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AGRICULTURAL SETTLEMENT AND DEVELOPMENT IN EASTERN NICARAGUA

by

James Robert Taylor, Jr.

At the time of this study the author was a project assistant with the Land Tenure Center. He is now assistant professor of economics at New Mexico State University.

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I. INTRODUCTION

The Setting

Agricultural colonization, under leadership and inducements offered by the national government, had been selected by Nicaragua as the principal means by which the problems of insufficient economic opportunity in agriculture for a growing population would be resolved. The Agrarian Institute of Nicaragua (IAN), a semi-autonomous government agency created to implement the Agrarian Reform Law of 1963, was interested in surveying the economic, social, and agronomic conditions in a 300,000 hectare area in Eastern Nicaragua which had been selected as the tentative site of an agricultural settlement and development project known as the Rigoberto Cabezas Project. The project envisaged the selection and location on farms of several thousand families from more populated parts of the country. The author worked along with IAN personnel on the survey of the site.

The selection of the Rigoberto Cabezas area for the first large scale regional settlement and development project was predicated on the assumption that large areas of unsettled public lands were available for directed settlement within the confines of the project area. In addition to government sponsored settlement, the project also called for the provision of land titles to persons already occupying land in the area (spontaneous or voluntary settlers), as well as their inclusion in economic development programs associated with the settlement project.

Early in the course of the field investigation it became apparent that the presumption with respect to the number of persons actually settled on farms in the project area was not accurate, and that in fact the area was virtually filled with incoming settlers and natives of the region. The significance of this finding was twofold. In the first place, it precluded or greatly reduced the possibility of selecting additional settlers from other areas of the country where land tenure problems were deemed to be most critical. In addition, by calling attention

to the magnitude of the voluntary migration movement it underlined the more immediate relevance to actual conditions in the Atlantic Region of those aspects of agrarian legislation and policy which deal with the role of the state in assisting spontaneous settlers who have located themselves and their families on the public domain.

The momentum of the push towards frontier areas in Nicaragua (and Central America in general) must be viewed as a fact of life which has altered the nature of the program alternatives faced by organizations and persons interested in improved economic opportunities on the land for the agricultural masses. For some time now, a debate has ensued about the relative merits of two alternatives: distributive type land reforms which would subdivide privately held lands, and the undertaking through government initiative of planned settlement projects on the sparsely populated national lands. The physical presence of thousands of settlers already on these lands attests to their having selected their own solution to their problems, namely migration without inducement of government planned and supported programs. Many more may follow in their footsteps. Out of the efforts of the settlers interacting with their physical, economic, and political environment, as well as among themselves, an economy takes shape. The question arises: Does the frontier economy, as it is or in the direction in which it seems to be moving, represent an effective solution to the problems that precipitated migration in the first place? If the answer is a negative one, an explanation is called for, and from the explanation a formulation of the manner by which the process of settling and developing public lands might be improved.

The importance of understanding the ongoing experience of undirected land settlement in the Atlantic Region of Nicaragua is underlined by the ecological differences between the humid tropics of the Atlantic Region and the rest of the country. The traditional agricultural food crops of Central America frequently cannot be grown with equal success over long periods of time in the humid regions because the excess humidity interferes with certain operations or because they expose the soil to the erosive and nutrient leaching effects of high precipitation. Under these conditions, the ability of agricultural settlers to adapt their habits of production to a new environment has important long run consequences.

In order to contribute to the basic orientation of agricultural development policy, this situation will have to be viewed with respect to a broader framework of alternatives, to include:

measures to increase employment and incomes in areas of agricultural outmigration, the expansion of urban employment, and the settlement of public lands under various forms of government participation. This study should contribute towards informed evaluation of these alternatives by providing economic data on the results obtained from unguided and unassisted settlement of national lands. Inferences from this data may be made with respect to the potential effect of measures designed to improve upon these results.

Spontaneous Settlement

The term "spontaneous settlement" has been used to define one end of a continuum with respect to public participation in the settlement and development of frontier areas. Pure spontaneous settlement implies the total absence of public services. At the other extreme, a broad array of services may be offered, such as: settler selection, financing the cost of migration, designation of settlement sites and farm size, land clearing, provision of titles to land, construction of roads and buildings, planning and financing of production and marketing, and others. While a given settlement pattern may be an intermediate between the two polar cases, the extremes are common. Many Latin American governments have planned and executed elaborate and costly colonization projects affecting relatively small numbers of colonists while simultaneously allowing the majority to depend almost entirely on their own efforts.

Hypothesis of the Study

The descriptive survey was initiated without an awareness that the area had developed to the point where substantial differentiation had occurred within the farm economy. Once the field work phase of the research was underway, time did not permit a detailed reformulation of the study. In addition, there is, to my knowledge, no secondary data on agricultural settlement in Nicaragua from which working hypotheses could have been deduced. Consequently, the questions and hypotheses with regard to the settlement-development process have been formulated in retrospect. The evidence brought to bear on some of the questions will not be as complete as would have been the case had there been greater foreknowledge of what was taking place.

The principal hypothesis is the following: the agricultural economy developed through spontaneous land settlement tends to evolve so as to reproduce the economic structure characteristic of the rest of the country. In the agricultural economy of the Central

American area, this structure has dualism as its salient characteristic, in essence a number of interrelated dichotomies such as: capital intensive versus labor intensive production methods, the latifundio-minifundio complex, legally defined versus customary tenure rights, modern versus primitive technologies, with little "spillover" to the traditional sector, and so on.

If this hypothesis is found to be correct it will suggest that the availability of additional land is not a sufficient condition for producing changes in the economic structure of dualistic economies; that old economic patterns follow the settlers as they relocate in another part of the country. The analysis is rather straightforward and simple up to this point. The next task, and probably the more difficult one, will be to explain why lower income groups do not make the transition to higher income levels when the physical land constraint existing in areas of outmigration is overcome. The role of a number of variables will be examined, such as the importance and availability of capital, access to market, security of expectations as affected by the land tenure system, education, and other factors. Only tentative explanations can be expected, subject to further research, refinement, and change, and ultimately to experimentation.

II. METHODOLOGY

Definition of Duality and Implications of the Results

Transitional economies generally contain two easily identifiable sectors, a capitalist sector, and a subsistence sector. The distinction made by W.A. Lewis, which will be followed here with several extensions, is that the one sector utilizes reproducible capital and the other does not.[1] This accounts for the greater output per unit of labor in the capitalist sector. In the Central American context, the use of reproducible capital is generally found in association with production of primary goods for export markets, whereas subsistence production is directed to the internal markets.

The capitalist-subsistence dichotomy based on the use of reproducible capital singles out the most proximate "cause" of higher productivity--the physical capital input. Another essential distinction is the degree to which each of the sectors is integrated with the total social system of which it is a part. As suggested by Professor Kenneth Parsons, a pure subsistence economy is capable of functioning independently of the state, the market, the formal educational system, and modern science and technology.[2] The capitalist sector, on the other hand, is intimately connected with and dependent upon the more inclusive social system. The concept of the pure subsistence economy, though a limiting rather than a definitive term, is not without contemporary examples. The shifting cultivation carried out under a dispersed settlement pattern in the jungles of tropical Central America fits the concept rather closely.

Another important qualification to the duality hypothesis is that the capitalist and subsistence sectors do not necessarily behave independently of one another. At best, there may be a harmonious relation between the two, with the growing capitalist sector

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[1] W.A. Lewis, "Economic Development With Unlimited Supplies of Labor," reprinted in A.N. Agarwala and S.P. Singh (eds.), The Economics of Underdevelopment (New York: Oxford University Press, 1963), p. 407.

[2] From lecture notes, Economics 474, University of Wisconsin, Spring Semester, 1968.

absorbing redundant labor from the subsistence sector in addition to providing a market for the products of the latter, particularly food products. The contrasting situation is one in which one sector grows at the expense of the other, displacing and impoverishing it, as when lands cultivated by subsistence cultivators are usurped for developing plantation agriculture, or cottage industry is eliminated by machine manufacture. Myint recognized a more subtle form of exploiting the subsistence sector--the policy of discouraging or neglecting the development of peasant cash production as a means of implementing the cheap labor policy.[3]

Since the capacity of one group to inflict losses upon the other is theoretically subject to control by the powers of the state, the actual relation between the sectors must be perceived in the context of how the government responds to economic change characterized by conflicting rather than mutual interests. This point of view sees policy as a variable. By way of contrast writers concerned with divergent standards of living within Latin America commonly characterize the areas' governments as the willing partners of privileged minority interests, and conceive of the situation as the outcome of private ownership of capital rather than as a general problem in the creation of responsible government. This view, which is easy to sympathize with if the analysis is restricted to Latin America, is implicit in Rodolfo Stavenhagen's proposal that the term "dual societies" be rejected in favor of describing the situation in terms of "internal colonialism."[4]

The duality concept is not intended simply as a descriptive device. By identifying the forms of capital associated with differential economic performance, inferences may be made with respect to the possibility of expanding the stock of productive capital so as to embrace the subsistence sector. For example, variable economic performance may be due to the degree of use of specific forms of working capital which embody innovations that effect the biological

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[3]Hla Myint, The Economies of the Developing Countries (New York: Frederick A. Praeger, Inc., 1965), p. 61.

[4]Rodolfo Stavenhagen, "Seven Fallacies About Latin America," in J. Petras and M. Zeitlin (eds.), Latin America--Reform or Revolution (New York: Fawcett Publications, Inc., 1968), p. 18.

productivity of natural resources. Such a finding would suggest the beneficial results to be obtained from inducing the subsistence sector to utilize these inputs by disseminating knowledge regarding their use and results, and making them available through the provision of credit. Another possibility is that the relevant form of reproducible capital is social overhead capital in the form of roads. Evidence that the stragegic variable influencing the level of labor productivity is proximity of a road which facilitates the flow of goods to market would suggest the extension or improvement of the system of penetration roads. If, however, the use of capitalist or subsistence type production techniques is contingent upon a relatively unalterable difference in the quality of natural resources (as between lateritic and alluvial soils), the dual productive pattern may not be susceptible to modification. In general, any form of capital whose use is associated with relatively high levels of labor productivity will be evaluated, insofar as possible, for its potential use by the subsistence sector.

Research findings related to possible improvement of the productivity of human resources in the area covered by this study should also contribute to the broad question of the potential role of future land settlement in the economic development of Nicaragua, insofar as the Rama situation is typical of the Atlantic Region as a whole.

Testing the Hypothesis

The hypothesis will be tested by determining whether the actual situation in the area studied conforms to the conceptual model of the dual economy just described. The distribution and dispersion of data on income and productivity levels will be examined, as well as the degree of association between output per capita and the use of reproducible capital. Acceptance of the duality hypothesis would follow from finding low labor productivity and low capital investment on the majority of the farms, and relatively high levels of both on a minority of the units, the "islands" of capitalism. If this is found to be the case, the integrational aspects of dualism will be taken up. This will involve seeing whether or not the division of the farms according to productivity and capital also differentiates them according to use of the services of the state, the operator's educational attainment, participation in the market economy, and the use of "improved" technologies.

Some evidence has been gathered with respect to the type of relationship which exists between the capital using and subsistence sectors in the area studied. The data which bears on this question

is in the form of the absorption of labor by capital intensive enterprises and competition between the sectors for land, including the manner in which conflicting claims are handled.

An important consideration in testing the duality hypothesis is the evolution of subsistence units over time. Multisector models derived from the classical assumption generally do not deal with the transformation of the subsistence economy per se. Insofar as intersectoral relations are concerned, they conceive of development as the absorption of labor into the capitalist sector. The presumption is that development proceeds from an increased rate of savings by an already existing capitalist class, and that the capital goods created through saving are used in association with labor which is bid out of the subsistence sector. By assuming this to be true one would overlook the possibility that subsistence cultivators may capitalize their farms, drawing on savings from production carried out under traditional production techniques. If this actually occurs, the amount of capital invested on a particular unit would be a function of time rather than a reflection of basic social differences between groups of producers. The data will be examined to test this relationship.

