%		No.	%				
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ST-T.2

1 Por 1.000 habitantes
2 Por 1.000 nacidos vivos

FICHA DEMOGRAFICA

CUESTIONARIO 2

	MIEMBROS DEL HOGAR	PARENTESCO	SEXO	EDAD	PARA MAYORES DE 6 AÑOS			POBL. <15 a.	NEP (15-49 AÑOS) MUJERES EN EDAD FERTIL		
					INSTRUCCION		OCUPACION		PREGUNTAR:		
					¿Cuántos años de escuela ha completado? (escribir número, ninguno = 0)	¿Sabe leer y escribir? SI = 1 No = 2	¿A qué labor se dedica la mayor parte del tiempo?		¿Quién le atendió el parto de....?? Médico = 1 Enfermera o auxiliar = 2 Partera = 3 Otros = 4	¿Está embarazada? SI = 1 No = 2	¿Está dando de lactar? SI = 1 No = 2
	¿DÉ los nombres de cada una de las personas que componen este hogar? (empezando con el jefe del hogar).	¿Cuál es la relación de esta persona con el jefe del hogar? Hombre = 1 Mujer = 2		Años cumplidos.							
	VIVOS										
1											
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12											
	PARA LOS NIJOS MUERTOS			A QUÉ EDAD MURIO	DE QUE MURIO	RECIBIO ATENCION MEDICA.	<p>COMENTARIOS</p> <p>.....</p> <p>.....</p> <p>A criterio del encuestador cuan confiable es la entrevista.</p> <p>exedente <input type="checkbox"/> Bueno <input type="checkbox"/> Regular <input type="checkbox"/> Malo <input type="checkbox"/></p>				
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MINISTERIO DE SALUD PUBLICA
INSTITUTO NACIONAL DE INVESTIGACIONES
NUTRICIONALES Y MEDICO SOCIALES

PROYECTO NIVELES DE SALUD: CAYAMBE

FORMULARIO N° 3

UNIDADES PRODUCTIVAS

ENCUESTA SOCIO-ECONOMICA

PREG. N°	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS	
	Ubicación	Niveles de Salud Cayambe 04	04 1-2	
		Formulario 3 3	3 3	
		Parroquia: Cabecera <input type="checkbox"/> 1, Resto <input type="checkbox"/> 2 Cayambe <input type="checkbox"/> 1 Ascazubi <input type="checkbox"/> 2 Cangahua <input type="checkbox"/> 3 Olmedo <input type="checkbox"/> 4 Oton <input type="checkbox"/> 5 Sta. R. Cusubamba <input type="checkbox"/> 6		4-5
		N° de la Celda dentro de la Parroquia <input type="text"/>		6-7
		N° de UPA's en la Celda N° <input type="text"/>		8-9
		UPA N° <input type="text"/>		10-11
		Altura Metros sobre el nivel del mar <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mt.		12-14
1	Distancias:	- A la vía carrozable: <input type="text"/> <input type="text"/> Km.	15-16	
		- A la cabecera parroquial <input type="text"/> <input type="text"/> Km.	17-18	
		- A la cabecera cantonal <input type="text"/> <input type="text"/> Km.	19-20	
		TARJETA N° 1	1 21	
2	Entrevistador: Clasifique la unidad productiva, según las categorías adjuntas.	- Unidad productiva Agropecuaria <input type="checkbox"/> 1	22	
		- Unidad productiva Agropecuaria Industrial <input type="checkbox"/> 2		
		- Unidad productiva Artesanal <input type="checkbox"/> 3		
		- Unidad productiva Industrial <input type="checkbox"/> 4		
3	Forma de la Propiedad de la unidad productiva	- <u>Propiedad con título</u>	23	
		- Herencia <input type="checkbox"/> 1		
		- Compra <input type="checkbox"/> 2		
		- Adjudicación <input type="checkbox"/> 3		
		- Usufructuación sin título <input type="checkbox"/> 4		
		- Arrendamiento <input type="checkbox"/> 5		
		- Aparcería <input type="checkbox"/> 6		
	- Otro: <input type="checkbox"/> 7			
	Especifique _____ _____			