Sources and Handling of Data

Most of the data presented in this study was collected through field interviews conducted in the project area by Nicaraguan agronomists. The author participated in the field work by carrying out supplementary informal interviews and supervising the formal interviews for which a questionnaire was utilized.

An initial difficulty in getting the field work under way was the lack of reliable population estimates. It had been presumed that about 1,000 farms were located in the area, and that they were situated for the most part within a few kilometers of the Rama Road. While pretesting the questionnaire we were assured by many local people that settlers had penetrated the jungles even beyond the limits of the project area, suggesting a need for a better estimate of the number of farms. The basis for this new estimate was the records of the malaria control agency (Servicio Nacional de Erradicación de Malaria), which showed the number of homes within the study area that the agency had visited in January 1965. This information was used for estimating the number of farms by using a ratio of farms to homes derived from the 1963 census. (Note that the census was relied upon for estimating the proportion of farms to homes, but not for an accurate count of the population. The census

grossly underestimates the area's population.) The resulting figure was four thousand farms. A separate estimate was made after the field work was terminated; the total area of 300,000 hectares was divided by the average farm size as estimated in this study. This division gave a figure of 4,214 farms, which is reasonably close to the calculation made on the basis of the information provided by the malaria control agency.

A sample of 272 units was covered by interviews, about 7 percent of the total number of farms. This was the maximum number of interviews that could be carried out before the beginning of the rainy season during which time travel within the area is severely restricted.

The sample was obtained through a combination of probability and nonprobability sampling. While working in the proximity of the highway it was possible to take a simple random sample. This was not the practical thing to do while working in places where it was not possible to use a vehicle, as too much time would have been lost in travel. The solution in the isolated areas was to interview only in those comarcas (townships) in which a rural chapel was located. Catholic missionaries had established a series of small chapels throughout the area, which they visit twice a year. Each chapel serves several comarcas. The chapels are well distributed geographically and are interconnected by foot paths which are kept clear for the priests and other travelers. It was decided to visit every comarca in which a chapel was located, and to take a random sample of farms within the chapel-comarca. The size of the sample in each chapel-comarca was based on the total population of all the comarcas served by the chapel. This is similar to cluster sampling, except that the clusters were not randomly chosen.

The extent to which the above procedure gives the results that would be obtained had a random sample been taken in every comarca depends on whether or not the chapel-comarcas are representative of the rest. My judgment is that they are quite typical; this conclusion is based on travel, usually on foot, throughout many of the comarcas in which chapels are not located. The impression received is that the entire area in which combined probability and nonprobability sampling was employed shows relatively small differentiation in the type of farm units as compared to the area bordering on the highway where a purely random sample was obtained.

One indication of the representativeness of the sample is obtained by comparing farm size as estimated by census data and as derived from this study. The figures are quite close, being 110 and 103 manzanas respectively. (Comparison with the census data

presumes that while the census coverage was not complete, it was sufficient for obtaining an accurate estimate of farm size.)

Most of the data that was obtained is presented in tabular form, using both frequency distributions and cross tabulations. In some cases regression and correlation coefficients were calculated. In general, the relationship between variables is so clear that tests of statistical significance were not made.

III. THE POSTWAR AGRICULTURAL ECONOMY OF NICARAGUA

This section will describe certain postwar changes in the Nicaraguan economy for perspective against which to understand the significance of the decision to develop the frontier regions of the country. Emphasis is given to the simultaneous rapid growth of per capita incomes, generated primarily by the agricultural sector and the emergence of agrarian reform as a political issue.

Background

Nicaragua is the largest and least densely populated of the five Central American republics. It lies entirely within the tropical zone, encompassing an area of approximately 130,000 square kilometers, or about 12 million hectares. The population in 1963 was about 1.5 million persons, and is presently growing at about 3 percent per year. At this rate, the total population will reach 2 million by 1972.

Approximately 60 percent of the population has been classified as rural, and 40 percent urban.[5] The census classified as rural those persons not living in departmental or municipal capitals, in towns with a population greater than 1,000 persons, or in those localities where the predominant economic activity is nonagricultural. It is difficult to say whether or not this criteria accurately indicates the proportion of the labor force which is engaged in agricultural occupations. On the one hand, the smaller communities classified as rural always have a number of persons working in nonagricultural occupations (petty merchants, craftsmen, agricultural buyers, etc.). On the other, the larger communities classified as urban contain many individuals who work as agricultural laborers, particularly during the coffee and cotton harvests.

About one-third of the rural labor force (considered to be males over 10 years of age living in rural areas) was classified by the census as literate. This figure probably overestimates the literacy of the agricultural labor force as it includes persons still attending school and rural inhabitants engaged in a nonagricultural occupation.

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[5]Dirección General de Estadística y Censos, Censos Nacionales 1963--Población (Managua, Nicaragua, 1966).

As frequent reference will be made to the various geographical regions of Nicaragua, it will be useful to outline their characteristics at this point. It must be borne in mind that the departmental boundaries do not correspond precisely to the limits of geographical zones, that the change in natural features is often gradual rather than abrupt, and that there are important variations within each region.

The Pacific Region

This region is an area of coastal plains and volcanic mountains covering about 15 percent of the land area of Nicaragua and one-third of the area in farms. The national census indicates that this region has the highest population density and has 56 percent of the total population of the country. Largely because the national capital, Managua, is located in the Pacific Region, only 43 percent of the population lives in a rural setting, compared to about 80 percent in the rest of the country.

In Managua, the temperature averages about 83 degrees F. with little variation throughout the year.[6] There are rainy (invierno or winter) and dry (verano or summer) seasons of roughly equal duration. Variation in precipitation during the rainy season causes wide swings in crop yields.

Of the total land area in Nicaragua classified as "most productive soils suitable for intensive use, adapted to production of annual crops and pastures employing simple conservation methods," about three-quarters is located in the Pacific Region.[7] These soils are mainly of volcanic origin.

Within the area are found the Managua-Carazo uplands. The cooler climate of the uplands and the productivity of the soils combine to make it an important center of coffee production.

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[6] International Bank for Reconstruction and Development, The Economic Development of Nicaragua (Baltimore: The Johns Hopkins Press, 1952), p. 282.

[7] Charles P. Butler, Adjusting Nicaragua's Agriculture to Changing Conditions (Washington, D.C.: U.S. Department of Agriculture and the Agency for International Development, March 1966), p. 4.

The Atlantic Region

The Atlantic Region (departments of Zelaya and Rio San Juan) covers more than one-half of the area of the country, but has only 7 percent of the population and 9 percent of the area in farms.

The salient natural characteristic of the Atlantic Zone is the prolonged rainy season. The "dry" season lasts for about three months, but unlike the rest of the country there is usually some precipitation during this season, enough so that the cattle always have green pastures and, not infrequently, so much that it interferes with land preparation ("slash and burn;" plowing is rarely attempted) and the harvesting of certain crops.

The soils of the region have not been mapped, but it is believed that most of the area has lateritic soils typical of tropical rainforests the world over. More productive and durable alluvial soils are found along the river systems which flow towards the Atlantic Ocean. Natives of the Eastern Region generally farm and make their homes on the banks of the rivers, which were until recent times the only communication routes.

The Central and Northern Region

This region contains about 37 percent of the population, one-third of the area of the country, and 53 percent of the area in farms. Eighty-two percent of the population resides in rural areas.

Geologically, the area is a continuation of the highlands of Honduras, with altitudes of from 1,500 to 5,000 feet in most of the area, but gradually sloping down towards sea level in the southerly departments of Boaco and Chontales.

A contrast to the level, deep volcanic soils of the Pacific Region and its capital intensive export agriculture, agriculture and grazing in the Central Region are frequently carried out on steep slopes with shallow topsoils formed from granite and metamorphic rock. Reforestation projects have been recommended in some of the areas presently supporting subsistence agriculture.

The seasonal distribution of rainfall is similar to that of the Pacific Region, with a slightly longer rainy season (about seven months). The temperature is cooler than along the coast, decreasing by an estimated three degrees F. for every thousand foot increase in elevation.[8] A lot of coffee is grown in the departments of Matagalpa

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[8] International Bank for Reconstruction and Development, op. cit., p. 285.

and Jinotega, on rougher topography and poorer soils than found in the Managua-Carazo uplands.

Postwar Economic Trends

Historically, Nicaragua has been one of the truly poor Latin American republics. In terms of natural resources, however, it is frequently alleged that the country is wealthy. In 1953, a mission from the International Bank for Reconstruction and Development reported that:

> From its nearly year-long travel in the country, the mission concluded that few underdeveloped countries have so great a physical potential for growth and economic development as does Nicaragua. In area this is the largest country in Central America. In relation to its present population, it has almost unlimited land for development. The land can grow nearly every tropical crop and many nontropical crops.[9]

Growth of national income in the postwar period suggests that the physical potential is being exploited. Per capita income more than doubled in the two decade period, 1945 to 1965, increasing from U.S. $157 to $321.[10] This period has not been one of continuous growth, however. From 1945 to 1955, per capita incomes rose from $157 to $245.[11] The 1955-60 period saw a slight decline in per capita incomes (an average of six-tenths of a percent per year).[12] There was an increase in GNP during this period, but it was outpaced by population which grew at a rate of about 3 percent. The first half of the sixties saw a return to rapid growth in per

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[9] Ibid., p. 3.

[10] Banco Central de Nicaragua, Informe Anual de 1961 and Informe Anual de 1966 (Managua, Nicaragua: 1962 and 1967), p. 56 (1961) and p. 114 (1966).

[11] Ibid., p. 56 (1961).

[12] Comité ad hoc, Evaluación del Plan Nacional de Desarrollo Economico y Social de Nicaragua, 1965-1969 (Comité de los Nueve, Alianza Para el Progreso, August 1966), p. 14.

capita income, with GNP increasing at the rate of 9 percent per year, leaving a net gain of 6 percent per person after adjusting for population growth.[13]

The principal source of economic growth in the postwar period has been the agricultural export sector. Over half of the increase in GNP during the 1960-65 period is accounted for by an increase in the value of exports.[14] Of the total increase in the value of exports during this same period, two-thirds is accounted for by a single crop--cotton.[15] By 1965 the value of cotton and cotton derived (oil, cotton seed) products had risen to over 10 percent of the value of gross national product. The value of cotton exports for this same year exceeded the total value of all exports prior to 1962, with the exception of 1955.[16] Prior to the rapid postwar increase of cotton production the two principal export products were coffee and gold. The value of the production of these two commodities has remained relatively stable in recent years. The value of cattle and beef exports has increased from $1.3 million to $10 million over the decade 1955 to 1965, making this the third most important export commodity at present.[17]

The social effects of this development, and what it portends for the future are frequently viewed with skepticism. Some of the arguments are as follows: 1) the production of food for internal

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[13]United Nations Economic and Social Council, Economic Commission for Latin America, Economic Survey of Latin America 1965 (New York: United Nations, 1967), p. 192.

[14]Banco Central de Nicaragua, Informe Anual de 1961 and Informe Anual de 1966 (Managua, Nicaragua), p. 71 (1961) and p. 200 (1966).

[15]Ibid., p. 75 (1961) and p. 210 (1966).

[16]Departamento de Estudios Económicos, "La Economía Nacional y el Algodón" (unpublished report of the Comisión Nacional de Algodón, 1968, on file at the Land Tenure Center Library, University of Wisconsin), Chapter 1, p. 7.

[17]Banco Central de Nicaragua, op. cit., p. 71 (1961) and p. 207 (1966).

markets has deteriorated as the nation's development efforts, both private and public, have been concentrated on cotton; 2) extreme disparities in income levels, changes in tenure status, and technological unemployment, all adversely affecting the "peasant" sector, have resulted from the cotton boom; 3) dependence on a single export product for economic prosperity often has disastrous consequences, through the effect of substitution by synthetics, oversupply as new competitors enter the field, and the whiplash effect of worldwide economic recessions on primary producing economies.

The third argument is founded upon many historical examples, and will not be pursued here, except to mention that the forecast generally predicted for cotton prices is bleak. The effect of the growth of cotton production on the structure of the internal economy will be discussed below, starting with its effect on the production of food for internal consumption.

Over 95 percent of the area devoted to cotton production is located in the Pacific Region of Nicaragua, particularly in the departments of Leon and Chinandega where the largest continuous area of agricultural land suited to annual intensive cultivation is found. Before the intrusion of cotton, this region was known as the granero (granary) of Nicaragua, producing a variety of food crops for domestic consumption, including corn, beans, rice, plantain, manioc, and others. A comparison of the two latest agricultural censuses shows that over the period 1952 to 1962, the total area dedicated to crops (excludes pasture) in the Pacific Region increased by a mere 1 percent, from 356,408 to 360,584 manzanas (one manzana is equal to 1.7 acres). In the same period the area dedicated to cotton increased from 53,070 to 133,148 manzanas. Part of the land utilized for cotton was formerly used for sesame, a crop grown almost exclusively for export. There were an average of 30,000 manzanas in sesame during the period 1950-55, which dropped to an average of 13,000 manzanas in 1960-65. The remainder of the land shifted over to cotton, some 60,000 manzanas, had been mainly in food crops for the domestic market. In Leon and Chinandega alone, the area in rice, corn, and beans, the principal staples of the Nicaraguan diet, decreased by 30,000 manzanas over the intercensal period.

Thus, a decrease in the land resources dedicated to food production in the Pacific Region was a large part of the opportunity cost of the expansion of cotton production. This is true, however, only in the Pacific Region. While the census figures show the cultivated area to have remained constant in the Pacific Region over the intercensal period, there was an increase of 146,000 manzanas for the Central and to a lesser extent the Atlantic Regions. The increase in the cultivated area in these regions exceeded their

population growth, allowing a marketable surplus to be shipped to the more populated and urbanized Pacific Region. The orientation of production in the Pacific Region towards export markets undoubtedly provided a stimulus to agriculture in the rest of the country.

The expansion in the cultivated area dedicated to food crops has not been of sufficient magnitude to compensate for the rapid rate at which population has been growing. The figures below show the percentages by which the area and production of rice, corn, and beans have grown over the period 1952-54 to 1962-64, during which population grew by about one-third.[18]

Percent Change, 1952-54 to 1962-64

Crop	Production	Area
Corn	17	25
Beans	5	17
Rice	12	-5

In the case of corn and beans, production increased by a lesser proportion than did the area of land used for these two crops, suggesting a decrease in average yields due to the poorer quality of land at the extensive margin. Rice production grew despite a slightly decreased land area, probably reflecting the development of irrigated-mechanized rice farming in the Lake Nicaragua area rather than a general increase in rice yields. An important reason for the sluggishness of the domestic agricultural sector is the primitive technology which is still employed for these crops. To meet her consumption needs, Nicaragua has had to resort to importing basic grains, dairy products, and other foodstuffs. In contrast, the technology utilized for cotton production helped increase yields 290 percent over the decade 1952-54 to 1962-64 with only a 118 percent increase in cotton acreage.[19]

From the above, it would seem that agricultural development efforts should aim towards increasing yields of food crops, not only for Nicaragua's needs, but also for neighboring Central American countries facing deficit food production in addition to having greater population pressures on land resources than Nicaragua.

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[18] From unpublished data of the National Planning Office (Oficina de Planificación) of Nicaragua.

[19] Ibid.

There are programs under way in Nicaragua to attain just this goal, such as the new supervised credit program, and the organization of regional agricultural service centers designed to provide productive, storage, and marketing services to smaller farmers. These programs will undoubtedly yield good results; nevertheless, there are certain limitations to be taken into account. For one thing, much of the land now dedicated to producing for the internal market is marginal land of doubtful capacity to sustain continued cultivation for very long. Reforestation projects have been recommended for some of the areas of subsistence farming in Central Nicaragua. Another limitation is the fact that a substantial part of the grain crop is grown each year on lands in the process of being converted from forest to permanent pasture. Once the pasture has been established, the land generally does not revert to cultivated crops. New lands cleared for agricultural use are located in frontier areas which, as time passes, are further and further away from markets. Much of the corn crop in the pioneer areas is used to fatten hogs because of the high cost of marketing the grain in its original form.

Perhaps the price of cotton will fall enough so that the best agricultural lands of the Pacific Region will again produce food crops for the Central American market. If so, the traditional role of the small farmer in producing for the internal market may be taken over by the large producers now growing cotton, who have a heavy fixed investment in machinery and a knowledge of modern agricultural techniques which may be transferred to other crops. (At least one of the large international development-type banks is already planning to assist cotton producers make the transition to modernized corn production in the event that the cotton market worsens.)

Stagnation in production for the domestic market would not in itself be sufficient grounds for criticizing the postwar economic changes, led by cotton, in view of the substantial gains that have been recorded. The other argument, and the more serious one, has to do with the effect on income distribution, employment levels, and tenure status. These assertions have never been systematically studied, and it is necessary to turn to indirect evidence and the observations of informed persons for an idea of what actually occurred. With respect to income levels and distribution, it is improbable that those at the bottom of the socio-economic ladder have realized much of an improvement (farm laborers, minifundistas). Agricultural wages in Nicaragua are only about $1 per day, and there is seasonal unemployment during the months when cotton and coffee are not being harvested. The level of real wages could not have been far below this at any time. At the other extreme, great fortunes have been made by cotton producers. Land concentration

is greatest in the Pacific Region, with 1.6 percent of the farms occupying 55.8 percent of the land in farms.[20]

There is no reason to expect that the standard of living of everyone should be improved during the early stages of economic growth. Indeed, some degree of concentration is often favorable to capital formation. However, the criticism of the rapid development of export agriculture in the postwar period is not limited to the unequal distribution of the benefits of economic growth. The claim is also made that technological unemployment has occurred, resulting in the displacement of workers who had enjoyed access to employment and land prior to the cotton transformation. Former President Luis Somoza told an audience attending a symposium on agrarian reform that:

> By 1955, there was plainly established in our country the social and economic problem being created in the agricultural sector, with the accelerated mechanization and extension of crops. The colonial structure of the country was disappearing and the country was entering a period of rapid agricultural development, encouraged by mechanization and by the improvement of the productivity of the two basic crops, coffee and cotton. This brought about as a consequence a violent displacement of the campesinos who traditionally worked the lands in periods of unemployment. Before my eyes I saw lands cleared and many people leave, permanent workers, sharecroppers, and squatters--by the force of the plow and machinery.[21]

Implied in the above argument is not merely the interpretation that labor was displaced, but that persons who had obtained land use rights through the traditional pre-export tenure system were deprived of that opportunity as landowners and investors took a more direct interest in agriculture, having been attracted by

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[20] Dirección General de Estadística y Censos, Censos Nacionales 1963--Agropecuario (Managua, Nicaragua, 1966).

[21] Luis A. Somoza, "Origen, Aplicación y Problemas de la Ley de Reforma Agraria," in Memoria, 10 de Julio de 1964-31 de Diciembre de 1965 (Managua: Instituto Agrario de Nicaragua, 1967).

cotton profits. One of the most knowledgeable individuals on the subject of agrarian problems in Nicaragua has summed up the impact of the cotton development on the campesino sector as un desalojo--an eviction. These opinions cannot in and of themselves be taken as evidence of a conclusive nature. They are, however, supported by a number of historical parallels which suggest the following generalization or hypothesis: when agricultural societies with class and power relationships resembling those of feudalism are opened to profitable trade with industrialized countries or regions, the economic situation of peasant cultivators suffers a reversal.

Some of the changes occurring in Nicaragua and other Central American countries have disposed me to believe that a general phenomenon is involved, namely the adverse effects on large groups of people of economic changes that raise potential profits in agrarian societies whose tenure-power structure permits a minority to arbitrarily redefine the economic status of the rest of the members of the society. Whether this has occurred in Nicaragua, and if so to what degree, we cannot say with any assurance. Claims that there are labor shortages during the cotton harvest, which has necessitated the import of machine pickers, may indicate that things are not as bad as they could be. Nevertheless, it is such an "exploitation" interpretation of the postwar changes in the agricultural sector that convinces people of the need for agrarian reforms. It is widely believed that "the rich are getting richer and the poor, poorer" as a result of recent economic development in Nicaragua.

Agrarian Reform

By the late 1950s agrarian reform had become a political issue in Nicaragua. The issue gave the Conservative Party, the opposition to the Somoza dominated Liberal Party, a chance to enlarge its popular base.[22] In 1957 and again in 1958, conservative deputy Julio Ycaza Tigerino presented Congress with an agrarian reform bill. The Ycaza Tigerino bill was not passed; however, the government submitted an agrarian reform law of its own, which was passed in 1963. In the interim Nicaragua had experienced an economic recession due to falling cotton prices, the invasion of private properties by organized groups of campesinos, and the encouragement given to agrarian reform by the Alliance for Progress.

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[22] Terry McCoy, "Agrarian Reform as a Political Issue in Nicaragua" (unpublished paper at the Land Tenure Center Library, University of Wisconsin, 1964), p. 5.

The Agrarian Reform Law calls for an equitable distribution of the cultivable area and its income, as well as increases in production, so as to raise the standard of living of the campesino masses. While this would seem to imply a redistribution of privately held lands, policy makers had determined that reform could be most effectively implemented through the settlement and development of public lands under the direction of the national government.

The first attempt by the Nicaraguan government to bring about agrarian reform through vast projects of colonization and regional development was to be the "Rigoberto Cabezas Project," located in the municipio of Rama, departamento of Zelaya. This project envisioned providing land to an estimated 3,500 induced settlers, and land titles to some 1,000 farmers thought to be actually settled in the area. Both groups were to be subjects of economic development programs, financed by international credit agencies as well as the government of Nicaragua. In addition to providing economic opportunities to the settlers, it was anticipated that the project area would supply food products to the internal market, alleviating the shortages brought about by transformation of the Pacific area to an export producing economy. The original site designated for the project was the object of this study. The characteristics affecting its potential for agricultural production are outlined in a subsequent section.

IV. MIGRATION TO RAMA AREA

This section seeks to explain the population shift to the department of Zelaya of relatively large numbers of agriculturally employed persons. The explanation should serve as a basis for predicting future migration. Also, by providing information on social and economic problems in areas of out-migration, additional evidence is brought to bear on some of the statements made on the nature of Nicaraguan economic development in the postwar period.

The Atlantic Region was not vacant prior to the migration described here. However, it was not until after World War II that Spanish-speaking Nicaraguans seeking new lands for farming entered the humid tropical lowlands in significant numbers.

The sources of information presented include primary data from settlers who were interviewed, census data on land use and population, and recently published geographic studies. Also useful were discussions with agricultural technicians familiar with conditions in areas of out-migration, and personal trips to these areas.

Geographical Origin of the Settlers

Most of the discussion on the Nicaraguan economy emphasized developments in the densely populated Pacific Region, particularly the pressures to which the traditional agricultural system had been subjected. Out-migration to frontier areas would seem to be one type of reaction to these circumstances.

In the case of the Rama area, by far the smallest proportion of the settlers surveyed came from the Pacific Region, only 3 percent. Almost one-fourth were born in the Atlantic Region, mainly the municipio of Rama where the survey was taken. The persons born and presently living in the area are not members of the indigenous tribes of Eastern Nicaragua. They are Spanish speaking, and may be descendants of settlers who migrated eastward years ago to work in the mines and on the banana plantations, to gather rubber and ipecac growing in a natural state, or to cut valuable timber. Slightly less than three-quarters are natives of the Central Region. Over half of the migrants interviewed came from the department of Chontales. This is not the most populated of the departments of the Central Region, but it is the closest to the municipio of Rama, which forms the eastern boundary of most of the department of Chontales. The number of migrants from other departments of the Central Region diminishes with distance from the study area.