PREGUNTA	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
4	INSTRUMENTOS DE PRODUCCION: Qué equipo motorizado utiliza en la unidad productiva.	Equipo: _____ _____ _____ _____	24
5	Qué equipo motorizado, tiene que alquilar.	Equipo: _____ _____ _____	25
6	Qué equipo no motorizado utiliza en la U.P.	Equipo: _____ _____ _____	26
7	Que equipo no motorizado tiene que alquilar.	Equipo: _____ _____ _____	27
8	AUTOMOTORES La unidad productiva dispone de vehículos.	No <input type="checkbox"/> Si <input type="checkbox"/> Cuántos: Cuáles : _____ _____ _____ _____	28
9	AYUDA RECIBIDA Ha recibido algún tipo de ayuda técnica.	Si <input type="checkbox"/> No <input type="checkbox"/> → P. 12 NR <input type="checkbox"/>	30
10	Qué tipo de ayuda ha recibido.	Tipo de Ayuda _____ _____ _____	31
11	De qué entidad recibió esta ayuda.	Entidad: _____ _____ _____	32
12	Ha recibido algún préstamo para incrementar su negocio?.	Si <input type="checkbox"/> No <input type="checkbox"/> → P. 15 NR <input type="checkbox"/>	33

PREG. N°	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
13	Quién le hizo ese préstamo.	Quién: _____ _____	
14	En qué utilizó el préstamo?	_____	34
15	MANO DE OBRA Cuántas personas trabajan aquí? (UPA).	Total <input type="text"/> Familiars del dueño. <input type="text"/> Particulares <input type="text"/> (Si sólo son particulares pase a la pregunta N° 17)	35 36-37 38 39-40
16	De los familiares cuántos trabajan permanentemente y cuántos son ocasionales.	Permanentes N° <input type="text"/> Temporales N° 5-10 m. <input type="text"/> Temp. menos de 5 m. <input type="text"/>	41 42 43
17	De los particulares cuántos trabajan permanentemente y cuántos ocasionales?	Permanentes N° <input type="text"/> Mayores a 10 m. Temporales N° 5-10 m. <input type="text"/> Temp. menos de 5 m. N° <input type="text"/>	44 45 46
	Si la unidad productiva es ARTESANAL (código 3 en pregunta N° 3). Haga preguntas B a 20 caso contrario vaya a pregunta N° 21.		X
18	Qué tipo de taller	Tipo: _____ _____	
19	Qué produce	Producto: _____ _____	48
20	Cuál es la producción mensual.	Producción _____ mensual (pase a pregunta N° 28)	48 49
	Si la unidad productiva es INDUSTRIAL O AGRO INDUSTRIAL (código 2 o 4, en pregunta N° 2), haga las preguntas siguientes. En caso contrario pase a preg. 24		
21	Qué tipo de industria es	Tipo _____ _____	50

PREG. N°-	PREGUNTA	CODIGOS Y/O RESPUESTAS		COLUMNAS
22	Qué produce?.	Producto	_____	51
23	Cuál es la producción mensual?.	Producción	_____ mensual	52
Si la unidad productiva es agrícola o agroindustrial (codigo 1 y 2 en pregunta N° 2) continúe la entrevista, caso contrario vaya a a pregunta N° 28.				X
TARJETA N° 2				2 21
24	Tipo de Suelo (reconocimiento) (Llenar entre vistador).	Negro Andino <input type="checkbox"/> 1 Brunizen <input type="checkbox"/> 2 Pardo desértico. <input type="checkbox"/> 3 Regosoles <input type="checkbox"/> 4	Lito soles <input type="checkbox"/> 5 Negro Andino (Laterítico) <input type="checkbox"/> 6 Sirrozen <input type="checkbox"/> 7	22
25	Agua de riego	Abundante <input type="checkbox"/> 1 Moderada <input type="checkbox"/> 2	Escasa <input type="checkbox"/> 3 Ninguna <input type="checkbox"/> 4	23
26	Extensión de la UPA por orientación de productos	PRODUCTOS	HECTAREAS N° %	PRODUCTIVIDAD qqxHa. TOTAL PRODUCIDO.
		Trigo	24-26	27-28 24-28
		Cebada	29-30	31-32 29-32
		Papas	33-34	35-36 33-36
		Maíz	37-38	39-40 37-40
		Hortalizas	41-42	43-44 41-44
		Pastos	45-46	47-48 45-48
		Bosques	49-50	49-50
		Páramo	51-52	51-52
		Otros	Cuáles: _____	54
		Total	100%	55
NOTA: Para cuando se acabe la entrevista. Califique, cuán confiables son las respuestas de esta entrevista. Excelente <input type="checkbox"/> Buena <input type="checkbox"/> Regular <input type="checkbox"/> Mala <input type="checkbox"/>				X