Another survey also carried out in the municipio of Rama, but to the south of the area covered by this study showed 9.5 percent natives of the Atlantic Region, 3.7 percent from the Pacific, and 86.8 percent from the Central Region.[23] The lower number of natives of the Atlantic Region in this area is probably because it has fewer navigable rivers.

The municipio of Rama is not, then, being populated by migrants from the area of greatest population density and assumed agrarian problems, but is instead being settled through an eastward push emanating from neighboring departments of the Central Zone.

The scant migration towards the Atlantic from the Pacific may not be attributable solely to distance. (Actually the departments of Estelí and Matagalpa, each of which contributed more migrants to the sample than the entire Pacific Region, are further from Rama than some of the most crowded departments of the Pacific Region.) The Rama road provides excellent access to the Atlantic Region from the Pacific. Consideration should also be given to the difference in the cultural and physical landscapes of the two regions. The campesino of the western part of the country is never very far from roads and communities (in which he may live if he does not possess his own agriculture property). He may be classified as more a semi-urbanite than a countryman. By contrast, much of the Atlantic Region is still virgin jungle. The settlement is dispersed, and travel for even short distances is impeded by the condition of the roads. The ox-drawn cart cannot be used extensively for transport as the roads are inadequate. Agricultural products are carried to market by pack animals (horses and mules), or on a campesino's back. The plow, used for land preparation in the Pacific Region, is almost never used in the rainforest area.

Out-migration from the Central Region involves a much less abrupt change. The change in climate and vegetation occurs rather gradually as one leaves this zone and goes east. The people are accustomed to living in a dispersed settlement pattern. Shifting agriculture is practiced, rather than plowing, with the exception of a few level and fertile valleys, such as the Valley of Sébaco.

At the outset of the study, when it was mistakenly believed that the majority of the settlers would be migrants from the Pacific Coast, it was hypothesized that they would be earning higher incomes than natives of the area because they migrated from a region where substantial modernization of agriculture had occurred, whereas those

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[23] Unpublished data from Instituto Agrario de Nicaragua.

born in Rama had only known primitive shifting agriculture and had been until recently out of contact with the market economy. This last assumption was also mistaken. In conversations, some of the natives of the area recalled the pre-World War II days when they worked on the banana plantations, or grew their own bananas and sold them to the fruit company. Some produced food products for consumption of workers on the banana plantations. The data which was obtained relating income level with the farm operators' geographic origin is shown in Table I.

Table I. Net Farm Output and Geographical Origin of Producer

Region Where Producer was Born	Number	Net Farm Output (Córdobas)[a]
Central and Northern	201	5940 (4563)[b]
Atlantic	62	4126
Pacific	8	2265

[a]The exchange rate, which has been very stable, is seven Córdobas per U.S. dollar.

[b]The figure in parentheses represents the average when four large farms all belonging to natives of the Central Region, producing a net farm output of greater than 40,000 Córdobas per year, and utilizing a high percentage of nonfamily labor, are excluded from the class average.

The above figures show lowest net farm output for the settlers from the Pacific Region. However, the number of settlers from this region is so small that it would be precarious to state conclusions that would be anything but tentative.

There is apparently a sizable difference in income levels attained by settlers of the Central Zone and those of the other two regions. However the difference between settlers of the Atlantic and Central Regions practically disappears when the incomes of the highest producers are not taken into account in calculating the average; by eliminating four producers from the Central Zone whose net farm output exceeded 40,000 Córdobas, the group average was reduced from 5,950 to 4,563 Córdobas. (No farm belonging to a native of the Atlantic Region produced in excess of 40,000

Córdobas.) The typical campesino from the Atlantic Region practices the same type agriculture as practiced by his counterpart who migrated out of the Central Zone.

Former Occupational and Tenure Status of Settlers

The former occupational and tenure status of 177 migrants to the study area is shown below in Table 2. Of the 272 persons interviewed, 95 were not questioned on occupation prior to migration either because they were natives of the Atlantic Region, because they migrated with their parents at an age too young to be economically active, or for some other reason.

Table 2. Occupational and Tenure Status During Year Prior to Migration

Occupation and Tenure	Number	Percent
Nonagricultural	20	11.3
Agricultural		
Worked with father or other relative	41	23.1
Possessed own farm	61	34.5
Worked on someone else's property[a]	55	33.1
	177	100.0

[a] Includes persons who worked as hired laborers, who acquired land through rental or illegal occupancy of private lands, and usufructuary tenants.

The most numerous of the above groups consists of persons who had possessed some land of their own in the past, constituting over one-third of the total. Almost all sold their previous possession prior to migration. The next largest group consists of persons who worked on someone else's property, mainly as renters and laborers. Many of the persons in this class had a multitenure status. They may, for example, have rented some land and also worked as hired laborers. Only 19 of the 55 worked exclusively as hired laborers.

Almost one-fourth of the migrants had not been independently employed before migrating. They worked on the farm of their parents or some other relative. The migration of this group is perhaps the most indicative of the problem of population growth.

Finally, about 11 percent of the producers did not have an agricultural occupation the year before migrating to the project area (this does not mean that they had no such experience sometime in the past). It will be argued later that this group and others like them who may migrate at a later data play an important role in the area's development. The migration of this group may better be explained in terms of the "pull" factors, those factors that attracted them to the area, rather than the "push" of former difficult circumstances.

Explanation of Out-Migration from Central Region

Each migrant interviewed was asked, "What conditions of your previous residence made you want to leave it?" The interviewers had the liberty of rewording the question if the meaning was not grasped immediately by the person being interviewed. The question assumes that there was something that induced out-migration; if they migrated because of an attractive feature of the Rama area, the reason for leaving was then the lack of this feature in the area they left. In other words, the push factor would be simply the inverse of the pull factor (assuming change for the sake of change was not the principal factor).

The question was asked in an "open-ended" rather than "closed" form because it was noted that the respondents were quite susceptible to suggestion. This method resulted in some responses that were difficult to interpret. At total of 26 answers out of 173 were not useful.

Fifty-five percent of the responses were coded as scarcity of land or employment. The various types of answers that were classified under this heading include low demand for labor or low level of wages, scarcity of land available for rental, nonavailability of unoccupied lands for settlement, or scarcity of land for purchase. The most common answer was the scarcity of unclaimed land. This answer was given not only by persons whose former tenure-occupational statuses were as renters, hired workers, or "squatters," but also by persons who, before migrating, had a possession of their own.

Forty percent of the respondents gave a variety of answers which were grouped under the common heading of "Quality of Resources." Most (about three-quarters) of the persons whose answers were classified in this category answered that they left because of low crop yields. Some of these attributed low yields to scarcity of rainfall. Several persons sold their farms and migrated out because all of their land had been converted to pasture. While we failed to ask why putting the land into pasture was a motive for out-migration, the interviewers and other persons queried agree that the probable

explanation is that these individuals were in the "land development" business. This enterprise involves clearing unclaimed national land, establishing pastures, then selling the improved holding to someone interested in ranching. A few individuals migrated because their former holding was located far from roads and villages and they decided to acquire a farm situated close to the Rama Road. In these cases, this attractive feature of the study area was the dominant factor in migration rather than a deterioration of conditions in the home community.

Some eight persons (5 percent) said that they left their former residence because of personal reasons. Of these, five had conflicts with neighbors or relatives. The other three left to be near relatives who had already migrated to the study area. It is possible that more than eight persons left their former residences for reasons of a personal nature as the principal or one of several motives, but did not care to disclose this.

Given the different reasons expressed for having migrated and the varied former occupational statuses of the migrants, is there any unifying explanation for this migration? It has already been suggested that the migration of one group (persons who had worked on a relative's property) is evidence of the effect of population growth. Another factor joined with the population increase to decrease the land area available for agriculture in the Central Region--the accelerated growth, in terms of land area, of extensive livestock grazing.

Census data on population and land use in the four department area of the Central Region which supplied the greatest number of settlers to the Rama area, seems to support the inference that campesinos working in subsistence agriculture have been caught in a squeeze between rapid population growth and competition with livestock farming. Comparison of population figures in the 1950 and 1963 censuses shows that Nicaragua's population grew by 46 percent over this period, while it increased by only 35 percent in the four department area referred to. Assuming that the natural rate of population growth in this area was equal to the national average, the 11 percent difference would be explained by net out-migration. From 1952 to 1963, the increase in the total area planted to cultivated crops in the four departments was 15 percent, much lower than the rate of population growth, while the area in pasture expanded by about 94 percent. Of the total land area of these departments, 79 percent was in agricultural holdings, as compared with 71 percent in the far more densely populated Pacific Region.

Census data is always suspect, and it is not difficult to find apparent inconsistencies and inexplicably high (or low) figures in the Nicaraguan agricultural censuses which tend to cast doubt on the reliability of the data presented in the above paragraphs. For example, while the pasture area in the four departments increased by 94 percent over the intercensal period 1952-1963, the growth of the cattle population over the same period was only 20 percent. (The census data on cattle numbers is considered by many to be an underestimation.) Another set of figures more difficult to explain are those showing the area in permanent (perennial) crops in the department of Chontales in 1952 and 1963. They are 77,000 and 9,000 manzanas respectively. The difficulty lies not so much in explaining the very sharp decrease as in explaining how the 1952 figure could have been so high. The principal permanent crop of the Central Region for many years has been coffee, but regional coffee production has been centered in the departments of Matagalpa and Jinotega, not Chontales. This decrease offsets otherwise strong gains made in the growth of the cultivated area in the four departments.

In spite of the above difficulties in working with secondary data, I am inclined to accept the notion that a rapid incorporation of land into permanent pasture has occurred in the areas from which settlers have left to migrate eastward. Conversations with agricultural technicians and other persons who have lived and worked in the Central Region, plus personal trips to Chontales, Boaco, and Matagalpa have reinforced the impression gained through the comments of migrants from these departments and use of census data. Particularly impressive was a trip in April 1967 to the municipio of Matiguás, in the department of Matagalpa.

The 1963 census showed that of the 125 municipios of the country, Matiguás was the leading producer of corn, both in terms of area and volume of production, and second highest in beans. The proportion of the total agricultural area devoted to these two crops was among the highest in the country. Traveling from Boaco northeast to the town of Matiguás, then directly east to Río Blanco, an obvious land use pattern was observed. Not until we were about half way between Matiguás and Río Blanco were there any signs of crop production; the land was almost entirely in pasture. A traveling companion who works in the area purchasing livestock and dairy products explained that a decade ago much of the area now in pasture was in forest. By the time we reached Río Blanco there was little pasture to be seen, and more of both forest and small areas that had been cleared for agriculture. The informants with whom I spoke explained that agricultural production is moving eastward with the advance of the road, then yielding to pasture.

The effect of extensive pasture development on two broad tenure groups is discussed below. The groups are: 1) farmers who possessed their own land (with or without a title); and 2) renters and laborers.

Migrants Who Possessed Land in Their Former Communities: Among this group, the principal reason given for out-migration was low yields, though some complained of a lack of land--an apparent paradox considering that they possessed a holding of their own (unless they were seeking to enlarge that holding). When one considers the type of agriculture practiced in the Central Region, the two reasons given for out-migration (lack of available lands and low yields) are quite related. In contrast with the Pacific Region, where a stationary agriculture is practiced, cultivation in the Central departments is of the shifting "slash and burn" variety. The soils are thin, rocky, and generally rather steeply sloping. Land for practicing shifting agriculture was not scarce in the past, but nowadays large areas are covered by pasture rather than the original or secondary natural vegetation. This means that the possessor of a subsistence plot must either continue to cultivate his land and thus downgrade its productivity, or abandon the region and seek employment or land elsewhere.

Renters and Laborers: A common practice for persons going into livestock farming in Nicaragua (as well as other Central and South American countries) is to lease woodland out to landless campesinos. These in turn clear the forest with axe and machete, plant an annual cultivated crop (usually rice, corn, or beans), and simultaneously with the cultivated crop, pasture, which takes over once the crop has been harvested. The land then rarely reverts to use for cultivated crops. Sometimes rather than have the job done by tenants, the landowner will employ day laborers or contract the work out to one person who is paid on a piece basis and hires his own crew of day laborers. The cash income from the crops pays for the land clearing operation, with the cultivated crops benefiting from the initial fertility of forest land. Once an area has been so converted to pasture, renters and laborers seeking employment in agriculture have to move on to new lands, whether on a possession of their own, or someone else's which may also be in the process of preparation for livestock grazing.

The rental payment reflects the proportion of land in a given area that has been converted from forest to pasture. Augusto Oporta, who assisted in this study, grew up in Juigalpa, in the department of Chontales. He relates that years ago when forested land was common in the Juigalpa area, his father paid tenants to cultivate his land so that it would be cleared for pasture (a negative rent!). Today, campesinos in the same department complain bitterly of the high rents they must pay to acquire a piece of land on which to practice agriculture.

Perhaps another indication of how conditions have evolved in the Central Region is the agricultural wage, as compared to the wage level for unskilled workers in other parts of Nicaragua. In

his publication on costs and returns to various crops in Nicaragua's three main geographic areas, Butler (who obtained his figures from Nicaraguan extension workers) uses an hourly agricultural wage of one Córdoba (100 centavos) in the Pacific Region, 86 centavos in the Atlantic Region, and 63 centavos in the Central.[24] There are no figures available for checking whether or not these relative differences have always existed.

Out-migration from the Central Region may be largely understood in terms of a shrinking physical land base for traditional agriculture, both in terms of area and quality, occurring simultaneously with rapid population growth. The diminishing land base is related to the growth of the area incorporated into livestock pastures. The relationship between livestock (cattle) production and the cultivation of food crops is another aspect of the dualism which characterizes Nicaragua's economy.

Much of the vast Atlantic Region (primarily the department of Zelaya but also Río San Juan and the eastern half of Jinotega) has not been brought under agricultural production. The four departments of the Central Region from which migrants left to settle the municipio of Rama will most likely continue to be a source of eastward migration.

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[24] Butler, op. cit., p. 18.

V. LEVELS OF INCOME AND PRODUCTION

Does frontier settlement merely serve the purpose of enabling settlers to maintain income levels characteristic of the subsistence (noncapital using) sector or are significant advances beyond this level achieved? This is a question that is in no way intended to test the advisability of continuing to permit settlers to occupy public lands. The incomes earned by settlers may be substantially below the national average and barely sufficient to keep body and soul together, yet settlement can perform an essential function by providing people who might otherwise find no productive employment with the chance to produce their own sustenance.

Several benchmarks are used for putting income levels of the study area in a national perspective. These include national averages of family and per capita incomes, and recommended income levels for urban industrial workers. Data is also presented which compares the gross value of production per unit of land in the area studied with averages for the rest of the country.

Physical Features of the Study Area

The area studied is primarily located in the municipio of Rama, department of Zelaya, with a small portion extending into the municipio of Villa Somoza, department of Chontales. The limits are the rivers Rama (south and southeast) and Siquia with its appendages, the Pilan and Inquinís (north and northeast) and two lumber (timber) trails which connect the northern and southern boundaries to the Rama Road.

The area within these boundaries covers about 300,000 hectares (equal to about 741,000 acres or 430,000 manzanas). The area is approximately rectangular, with an average distance of 65 kilometers between the eastern and western limits, and 45 kilometers from north to south. The Rama Road crosses the project area in an east-westerly direction from the town of Muhan to La Esperanza on the Siquia River. About 60 percent of the area lies north of the road; 40 percent lies to the south of it.

The area contains the lower mountains and foothills of the central highlands, being partially covered by the eastern portion of the Cordillera Amerrisque. The hills give way to the Caribbean coastal plain within the project area, particularly in the northeast,

between the Musuwaká and Siquia rivers, but also in the southeast and southwest. The plains in the eastern section are poorly drained and sparsely settled as they are too wet for corn and beans. Thus one sees flat areas in a natural state while a short distance away steep slopes have been cleared to produce subsistence crops. Approximately 20 percent of the entire area is level, 30 percent is moderately rolling, and the remaining half steeply rolling and broken.[25]

The natural vegetation of the area is typical of what ecologists classify as tropical rainforest. The average rainfall in the eastern fringe is about 120 inches. The distribution of the rains is bimodal, with one peak in late May and June, the other in October. There are also two cycles of temporary crops during the year: the primera, which is sown in the latter part of the "dry season" (in May), and the postrera or segunda (latter or second) sown in the last few months of the calendar year and harvested the following spring. Corn and rice are planted during the first cycle, corn and beans during the second cycle. First cycle crops are planted on land that is cleared and burned, while the natural vegetation is only cleared (not burned) for the second crop; there is too much humidity to permit burning prior to planting the postrera. Consequently, beans and the second corn crop are planted on land that has a low stand of secondary forest growth while rice and the first crop of corn are planted in areas of virgin or high secondary forest.

A critical period is the "dry season" (referred to in Nicaragua as summer or verano). These are months of low precipitation, and include March, April, and parts of February and May. During these months land is cleared and burned for first cycle crops, while at the same time the second cycle crops are harvested. This is also the only time of the year that the farm to market roads are fairly dry; consequently the marketing of agricultural products is also concentrated in this period. Occasionally the normally dry months are fairly rainy, causing the matured beans to sprout in the field before they are harvested and preventing burning of the high vegetation which has been felled for rice and first cycle corn. This occurred in 1966 when data was being collected for this study.

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[25] Information from technical personnel of the Department of Engineering, Instituto Agrario de Nicaragua.

The soils of the region belong to the latosol group, and have been weathered to a sufficient degree to be classified as lateritic. These are fairly typical rainforest soils, acidic and low in total and available nutrients. Phosphorous availability is particularly limited by the acidity of the soil, and manifests itself through nutritional diseases and defects of plants and animals. Cattle are reputed to have a weak bone structure. Growing corn adapts to phosphorous deficiency by the new leaves "drawing" phosphorous from the more developed parts of the plant. Though the area is well traversed by rivers and streams, the total proportion of alluvial soils (river deposited, high in organic matter), is negligible. The floodbanks of the rivers are narrow and frequently steep.

The major communications routes are the Rama Road, the rivers, several dry season roads that were constructed for hauling out timber, and many narrow footpaths. The Rama Road, an all weather road which is partially paved, is the route by which agricultural produce from the area is trucked to the principal consumption centers of the country. Construction of the road was begun during World War II and reached the town of Rama in 1967 (in 1965 it was completed as far as the Siquia River; the small portion of the highway beyond where it crosses this river has virtually no effect on the area we are concerned with in the present study). Ocean-going vessels make the trip between the Siquia and the Atlantic Coast and then up to Miami, Florida. The road was begun precisely for the purpose of providing a combination surface-water transportation route connecting the Pacific and Atlantic Coasts of Central America as an alternative to the Panama Canal, in the event of the incapacitation of the latter during World War II.

For the purpose of transporting agricultural products, the rivers are navigable only in their eastern extremes. One of the three principal rivers runs parallel with and close to the Rama Road; hence this river is no longer of commercial importance.

The timber trails were constructed for transport of the more valuable forest resources. (This activity has slowed down as most of the accessible valuable timber is reported to have been removed.) They serve for motor vehicle travel during the dry season, but require grading for this purpose. Three timber trails were encountered during the course of the field work, though there may be more. One, which forms the southwest boundary of the study area, is graded each year during the dry season so that trucks may enter. The cost is borne by voluntary contributions of local people who hire a bulldozer and operator. Another trail runs north from the town of Muhan to the Inquinís River. It was graded and used by motor vehicles in 1964, but not in 1965 or 1966. This road runs through far more rugged country than the first one mentioned, and

may not be economical to maintain. The third timber road runs parallel to the stream Caño Iguanas in the southeastern part of the area, terminating at the Rama River. This road is in excellent condition and goes over fairly level terrain, yet it bears little agricultural traffic. This may be due to the poor soil drainage in the area served by the road, absentee ownership, or both.

The initial construction of the timber trails, paid for by private persons or companies that cut timber, may be considered as an external economy to the farmers of the area, though their continued use for motor vehicles requires an annual upkeep cost. No roads of similar quality have been built for the express purpose of marketing agricultural products. Perhaps this is because of the problem of initial finance. The writer's judgment is that the low level of current agricultural production does not warrant the construction of penetration roads suitable for motor vehicles, irrespective of finance considerations. This point is developed in a subsequent section.

Finally, there are the small footpaths built by the campesinos. These are the principal "penetration roads" used for marketing grains, livestock, and dairy and poultry products. They cannot be used for trucks or for animal drawn wagons or carts. Travel on foot along these paths is not much slower than on horseback or mule, especially in wooded areas because of the broken topography, the muddy condition of the paths, and the tangled roots in which an animal's hooves are easily ensnared.

The pattern of settlement is very dispersed, particularly where one leaves the Rama Road. Outside of the small settlements along this road, there are only two other towns. One, Guadalupe, is located along the navigable portion of the Rama River; the other, El Coral, is located along the timber road in the southwest portion of the project area. The settlements are primarily market towns whose existence is supported by the area's agricultural production. Like the timber roads, they had their origins in economic activities quite distinct from their present function--road construction, forestry, or banana production.

Present Levels of Income

Average family incomes and their distribution provide an index of the contribution of land colonization as it is currently being carried out. By comparing the figures with national averages and income levels of selected groups in the economy, the families engaged

in agricultural production in the area studied may be classified according to their relative place in the survival-surplus continuum. Family incomes for the agricultural year 1965 are shown in Table 3.

Table 3. Net Family Income From Agriculture

Net Family Income From Agriculture (Córdobas)	Number of Families	Percent	Cumulative Percent
Less than zero	5	1.8	1.8
0 - 1,499	64	23.5	25.3
1,500 - 2,999	80	29.4	54.7
3,000 - 4,499	48	17.6	72.4
5,000 - 5,999	21	7.7	80.0
6,000 - 7,499	14	5.1	85.1
7,500 - 8,999	15	5.5	90.6
9,000 - 10,499	7	2.6	93.8
10,500 - 11,999	7	2.6	95.8
12,000 or more	11	4.0	100.0
Total	272	100.0	

The mean family income level was C$4,320 ($617). With an average of 6.3 members to each household, mean per capita income was $98.00. As the distribution shows, almost two-thirds of the families received an income below the average for the sample. Modal family income, which is a better indicator of the typical level than the mean, was estimated at C$2,145 ($307),[26] less than one-half the mean value. Modal per capita income was $48.00.

[26]The mode was calculated in Herbert Arkin and Raymond R. Colton, Statistical Methods (New York: Barnes and Noble, 1962), p. 23.

The mean family income in Nicaragua for 1965 was $2,048; this is more than three times the Rama mean and about six times the modal family income in Rama. In Nicaragua, incomes in agriculture are about one-half of what they are in the rest of the economy. This would bring the mean family income in the country's agricultural sector down to about $1,020, which is still substantially higher than that found in the area studied.

The Nicaraguan Ministry of Economy provides estimates on the income necessary to maintain the family of an industrial worker. This standard plus a 10 percent increment for savings has been suggested as a minimum target for planning farm size in programs of land distribution in Central America. The Ministry figures, adjusted for the rural areas by deducting the expense of home rental, as this is generally not an expense for rural families, give a standard of about C$5,800 ($830) per year (without the 10 percent increment for savings.)[27] Most of this is allocated to food, and would not provide for a completely balanced diet. Almost 80 percent of the families covered by this study are living below the above standard. A lower standard, of say C$4,500, would be superior to the income of 72 percent of the families sampled.

Productivity of Land Resources

One measure of the relative productivity of the resources of the Rama area is the value of output per unit of land. An unpublished survey of farms of less than 100 manzanas in size was carried out in 1965 by the National Planning Office in all of the departments except those of the Atlantic Region (Zelaya and Río San Juan). Average value of output per manzana for the national sample was approximately 560 Córdobas ($80). The average for the Rama study was only 93 Córdobas on farms of less than 100 manzanas. The average for farms of all sizes in the Rama area was only 58 Córdobas.