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NUTRICIONALES Y MEDICO SOCIALES

PROYECTO NIVELES DE SALUD: CAYAMBE

FORMULARIO N° 4

JEFES DE FAMILIA

ENCUESTA SOCIO-ECONOMICA

N°-de PREGUNTA	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
	UBICACION E IDENTIFICACION	Niveles de Salud Cayambe 04	04 1-2
		Tipo de Formularios 4	4 3
		PARROQUIA: CABECERA: <input type="checkbox"/> 1 RESTO: <input type="checkbox"/> 2 Cayambe <input type="checkbox"/> 1 Ascázubi <input type="checkbox"/> 2 Cangahua <input type="checkbox"/> 3 Olmedo <input type="checkbox"/> 4 Oton <input type="checkbox"/> 5 Cusubamba <input type="checkbox"/> 6	4-5
		N° de la Celda <input type="text"/>	6-7
		N° de Encuesta en la Celda <input type="text"/>	8-9
		Tipo de Unidad Productiva <input type="text"/>	10-11
		Tarjeta N° 1	1 12
1		ENTREVISTADOR: Clasifique a la familia.	INDIGENA <input type="checkbox"/> 1 MESTIZO <input type="checkbox"/> 2
2	ENTREVISTADOR: De qué tipo es la comunidad?.	DISPERSO <input type="checkbox"/> 1 CASERIO <input type="checkbox"/> 2 PUEBLO <input type="checkbox"/> 3	14
3	Lugar de Nacimiento del Jefe de Familia.	PROVINCIA _____ CANTON _____ PARROQUIA _____	15-16 17 18
4	Ha vivido (el Jefe de familia) en esta parroquia todo el tiempo?.	SI <input type="checkbox"/> 1 → p 8 NO <input type="checkbox"/> 2 NR <input type="checkbox"/> 3	19
5	Qué tiempo lleva residiendo en esta parroquia?.	TIEMPO: Años _____ Meses _____	20

Nº DE PREG.	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
6	Antes de vivir en esta parroquia donde vivía Usted?.	PROVINCIA _____	21-22
		CANTON _____	23
		PARROQUIA _____	24
7	Por qué motivo se vino a vivir en esta parroquia?.	MOTIVO _____ _____	25
8	Cuál es su actividad económica principal?.	DEFINA _____ _____	26
9	A qué distancia de la casa se encuentra el lugar de trabajo habitual?	- Dentro de la misma casa <input type="checkbox"/> - En la misma propiedad <input type="checkbox"/> - Fuera de la propiedad:	27
10	Qué medio de transporte utiliza para trasladarse al lugar de trabajo?.	MEDIO: _____ _____	28
11	De cuántas horas es su jornada de trabajo?.	Nº DE HORAS _____	29
12	Además de su actividad principal, que otras actividades económicas realiza Usted?. Dígalas en orden de importancia.	1 _____ 2 _____ 3 _____ 4 _____	30-31
13	Empleo de fuerza de trabajo familiar, adicional.	Esposa Si <input type="checkbox"/> 1 No <input type="checkbox"/> 2	32
		Hijos <input type="checkbox"/> <input type="checkbox"/>	33-34
14	Cuántas hectáreas posee Usted?.	Nº _____ Cultivos _____ Mas * _____	35-36
		_____	37-38
15	De los siguientes animales, cuántos posee Usted?.	VACUNOS 41-42 <input type="checkbox"/> <input type="checkbox"/>	39-40
		CABALLAR 43-44 <input type="checkbox"/> <input type="checkbox"/>	
		PORCINO 45-46 <input type="checkbox"/> <input type="checkbox"/>	
		AVES 47-48 <input type="checkbox"/> <input type="checkbox"/>	
		CUYES 49-50 <input type="checkbox"/> <input type="checkbox"/>	41-50
16	Qué maquinarias posee Usted?.	MAQUINARIA _____ _____ _____	51