The calculation of output per unit of land in the Rama area needs to be adjusted, since much of the land still has not been brought under cultivation. However, a proportion of the "idle" land is actually cropland being rested. Since the general practice in the region is to rest the land for two to four years after each crop, there are approximately three manzanas of land in rest for

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[27] Unpublished data from the Ministerio de Economía, Nicaragua.

each manzana in actual cultivation. This is not true of pasture land, as pasture lands are not "shifted" annually; they are a permanent crop. Therefore, the land actually utilized is the sum of the areas in pasture, permanent crops, and annual crops, plus the area being rested. This is approximately 65 percent of the area surveyed (see Table 4). Therefore, the value of output per manzana actually used equals 90 Córdobas. This value is still far below the national average of 560.

Table 4. Land Use According to Farm Size (Percentage Distribution)

Farm Size (Manzanas)	Number of Farms	Percent of Area[a]			
		Crops			
		Annual	Permanent[b]	Pasture	Idle
1 - 5	11	92.2	7.3	-	.5
5 - 10	19	93.1	1.4	0.8	4.8
10 - 20	20	64.1	6.3	5.2	24.4
20 - 50	55	25.7	4.5	10.9	58.9
50 - 100	68	16.9	3.2	17.2	62.7
100 - 200	58	9.8	2.0	25.5	62.7
200 - 500	36	6.4	1.3	15.7	76.6
500 - 1,000	3	1.4	.9	18.5	79.2
1,000 - 2,500	2	1.0	1.8	56.6	40.7
All farms	272	10.5	2.0	21.3	66.2

[a]Horizontal sums equal 100.

[b]Includes a wide assortment of permanent and semipermanent crops, including root crops, bananas and plantains, coffee, cacao, and tree crops.

Table 5 relates value of output per manzana to size of the operating unit in Rama and the rest of the country. However,

Table 5. Farm Size and Value of Output Per Manzana, Rama and the Rest of Nicaragua, 1965

Farm Size (Manzanas)	Output Per Manzana (Córdobas)	
	Rama	National Sample[a]
Less than 5	418	713
5 - 10	270	490
10 - 20	223	517
20 - 50	96	487
50 - 100	68	613
Over 100	48	-

[a]The national sample did not include the Atlantic Region, and only covered farms less than 100 manzanas in size.

Source: National sample figures calculated from data of the Oficina de Planificación.

a very misleading impression may result if the raw data is not interpreted in the light of the agricultural practices and tenure institutions characteristic of the region.

For the national sample, the figures show a fairly constant level of output per manzana (which does not preclude considerable variation in soil type, land use, technology, labor intensity, and other factors both between and within the different size categories.) The Rama data shows output per manzana dropping precipitously as farm size increases. However, the raw data of the above table exaggerates the productivity of land for the smaller units (less than 20 manzanas) and underestimates it on units of over 50 manzanas, for the following reasons:

1. Intensive use of land on the smaller units: it was stated earlier that crop farming is carried out on a shifting or rotational basis, with two to four units of land "resting" for each unit under actual cultivation. Yet as Table 4 demonstrates, almost 100 percent of the area on farms under 10 manzanas was under actual cultivation.

The smaller units are able to cultivate almost 100 percent of their land because they are temporary units. They are operated primarily by renters and usufructuary occupants who rarely farm the same parcel of land for more than a single crop cycle. After the harvest, the owner of the property either allows the land to revert to natural vegetation or establishes permanent pasture. Thus, the intensive use of land on these temporary units of operation must be viewed in the context of the more extensive land use on the property units of which they are a part.

When the value of output per manzana is compared for the two smallest size classes, one to five manzanas (average 3.4) and five to ten manzanas (average 7.0), there is evidence of decreasing intensity of land use, since land in both classes is almost completely occupied with annual crops. In the Rama area corn, rice, and beans take up all but an insignificant proportion of the total area in annual crops. The value of output and labor requirements for the three crops in the surveyed area are shown below:

	Value of Product (Córdobas per Manzana)	Days of Labor Per Manzana
Rice	575	56
Beans	429	56
Corn	180	29

The output per manzana on one to five manzana units, 418 Córdobas, suggests emphasis on rice and/or beans with a relatively small area of corn. Output per manzana on the five to ten manzana units, 276 Córdobas, indicates greater emphasis on corn. Because of the lower labor requirements for corn, the five to ten manzana units can probably be operated within the same labor constraint (essentially family labor) faced by the smaller units. This situation and related problems are dealt with more fully in the next section.

2. Extensive use of land on larger units: The area of idle land on units of over 50 manzanas in size exceeds that required by the 3:1 ratio of rested land to annual crops (see Table 4). Therefore, there is excess land on these units, which results in underestimating the productivity of the land when this is measured by dividing the total value of production by the total area of the farm. Since the Rama area is a pioneer area, it can be expected that this excess land will be brought under cultivation some time in the future.

Although the figures shown thus far indicate that most of the families interviewed are earning low incomes according to various standards, it would be a mistake to assume that they are not a part of the exchange economy. For the area as a whole, only 28 percent of the value of the production was consumed on the farm. On the units with a total value of production greater than C$10,000, 85 percent of the value of production entered commercial channels or was added to inventories. Even on units whose total production was less than C$2,000, half of the value of production entered commercial channels.

VI. ANALYSIS OF VARIATIONS IN LEVELS OF PRODUCTIVITY

The previous section showed that in general, family income levels in the Rama area are comparable to those of the poorest strata of Nicaraguan society. Nevertheless, there is considerable variation in output per man within the area. The variation in productivity is here analyzed for its association with capital, in its different forms and application to specific enterprises. This will serve to identify the capitalist and subsistence sectors within the region's agricultural economy, as well as providing the basis for examining the relation between the two sectors and their degrees of integration with the broader framework of state and economy.

Productivity of Labor: Frequency Distribution and Relation to Capital

The data in the previous section showed that the distribution of income is skewed to the right. The same situation holds when the productivity of the farms is expressed in terms of value added per unit of labor,[28] as Table 6 demonstrates.

The distribution (as shown in Table 6) could reflect random deviations from the mean with the proportioning of the factors of production held constant, or different levels of labor productivity based upon changing factor proportions. Table 7 shows the value of capital per worker associated with each level of labor productivity.

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[28] The net farm output (value added) was calculated as follows: "This is computed by subtracting from the total farm income the cost of farm supplies, the depreciation of equipment and machinery, the miscellaneous crop and livestock expenses, the miscellaneous general cash farm expenses, and the decrease in the value of fixed assets;" from W.Y. Yang, Methods of Farm Management Investigations (Rome: Food and Agriculture Organization of the United Nations, 1965), pp. 57-58. This was expressed on a per man basis by dividing the net farm output by the size of the farm labor force.

Table 6. Net Farm Output Per Unit of Labor

Net Farm Output Product Per Man-Year of Labor[a] (Córdobas)	Number of Farms	Percent of Farms
0 - 999	57	21.0
1,000 - 1,999	95	34.9
2,000 - 2,999	59	21.7
3,000 - 3,999	31	11.4
4,000 - 4,999	14	5.1
5,000 - 5,999	3	1.1
6,000 - 6,999	5	1.8
7,000 - 7,999	5	1.8
8,000 - 8,999	3	1.1
Total	272	100.0

[a]Man-years of labor measures the labor available to the farm. It may not have been fully employed. Man-years calculated as follows: taking into account Sundays, religious and national holidays, it was assumed that each member of the family labor force was available for work 260 days of the year. Days worked off the farm and sick periods were deducted from this 260 day base. Hired labor was included according to the number of days non-family labor was employed.

$$\text{Man-years of labor} = \frac{(260 \times \text{no. of members of family labor force - days}) (\text{spent sick or employed off the farm + no. of days}) (\text{non-family labor was hired})}{260}$$

Table 7. Net Farm Output and Capital Per Worker (Values in Córdobas)

Value Added Per Worker	Nonland Capital Per Worker[a]
0 - 999	520
1,000 - 1,999	1,127
2,000 - 2,999	2,145
3,000 - 3,999	3,670
4,000 - 4,999	5,754
5,000 - 8,999	10,904

[a]Physical improvements such as fences, buildings, and corrals are included.

The above figures demonstrate quite clearly that the level of output per worker is closely associated with the corresponding capital level. By breaking down the total value of capital into its component categories, a more precise idea can be had of the changes in farm organization that accompany variations in labor productivity.

Class of Capital	Percent of Total Value
Cattle (dual purpose)	69.0
Equipment and Improvements	17.6
All Other Livestock	13.4
Total	100.0

The figures illustrate the overwhelming importance of cattle in the capital configuration. Alone they account for over two-thirds of the total investment on the sample farms, exclusive of the land itself. A portion of the value of "other livestock" includes horses used for herding cattle. Likewise, the equipment and improvements include pasture fences and corrals which are required by the livestock enterprise. The remaining "capital," perhaps 15 percent or less, covers the implements used in traditional agriculture, primarily machetes and axes, plus small livestock (pigs and chickens). Thus, an increase in capital per worker is essentially an expansion of the cattle enterprise.

Capital and Enterprise Combinations

Rather than consider each crop and livestock product as a separate enterprise and compare all for relative productivity and capital requirements, a simple but analytically effective classification is obtained by separating them into two classes: cattle and "all others." The cattle enterprise is not divided into beef and dairy as they are not separate in practice. Dairy production is primarily for household purposes and a small regional market. All the crops are grouped together because none uses any reproducible capital other than simple, inexpensive hand tools, and the cropping pattern varies little from one farm to another. Small livestock, mainly pigs and chickens, are grouped with crop products in "all others" because of the complementarity involved. In addition to what they scavenge, they are fed on agricultural products that are bulky to transport in their original form (corn, root crops, bananas, and plantain). The poorest of farmers will generally have

a few pigs or chickens around the door yard, but no one specializes in their production or produces them on a large scale. Since the investment in small livestock is minimal and spread thinly over all or most of the farms, it makes little difference to equate all crops and small livestock with subsistence agriculture and cattle with "capitalistic" production. The capital-output ratios for the two sets of enterprises are roughly .35 for subsistence and 2.7 for capital intensive production.

In Table 8 the level of productivity is seen as a function of the relative importance of the two sets of enterprises. The subsistence enterprise is measured in terms of the area of land devoted to crops, the capital intensive enterprise in terms of the area in pasture and cattle numbers.

Table 8. Income and Factor Levels Per Man-Year of Labor

Net Agricultural Output Per Man-Year of Labor (Córdobas)	Factor Levels Per Unit of Labor		
	Land in Crops (Manzanas)	Land in Pasture (Manzanas)	Head of Cattle
0 - 999	3.6	1.8	.5
1,000 - 1,999	6.1	4.1	1.4
2,000 - 2,999	6.7	7.5	2.7
3,000 - 3,999	8.3	13.6	6.0
4,000 - 4,999	6.9	20.5	9.8
5,000 - 8,999	6.6	39.3	22.1

From the second class to the last, increased output is obtained by keeping the subsistence enterprise fairly constant while the livestock enterprise is continuously expanded. From six to seven manzanas of the typical crop mix is probably the maximum that can be handled by an average worker employed exclusively in subsistence production. (This may be more than the average for the tropics because there are two crop cycles per year in the Rama area.) It appears that the subsistence maximum may be maintained while the cattle enterprise is expanded from 1.4 to 22.1 units; in other words the two sets of enterprises are supplementary with respect to labor. The conditions for a supplementary enterprise relationship exist: "Supplementary conditions arise mainly out of time and are to be found especially where a) enterprises can be produced only during a distinct and limited period of the year, and b) the resources employed give off a flow of services over all time

periods."[29] Labor is a "flow" resource. The calendar for crop activities has two peak periods during which the land preparation and harvest operations overlap for the two crop cycles. The field activities of the livestock enterprise, essentially clearing weeds from the pasture with a machete and building and maintaining fences and corrals, can be carried out any time of the year when crop activities are less demanding. The cattle are maintained entirely on pasture, so that no cropland is transferred to use as an intermediate activity for beef and dairy production. The pastures are sown simultaneously with an annual crop and are permanent, requiring re-establishment only if they are neglected and taken over by weeds.