Nº DE PREG.	PREGUNTA	CODIGOS Y / O RESPUESTAS	COLUMNAS
17	Qué vehículos posee Usted?	VEHICULOS: _____ _____ _____	52
18	Qué instrumentos de trabajo posee Usted?	INSTRUMENTOS _____ _____ _____	53
19	Cuál es su ingreso mensual familiar por:	- Su actividad Económica principal S/. _____ - Por otras actividades S/. _____ - Por otros miembros de la familia S/. _____ TOTAL = _____	54
20	ENTREVISTADOR: Clasifique la vivienda en:	CHOZA 1 CASA A 2 CASA B 3 CASA C 4	55
21	Area de Construcción total (incluyendo todos los pisos).	_____ mts ²	56
22	SERVICIOS: Agua.	POTABLE <input type="checkbox"/> 1 ENTUBADO <input type="checkbox"/> 2 Vertiente <input type="checkbox"/> 2 Acequia/Río <input type="checkbox"/> 4 Pozo <input type="checkbox"/> 5 Otros <input type="checkbox"/> 6	57
23	Distancia al sitio de aprovisionamiento de agua.	_____ metros	58
24	CONTROL: de basuras	La entierra <input type="checkbox"/> 1 La quema <input type="checkbox"/> 2 Tira a la quebrada <input type="checkbox"/> 3 Bota al campo <input type="checkbox"/> 4 Preparación de abono <input type="checkbox"/> 5 Otros <input type="checkbox"/> 6	59
25	CONTROL: de Escretas	LETRINA <input type="checkbox"/> 1 CAMPO <input type="checkbox"/> 2 CANALIZACION <input type="checkbox"/> 3 Otro <input type="checkbox"/> 4	60

Nº DE PREG.	PREGUNTA	CODIGOS Y/O RESPUESTAS			COLUMNAS	
26	LUZ ELECTRICA	SI	<input type="checkbox"/> 1	NO	<input type="checkbox"/> 2	61
27	DISPONIBILIDAD DE SERVICIOS. 1. Dónde hace sus compras?	Sal, Panela, Manteca				
		Espermas, etc. LUGAR: _____			62	
		DISTANCIA: _____ Km.			63	
		FRECUENCIA: _____			64	
		ROPA: LUGAR: _____			65	
		DISTANCIA: _____ Km.			66	
		FRECUENCIA: _____			67	
28	Cuando Usted necesita los servicios de:----- -----Dónde los consigue?.	SERVICIOS DE LUGAR DISTANCIA FRECUENCIA				
		Médico	72	73	74	72-74
		Dentista	75	76	77	75-77
		Escuela	78	79		78-79
		Colegio	80		80	
		TARJETA Nº 2			2	
					12	
29	COMERCIALIZACION ¿Dónde vende sus productos?.	PRODUCTO LUGAR DISTANCIA				
		Ganado	_____	_____ Km.	13-14	
		Leche	_____	_____ Km.	15-16	
		Agrícolas	_____	_____ Km.	17-18	
		Industriales	_____	_____ Km.	19-20	
		Artesanales	_____	_____ Km.	21-22	
30	MEDIOS DE TRANSPORTE. A qué distancia de su casa, coge el carro?.	DISTANCIA: _____ metros			23	
31	Qué tipo de vehículo utiliza Usted con mayor frecuencia?.	TIPO: _____ _____			24	

Nº DE PREG.	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
32	A dónde acostumbra ir en carro y cuanto tiempo durará el viaje?.	A DONDE _____	25
		TIEMPO DE VIAJE _____	26
33	Cada que tiempo pasan los carros en los que Usted puede viajar?.	TIEMPO: _____	27
34	En qué transporta sus productos al sitio de venta?.	TIPO DE TRANSPORTE: _____	28
35	MEDIOS DE COMUNICACION Escucha Usted la radio?.	NO <input type="checkbox"/> 0 (Pasar a Pregunta 39) SI <input type="checkbox"/> 1	29
36	Qué emisoras escucha?.	_____ _____	30-31
37	A qué hora prefiere oír la radio?.	HORA _____ A.M. HORA _____ P.M.	32-33
38	Qué programa prefiere oír?.	PROGRAMA _____	34
39	Ven Ustedes Televisión?.	NO <input type="checkbox"/> 0 (Pasar a Pregunta 43) SI <input type="checkbox"/> 1	35
40	A qué hora prefiere ver?.	HORA _____ A.M.	36
		HORA _____ P.M.	37
41	Qué programa es el que más le gusta de la T.V.	PROGRAMA _____	38
42	Cuál es su canal preferido?.	CANAL: _____	39
43	Leen Ustedes el periódico?.	NO <input type="checkbox"/> 0 (Pasar a la Pregunta 46) SI <input type="checkbox"/> 1	40
44	Cada qué tiempo leen el periódico?.	TIEMPO _____	41
45	Qué es lo que más le gusta leer del periódico?.	_____	42
46	Lee revistas?.	NO <input type="checkbox"/> 0 (Pasar a la pregunta 49) SI <input type="checkbox"/> 1	43

Nº DE PREG.	PREGUNTA	CODIGOS Y/O RESPUESTAS	COLUMNAS
47	Cada qué tiempo lee revistas?.	_____	44
48	Qué revistas son las que más lee?.	REVISTAS _____ _____	45-46
49	Las gentes en las comunidades se reúnen para discutir sus problemas, en esta comunidad se han reunido alguna vez?	NO <input type="checkbox"/> 0 (Pasar a Pregunta 53) SI <input type="checkbox"/> 1	47
50	Quién promovió la reunión?.	_____ _____	48
51	Para qué se reunieron?.	MOTIVO _____ _____	49
52	En dónde se reunieron?.	LUGAR _____	50
53	Qué tipo de organización existe en la comunidad?.	ORGANIZACION _____ _____	51
// ENCUESTA A LA MUJER JEFE DEL HOGAR //			
54	Sra. Cuál es su edad en años cumplidos?.	EDAD <input type="text"/> <input type="text"/> AÑOS	52
55	Cuántos embarazos ha tenido Ud.?.	EMBARAZOS <input type="text"/> <input type="text"/>	53-54
56	Cuántos han nacido vivos?.	Nº <input type="text"/> <input type="text"/>	55
57	Cuántos le han nacido muertos?.	Nº <input type="text"/> <input type="text"/>	56
58	Cuántas (pérdidas, arros) abortos; ha tenido Ud.?.	Nº <input type="text"/> <input type="text"/>	57
59	Cuántos actualmente vivos tiene Ud.?.	Nº <input type="text"/> <input type="text"/>	58
60	Actualmente está embarazada?.	SI <input type="checkbox"/> NO <input type="checkbox"/>	59
61	Qué hace para no quedar embarazada?.	_____ _____	60



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PROYECTO NIVELES DE SALUD: CAYAMBE

CUESTIONARIO 5

CONOCIMIENTOS MEDICOS

NOMBRE

CASA Nº

CLASIFICACION SE

- 1 A dónde acude si alguien de su familia está enfermo? _____

- 2 A dónde más le podría llevar para tratamiento?. _____

- 3 Podría indicarme si conoce a personas campesinas que sepan curar algunas enfermedades? _____

NOMBRE

QUE TIPO DE ENFERMEDAD SABE CURAR

NOMBRE	QUE TIPO DE ENFERMEDAD SABE CURAR
_____	_____
_____	_____
_____	_____
_____	_____

- 4 Ha sido algún miembro de su familia atendido por una de estas personas en el último año?. Si No → Pase a pregunta Nº 12
- 5 Que tiempo esperó desde que llegó hasta que le atendieron?. _____

- 6 Cuánto gastó la familia para llegar a donde está esta persona (el agente)?.
- Transporte _____
 - Comida _____
 - Dormida _____
- 7 El trato que ha recibido de esta persona ha sido:
- muy amable 1
 - cordial 2
 - regular 3
 - algo despectivo 4
 - muy despectivo 5

8 El tratamiento que le ha dado, ha sido en base a:

9 Cómo le pagó por (trate de detallar la cantidad y forma de pago)

- sus servicios: _____

- sus remedios : _____

10 Considera ese pago:

SERVICIOS

REMEDIOS

- muy caro:

- adecuado:

- muy barato:

11 A qué momento puede Ud, recurrir por ayuda donde aquella persona? (Nota: se trata de averiguar la disponibilidad, días y horas de atención).

12 Podría indicarme si existen algunos médicos, en algún lugar cercano, a donde puede ir si alguien de su familia está enfermo? (Nota: indicar si es médico particular, o vinculado a un subcentro de salud, al Seguro Campesino, o al hospital, etc).