While the crop area per man remained fairly constant, this does not preclude an increasing income per labor input from crop production based on varying productivity per unit of land. While this occurs, its effect is relatively small. The increase in net value of output per man from the second class, with an average of 1,513 Córdobas, to the last with an average of 6,870 Córdobas, is 5,357 Córdobas. Of this increment, 912 Córdobas came from an increased value of crops and associated enterprises (small livestock, especially hogs and chickens), while the remainder, 4,445 Córdobas, was due to an increment in the production of cattle and dairy products.

The data of Table 8 seem to indicate that two distinct sets of enterprises with respect to capital use are found together on units of all levels of productivity, though in different proportions. This is not actually the case. The class averages disguise variations within classes. Of the 272 farms in the sample all but one had some type of crop activity, whereas only 144 (53 percent) had cattle.

Capital Intensity and Level of Technology

One of the characteristics of the pure subsistence economy is that it is pre-scientific; it does not draw upon the improved technologies of modern science. To what extent are such technologies utilized by the subsistence and capitalistic enterprise-sectors in the Rama area? Some rough indicators of the use of yield increasing

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[29] Earl O. Heady, Economics of Agricultural Production and Resource Use (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1952), p. 231.

and labor saving technologies were obtained through the field interviews. In the case of the cattle enterprise the data refer to veterinary practices. About 15 percent of the cattlemen reported that they vaccinate their animals to prevent disease, 38 percent use insecticides for external pests as well as preparations for internal parasites, and 64 percent use some type of medication for sick animals (antibiotics, purgatives, commercial medicines sold by brand name, and medicinal plants). In the case of annual agricultural crops which occupy 85 percent of the crop area, not a single person used fertilizer or lime; none used fungicides (fungus diseases are common, affecting particularly corn which is the major crop); 3 percent used chemical weed killers (labor saving, used principally for rice); and one individual used a field insecticide (Dieldrin, for corn borer). The most common non-traditional input employed is DDT to protect corn while being stored. DDT was used on 25 percent of the farms. No one clears land for cultivation by means other than the use of the machete and axe. Any device which disturbs the top soil would greatly accelerate erosion.

The lesser use of yield increasing and protective technologies in crop production does not reflect a natural abundance. On the contrary, nutritional diseases, pests, and plant diseases cause frequent and serious fluctuations in crop yields. Nor does it reflect resistance to change, as the same individuals that practice primitive agriculture have been receptive to improvements in animal care, as well as other changes such as improved pastures and crossing native cattle with imported Brahmans. The difficulty is that the numerous and complex technical problems of food production in the wet tropics have not been resolved yet by scientific research, nor has such research been undertaken on the scale required by the urgency of the nutritional and economic problems of tropical countries. And where this research has been undertaken, it has not reached the traditional sector for reasons which are partially known to social investigators.

Non-Reproducible Capital -- Land

In Latin America specialization in livestock grazing is frequently found on relatively large sized units, with smaller units concentrating on crop production. On the smallest units the available labor supply is frequently fixed (according to the size of the family), and family income is maximized through enterprises which yield a high value of output per unit of land. These are generally crop rather than pastoral enterprises. The intensity of crop enterprises (in terms of output per unit of land) can be varied widely by changing the type of crop and the yield, the latter

through yield increasing technologies, closer planting, and greater use of labor. Pastoral farming does not generally lend itself to the same degree of flexibility, though one exception is the beef-dairy alternative.

The assertion with respect to the higher value productivity of crops as opposed to livestock cannot be made with assurance in areas of shifting cultivation that are capable of supporting permanent pastures, for reasons already explained. This is especially true for annual crops, which make up 84 percent of the crop area. The average value of livestock and dairy production per manzana of pasture was about 100 Córdobas. This is most likely an underestimation of the potential output; in the first place because there are ways for increasing cattle production which many producers have not yet implemented and in the second place the establishment of pastures generally precedes their stocking; consequently, they have probably not reached full carrying capacity. As shown in Table 5 of the previous section, the smallest units, which are completely in cultivated crops, produced an average of 418 Córdobas per manzana. Assuming a three year rest period, this is reduced to 104 Córdobas per manzana, barely above the current yield from pasture, which has a much lower labor requirement (including animal care). Consequently, the optimal use of resources would indicate that over time, increasing specialization in livestock production should occur, with perhaps a small crop area for home food consumption. This is actually occurring on some units.

However, for what persons is the opportunity to increase incomes through an expansion of the area devoted to pastures a realistic alternative? In terms of control over land resources the renters, usufructuary tenants and squatters on private lands would probably have to be excluded since they are working lands to which another party has a private claim. Rental of land on a relatively permanent basis, as would be required for cattle production, is very rare. The squatters, usufruct tenants, and renters account for approximately one-fourth of the units sampled. Another group which may not make the transition to specialization in livestock production consists of the operators of farms averaging between 20 and 50 manzanas in size (most of whom are independent cultivators). At present average value of output per manzana on these units, 96 Córdobas, is approximately what would be obtained through specialization in livestock. The gain through emphasizing the livestock rather than crop production would be primarily in the form of a lower labor requirement. This change would not affect their level of farm income since these units are operated almost exclusively with family labor, though it is possible that some of the released

labor would find off-farm employment. These gains may be small in proportion to the effort and capital cost required to build up the livestock enterprise.

Another group that does not have an alternative consists of the landless labor force. For the entire sample, 28 percent of the labor force was hired. (An additional estimate, derived from the difference between the average farm labor force, including hired labor, and the labor potential of the average family, gave a landless labor figure of 29 percent.)

The units on which a substantial increase in income through cattle production may be realized are those greater than 50 manzanas in size. On these farms there is a high proportion of excess land beyond that required by shifting cultivation. These units comprise 61 percent of the sample farms. Whether or not the present operators of these units will actually undertake the transformation will depend on variables other than land, such as capital and skills.

One question that frequently comes up with respect to this type of data is the size of the labor force needed to attain the higher levels of productivity. The data of this study shows that the labor force on 30 units having greater than 4,000 Córdobas net farm output per man averaged 3.4 men. However, this figure is heavily influenced by one farm with a labor force of 33 men, part of which is utilized for crop activities. Eliminating this single case, the average labor force for the remaining 29 units comes out to 2.4. This is only slightly greater than the labor potential of the typical family, estimated at 1.6 man-years of labor. These figures are evidence that substantial gains are possible by specializing in ranching within the framework of the family farm. This is not a denial of the possibility of greater labor efficiency on much larger units. The data are not sufficient to test this relationship.

Social Overhead Capital--Farm to Market Roads

The data of this section deals with the possible effect of the existing system of farm to market roads on the productivity of labor in the project area. The penetration roads which connect the farms to the market towns that are located along the Rama Road are very rudimentary. Most do not serve for motor vehicle traffic, nor are they adequate for the animal-drawn carts which are found in other regions of the country. Agricultural products are brought to market by pack animals, and sometimes on the back of a campesino.

The farms located along, or close to the Rama Road do not face the problem of transporting their products for long distances along poor roads. The labor productivity on these favorably located units may be compared to that of units which do not enjoy the same locational advantage. If proximity to the highway can be shown to have a measurable effect on the output of labor, this should indicate the beneficial effects to be expected from the construction of an improved system of farm to market roads that would support motor vehicles.

If this were true, producers located along the highway would have more time available for farm labors since they spend less time transporting their products to market. Also, the disutility associated with traveling long distances to market may exceed the cash value of certain products and discourage production in excess of the consumption needs of the family.

For the purpose of relating location to productivity, the area was divided into four roughly parallel zones. These four zones were ranked in an ordinal scale, according to their transport advantages, number one having the best advantage, number two less advantage, and so on (the difficulty of evaluating the importance of topography, river transportation, and the timber roads makes it impossible to be more precise). Net agricultural output per worker was calculated for each zone.

The average productivity of labor on farms in the zone nearest the Rama Road, the zone with greatest advantage, was lower than in zones two and four, and only slightly higher than in zone three. This demonstrates that in spite of the extra effort required to market agricultural and livestock products raised in the last three zones, the labor output was not adversely affected.

Since producers located in the highway zone spent less time in marketing, it is apparent that the extra time available to them for agricultural work was not used productively; if it were, this presumably would have been reflected in higher output. This suggests that the locational advantage of being near the highway consists of more leisure time.

The conclusion drawn from the data on location and productivity is static and does not take into account changes over time. It is quite likely that land consolidation will occur over time and that the major impact of this process will be felt in the vicinity of the Rama Road, at least initially. At present the zone nearest the road includes a greater proportion of units at both extremes of the

size-tenure continuum. The absorption of the smaller by the larger units may come about through purchases, reincorporation of rented land into the ownership units, and the removal of "squatters;" with or without compensation for improvements. If this occurs, and is associated with greater specialization in cattle production, labor productivity will be higher along the Rama Road. This will not, however, be due to the relatively lower cost of marketing, which is less of an advantage for cattle than for any other regional farm product. It will be because the owners of the larger units prefer the consumer benefits of having their farms conveniently located, and because they have the capital and other means necessary for acquiring such locations. Consumer benefits include the normal advantages of living near towns and good roads, and travel convenience for the owners of the largest units who have, in addition to their farm in Rama, other business interests or employment. These are generally urban or town based, but in some cases include farms in other parts of Nicaragua.

Summary

Despite the low levels of average income and productivity in the Rama area there are product and factor combinations associated with incomes that compare well with national averages, particularly for the agricultural sector. Specialization in ranching, which has been equated with capitalistic production, as opposed to subsistence agriculture, is characteristic of farms with high labor productivity.

The fact that such a limited number of individuals have achieved the more optimal factor combinations is evidence of the operation of a dual economy, but neither complete nor very meaningful evidence in terms of usefulness for orienting and implementing public policy. The more complete analysis of the economy in the following sections should provide the basis for an interpretation of the findings within a policy context.

VII. GROWTH OF INCOME OVER TIME AND INTEGRATIONAL ASPECTS OF ECONOMIC DUALITY

The data of Table 7 suggest the hypothesis that the ratio of capital to labor, and consequently the productivity of labor, is a function of time. This may be expected in a pioneer area, where institutional credit has not been available, and where the land must undergo a physical and ecological transformation. Under this hypothesis settlers would increase their level of labor productivity each year by increasing the size of the herd and the area in pasture until peak labor productivity is attained. The hypothesis will be rejected if the difference between capitalist and subsistence levels of productivity is established during the initial years of economic activity, and maintained thereafter, in which case there would be a zero or very low correlation between the number of years which the farm has been under operation and the productivity of labor. Length of operation was ascertained for each operator in nine productivity classes (zero to 9,000 Córdobas). An examination of this data did in fact show very little correlation between productivity and length of operation, so the hypothesis is rejected.

When the data is adjusted so as to include only the range of two to twenty years, there is absolutely no relationship between time and the level of productivity. If this is so, it bears an explanation, as it seems highly doubtful that the conversion from jungle to livestock production can take place within a few years. Part of the explanation lies in the fact that many persons acquire properties that have already been partially cleared and sown to pasture. The clearing of land and sale of the improved property is said to be a way of life for certain campesinos who continually migrate to new frontier areas. Also, a high proportion of the more productive farms have been acquired by persons with independent sources of capital, generally individuals with a nonagricultural occupation or someone who already possesses one or several agricultural properties. Because of prior savings, or credit based on their economic situation, the new farm does not depend on internal savings for capital formation.