TIPO DE SERVICIO	LUGAR	UBICACION	HORARIO ATENCION	DIAS DE TRABAJO

13 Está afiliado al Seguro Campesino? Si No

14 Ha sido algún miembro de su familia atendido por algún médico en el último año? Si No → Pase a pregunta N° 18

15 El trato que ha recibido de este médico ha sido:

- muy amable

1

- cordial

2

- regular

3

- algo despectivo

4

- muy despectivo

5

16	Que tiempo esperó desde que llegó hasta que le atendieron? _____
17	Cuánto gastó su familia para llegar a donde este médico? - Transporte _____ - Comida _____ - Dormida _____
18	Cuál ha sido el tratamiento que le ha dado: _____
19	Le dió una receta? Sí <input type="checkbox"/> No <input type="checkbox"/> Pase a pregunta N° 20 Compró la receta? NO <input type="checkbox"/> PARCIAL <input type="checkbox"/> TOTAL <input type="checkbox"/>
20	Cómo le pagó por (trate de detallar la cantidad y forma de pago) - sus servicios: _____ - sus remedios : _____
21	Considera ese pago: <u>SERVICIOS</u> <u>REMEDIOS</u> - muy caro: <input type="checkbox"/> <input type="checkbox"/> - adecuado: <input type="checkbox"/> <input type="checkbox"/> - muy barato: <input type="checkbox"/> <input type="checkbox"/>
22	A qué momento puede Ud. recurrir por ayuda donde aquella persona? (Nota: se trata de averiguar la disponibilidad, días y horas de atención). _____ _____
	<u>Realizar las preguntas 18 y 19, sólo si respondió No a la pregunta N° 14</u>
23	Cuándo fue la última vez que fue a ver a un médico? . _____ _____
24	Cuáles son las razones por las que no han ido donde los doctores? . _____ _____ _____

25

Podría decirme, si los siguientes comentarios valen para los médicos y los curanderos: (Nota: pueden ser aplicados para uno de ellos o para ambos).
Responda Si o No.

	<u>CURANDEROS</u>	<u>MEDICOS</u>
- Permiten decirles exactamente cual es el problema	<input type="checkbox"/>	<input type="checkbox"/>
- Se apersonan en el problema	<input type="checkbox"/>	<input type="checkbox"/>
- Ponen gran interés en los sentimientos del paciente	<input type="checkbox"/>	<input type="checkbox"/>
- Le avisan lo que uno debe saber	<input type="checkbox"/>	<input type="checkbox"/>
- Puedo pagar lo que ellos me cobran	<input type="checkbox"/>	<input type="checkbox"/>
- Me cobran adecuadamente	<input type="checkbox"/>	<input type="checkbox"/>
- Examinan despacio para no cometer errores	<input type="checkbox"/>	<input type="checkbox"/>
- Son cuidadosos y amables al examinar	<input type="checkbox"/>	<input type="checkbox"/>
- Se comunican fácilmente con nosotros	<input type="checkbox"/>	<input type="checkbox"/>
- Comprenden lo que les queremos decir	<input type="checkbox"/>	<input type="checkbox"/>
- Están bien entrenados	<input type="checkbox"/>	<input type="checkbox"/>
- Tienen mucha experiencia	<input type="checkbox"/>	<input type="checkbox"/>
- Le dan el tratamiento correcto	<input type="checkbox"/>	<input type="checkbox"/>
- Se puede conseguir fácilmente el tratamiento que dan	<input type="checkbox"/>	<input type="checkbox"/>
- El costo del tratamiento está a mi alcance	<input type="checkbox"/>	<input type="checkbox"/>
- No me hacen sentir como que me dan caridad.	<input type="checkbox"/>	<input type="checkbox"/>



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Proy. Niveles de Salud
 de Cayambe

CUESTIONARIO 7

EXAMEN CLINICO

N.º DE I.R.L.G.	PREGUNTA	CODIGOS Y/O RESPUESTAS	CODIFICACION																						
1	UBICACION	Día en que se realiza la encuesta _____ _____ de _____ 1982 DIA MES Número de casa _____ Hora _____ Nombre de la localidad _____ Clasificación Socio-Económica _____	<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> </tr> </table>					1	2	3	4			5	6										
1	2	3	4																						
5	6																								
2	IDENTIFICACION INDIVIDUAL	Nombre _____ _____ SEXO Masculino <input type="checkbox"/> 1 Femenino <input type="checkbox"/> 2 EDAD <input type="text"/> años <input type="text"/> meses ALTURA <input type="text"/> cm. PESO <input type="text"/> Kg.	<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">7</td> </tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> </tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">13</td> <td style="text-align: center;">14</td> </tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">16</td> </tr> </table>		7					8	9	10	11				12	13	14			15	16		
7																									
8	9	10	11																						
12	13	14																							
15	16																								
3	ESTADO ACTUAL	ENFERMO <input type="checkbox"/> 1 SANO <input type="checkbox"/> 2	<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">17</td> </tr> </table>		17																				
17																									
4	APARIENCIA GENERAL	Excelente <input type="checkbox"/> 1 Buena <input type="checkbox"/> 2 Mala <input type="checkbox"/> 3	<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">18</td> </tr> </table>		18																				
18																									
	PIEL	Seborrea naso labial <input type="checkbox"/> Otro tipo de seborrea <input type="checkbox"/> Eritema <input type="checkbox"/> Pigmentación <input type="checkbox"/> Escabiosis <input type="checkbox"/> Acne <input type="checkbox"/> Piel agrietada <input type="checkbox"/> Petequias <input type="checkbox"/> Púrpura <input type="checkbox"/> Lesiones pelagrosas <input type="checkbox"/> Ictericia <input type="checkbox"/>	<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">19</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">20</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">21</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">22</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">23</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">24</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">25</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">26</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">27</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">28</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">29</td> </tr> </table>		19		20		21		22		23		24		25		26		27		28		29
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Nº DE PREC.	PREGUNTA	CODIGOS Y/O RESPUESTAS	CODIFICACION
14	CARDIOVASCULAR	P.A. _____ mm. Hg. Pulso _____ pulsaciones/minuto disnea <input type="checkbox"/> Auscultación normal <input type="checkbox"/> 1 anormal <input type="checkbox"/> 2 describa anomalía _____ _____	<input type="checkbox"/> 66 <input type="checkbox"/> 67 <input type="checkbox"/> 68 <input type="checkbox"/> 69
15	PULMONAR	Tos <input type="checkbox"/> Expectorcación <input type="checkbox"/> Cianosis <input type="checkbox"/> Auscultación normal <input type="checkbox"/> Anormales - estertores <input type="checkbox"/> - soplos <input type="checkbox"/>	<input type="checkbox"/> 70 <input type="checkbox"/> 71 <input type="checkbox"/> 72 <input type="checkbox"/> 73 <input type="checkbox"/> 74 <input type="checkbox"/> 75
6	ABDOMEN	Hepatomegalia <input type="checkbox"/> Esplenomegalia <input type="checkbox"/> Ascitis <input type="checkbox"/>	<input type="checkbox"/> 76 <input type="checkbox"/> 77 <input type="checkbox"/> 78
17	GENITO URINARIO	Trastornos de la micción <input type="checkbox"/>	<input type="checkbox"/> 79
18	EXTREMIDADES	Edema bilateral <input type="checkbox"/>	<input type="checkbox"/> 80
19	OTRA SIGNO-SINTOMATOLOGIA	_____ _____ _____	
20	AGRUPACION SINDROMICA	_____ _____ _____	
21	DIAGNOSTICO PRESUNTIVO	_____ _____ _____	
22	OBSERVACIONES Y COMENTARIOS	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____	



MINISTERIO DE SALUD PUBLICA
INSTITUTO NACIONAL DE INVESTIGACIONES
NUTRICIONALES Y MEDICO SOCIALES

Proy. Niveles de Salud: Cayambe

FICHA ANTROPOMETRICA

NOMBRE DEL NIÑO

NOMBRE DEL JEFE DE FAMILIA

COMUNIDAD

CASA N°

1	2	3	4

CLASIFICACION SE

5	6

FECHA DE NACIMIENTO

Edad en meses

7	8

DOCUMENTO PRESENTADO

- Partida de Nacimiento
- Partida de Bautizo
- Información Paterna
- Verificada

Estatura en cm.

9	10	11

Longitud en cm.

12	13	14

Peso en gramos

15	16	17	18	19

OTRO _____