The analysis was also carried out by classifying the farms according to the number of years they had been under the control of the present operator (treating time as the independent variable), and calculating average labor productivity for each class, rather than vice versa as done above. The results showed that average

labor productivity rose until the fifth year, after which it was relatively stable. However, the average rose by only 885 Córdobas over the four year period (from a first year average of 1,765 Córdobas to a fairly stable average of 2,650 Córdobas from the fifth year on). Since this change is very small in relation to the wide range in labor productivity shown in Table 7, it indicates that the increase in the community average over time was largely due to a substantial increase in labor productivity on a small number of units within a short period. This was substantiated by defining, somewhat arbitrarily, a subsistence range of productivity (0 - 4,000 Córdobas per unit of labor) and a capitalist range (over 4,000 Córdobas), and observing the proportions of farms that fell in each productivity range over the years. Ninety-nine percent of the farms that had been operated by the then present owner for only one year fell within the subsistence range. From the fifth year on, approximately 83 percent of the farms had a labor productivity less than 4,000 Córdobas. The average productivity within the subsistence range increased by only 250 Córdobas from the first to the fifth year. The major contribution to the increased average for all farms came from the small proportion of units that attained labor productivity in excess of 4,000 Córdobas by the fourth or fifth year of operation.

The above analysis suggests that over four-fifths of the producers do not participate in any transformation to capitalist producer status. Any increases in output to be carried out by the present operators will most likely involve an extension onto idle or newly acquired land of production patterns which they have already established.

Integrational Aspects of Dualism--The Legal-Tenure System

In an area of recently settled national lands such as Rama, one indication of the status of agricultural producers with respect to the services of the state is the size of the units of land which they occupy and operate, since this is a variable which is theoretically subject to public regulation. Another is their tenure situation with respect to the use and possession of land. We may tentatively classify producers according to their ability to expect the state's intervention on their behalf in the event they are threatened with a loss of economic opportunity through the arbitrary actions of other persons or groups (tentatively because not enough is known regarding the land policy of the Nicaraguan government and the procedures followed in resolving conflicts to make a definitive classification). After classifying the various tenure groups according to the security of their present level of

opportunity, economic indicators were calculated to measure their relative participation in subsistence or capitalist type agriculture.

The farms were classified initially into two broad classes: independent and dependent tenures. Those with independent tenures have exclusive possession of the land which they occupy. Those with dependent tenures occupy land to which someone else has a private claim, with or without the permission of the private owner. They include renters, squatters (precaristas), and usufructuary tenants (usufructuarios). The independent tenures include two types: those with and those without officially issued or witnessed documents testifying to their possession of land (mainly provisional titles and letters of sale).

The precaristas and renters were classified as the least secure occupants. Rental is insecure in that many of the rental contracts are for one-year periods with the intent of clearing land so that the owner may engage in livestock farming. On some large properties not actively exploited by their absentee owners, a very minimal rental fee is charged to persons who would otherwise squat on the same lands. Short term written contracts are provided which discourage improvements (permanent crops, fences, etc.) either by prohibiting them or by discharging the owner from the obligation to compensate the tenant for improvements. The classification of precaristas as having insecure tenures was done on the basis of cases of conflict encountered during the course of the field work. Usufructuarios, who are given permission to use land without payment, were classified as having the most secure of the dependent tenures, largely because they are frequently related to the owner of the land. Occupants of national lands who do not possess titles were classified as having the least secure independent tenures. These and the usufructuary tenants are generally located far from the Rama Road, in areas where conflict over land is not common. The precaristas and renters are almost all located near the highway. Those persons possessing provisional or permanent land titles (the latter being very uncommon), or officially witnessed letters of sale were classified together as having the most secure tenures.

Table 9 indicates the economic performance of the various tenure groups. (For the frequency distribution of farms according to tenure class see Table 11.)

Table 9. Tenure of Farm Operator and Economic Indicators

Tenure Status	Net Farm Output Per Unit of Labor (Córdobas)	Cattle Per Unit of Labor	Size of Farm (Manzanas)	Years of Operation
Dependent:				
Precarista	1,535	0.6	48	7
Renter	1,880	0.8	21	3[b]
Usufructuary	1,820	1.1	48	3
Independent:				
Nontitled	1,927	2.5	114	10
Titled[a]	2,764	5.5	140	9

[a]Mainly provisional titles and letters of sale witnessed by local officials.

[b]Twenty-six out of 30 had rented for a period of one year.

There are two principal observations to be made. The first is that the differences in labor productivity between the first four groups is small in spite of wide differences in farm size and the number of the years the operator has occupied the land. The producers belonging to these four tenure groups are for the most part engaged in the same kind of production, the cultivation of annual crops. The renters generally occupy as much land as they can cultivate in a single year. The precaristas and usufructuary tenants occupy, on the average, a unit large enough for them to practice shifting cultivation within the boundaries of their holdings. The nontitled occupants of national land occupy excess land beyond the requirements of rotational cultivation. The other observation is that while the average productivity of those producers possessing titles (or quasi-titles) is the highest, it is still well within the subsistence range. This is because many of them are, in fact, subsistence cultivators. The class average is highest largely because almost all of the farms on which labor productivity exceeds 4,000 Córdobas are in this tenure group.

One policy implication of the above discussion is that a more widespread distribution of security of expectations through the legalization of everyone's present holdings would perform primarily

a protective function, but would probably not lead to a significantly accelerated economic growth. Other measures would be needed in order to carry out an accelerated transformation of the productive process. The protective function is not insignificant, however. The observation that a pure subsistence economy is capable of functioning in the absence of the services of the modern nation state is true when the subsistence economy does not compete for land with capitalist agriculture. When they do compete for the same resources the former is apt to lose unless provided with strong guarantees against encroachment. (The question of conflicting land claims is taken up in Section IX.)

Integrational Aspects of Dualism--Participation in the Market Economy

Most of the farms in the Rama area, even the poorest, sell part of their production and consequently may be said to participate in the market economy. Subsistence producers in the Central and Atlantic Regions of Nicaragua have been drawn into the market economy by the construction of roads and the decrease in the production of food crops where these have been displaced by export products.

One observation that stood out during the course of the field work was the role of local merchants in the area's development. Many of the merchants that purchase grains from campesinos and sell consumer items also own farms in the area. Several of these "merchant-farmers" were interviewed as part of the sample, and in most cases their farms were well above average in productivity and capital levels. Of the eight farms with a family income derived from agriculture in excess of 10,000 Córdobas (after deducting the cost of hired labor), and labor productivity of greater than 5,000 Córdobas per worker, only two lived exclusively on the basis of agricultural earnings derived from their farm in the municipio of Rama. Four of the others were merchants whose businesses are located in the market towns along the Rama Road (one of them also operates a small hotel and bar).

The merchant-farmers are integrated into the market economy in a different manner than the typical subsistence producer. Their strategic function is that of acquiring a marketing margin from the subsistence cultivator which is then invested in a profitable agricultural enterprise. It is in this manner that much of the local capital accumulation takes place.

The other source of capital is investment funds brought in by persons who have significant economic interests that are not directly related to subsistence agriculture. (Institutional credit from banks and government lending agencies has been available only in extremely limited amounts to the Rama area and to the subsistence sector in general.) These people possess capital and contacts with the government and business community which are totally beyond the reach of the campesino. During the course of the field work we learned of several reputedly prosperous farms that were not included in the actual sample. Through informal secondary sources it was learned that in almost every case the owner had a substantial source of income earned in a professional, commercial, or government occupation prior to or concurrent with the establishment of the Rama farm. The integration of capital intensive farming in the Rama area with the market economy is clearly associated with the possession of a strategic role in the economy other than that of a direct agricultural producer.

Integrational Aspects of Duality-Education

In Table 10 labor productivity and family incomes are related to the number of years of formal schooling completed by the farm operator.

Table 10. Relation Between Education and Levels of Labor Productivity and Family Income

Years of Schooling Completed	Frequency	Net Farm Output Per Unit of Labor	Net Family Income From Agriculture
Less than 3 years	248	2,000	3,900
3 to less than 5	16	2,910	7,100
5 or more	8	3,600	10,500
Total	272	2,310	4,320

By classifying producers according to formal education received, a wider difference between class averages is obtained than is the case when the independent variable is land tenure (although the size of the sample for the higher educational levels leaves something to be desired). Still the difference between the

labor productivity of the first and third classes is not so wide as to provide a completely satisfactory explanation of the dispersion of the labor productivity distribution shown earlier (Table 6).

One of the persistent questions regarding education is its causal role in affecting economic performance. In the case of Nicaragua it is helpful to bear in mind that an education is available only to people who have a residence in or near towns and cities. Educational services are particularly poor in the Central and Atlantic Regions of the country, where the settlement pattern is very dispersed. A related observation already made is that people with an urban-based occupation make greater economic progress through agricultural activities in Nicaragua than do the campesinos. The significance of this is that the higher education of more efficient producers may be only incidental to the effect of urban capital and experience.

Actual school attendance figures show that the children of the persons interviewed will not be better educated than their parents. Of all the children between seven and nineteen years of age, 80 percent either never attended school or left before completing the first year. Only 14 percent of all the school age children were attending school, and most were in the first and second years. In an area like Rama the only children likely to get an education are those who live in or near the villages.

Summary

On about 80 to 85 percent of the farms sampled, labor productivity is not improved over time substantially beyond the subsistence level attained during the first and second years of pioneer settlement.

While the contrast between capitalistic and subsistence production is not as striking as in other parts of Central America (particularly those where banana and cotton production are well developed), the agricultural economy of the Rama area has the essential characteristics of economic dualism, dividing the productive units not only with respect to the relative use of capital in the production process but also with respect to technology, formal education, property rights, and integration with the national economy.

High productivity derived from the investment within the area's farm economy is carried out largely by persons with substantial sources of income earned in nonagricultural pursuits. The duality hypothesis posed earlier is accepted as a reasonable description of the area's economy.

VIII. ECONOMIC DUALITY AND DEVELOPMENT WITHIN AGRICULTURE

Not a great deal is accomplished by identifying a rural economy as one having the characteristics of duality. The more important questions involve the future growth of the two sectors and the manner in which they are related, both in the factor and product markets. These matters must be taken into account when the design of both the economic system and specific programs is undertaken as a means for achieving more desirable economic and social conditions.

The low levels of productivity and income in the subsistence sector are apparently the targets of change and improvement, judging from what is written and said in Nicaragua. The poverty of the subsistence cultivator, in addition to being a material hardship, tends to limit the development of other sectors of the economy. It does not perform the functions which a healthy agriculture sector should play in the course of economic development, such as providing a market for manufactured goods, keeping the urban sector well supplied with low cost wage goods (foodstuffs), providing capital for industrial development, and assisting the international sector to play its critical role in national economic development. The paradox of having tens of thousands of campesinos producing corn, rice, and other foodstuffs at such a low level of labor productivity that the country has had to import these products in recent years reflects the state of the arts, as well as the resources, with which this sector carries out its productive activities.

We can most conveniently look at the alternative means by which the subsistence sector in the Rama area may be transformed or incorporated into the capitalistic sector by examining some of the models used for explaining economic development which has occurred in different parts of the world. In general, these models deal with the overcoming of specific bottlenecks which effectively limited economic expansion in the countries involved.

The first two models discussed deal with increased output within the subsistence sector through the removal of resource constraints. The third model treats the development process explicitly from the point of view of the relations between sectors.

Expansion of the Cultivated Area and Peasant Exports

In examining the development role played by the export of primary products, Myint distinguishes between export industries completely dominated by foreign enterprise, such as mines and plantations, and peasant exports.[30] In the latter case, production is completely in the hands of peasant producers, though foreign export-import firms may handle the trade. The production of foodstuffs in the Rama area may be considered as an expansion of peasant exports, since the marketable surplus is largely shipped to other regions of Nicaragua and production is carried out through the use of traditional methods of agricultural production.

The growth of peasant exports of products such as rice, cocoa, palm oil, and cotton took place in some African and Asian countries to a degree which Myint considers spectacular.[31] The initial stimuli were: 1) imported consumer goods which were previously unknown in the subsistence economy; and 2) the opening up of more remote districts by improved transport and communication. The sparsely settled jungle areas were brought into production through the use of another under-utilized resource, peasant family labor. According to Myint, the existence of this surplus labor was not due to zero marginal productivity, but rather to the fact that leisure was preferred to increased production for home consumption. International trade provided peasants with the opportunity to exchange the potential production in excess of family needs for manufactured goods.

The process described by Myint essentially describes what has happened to subsistence producers in the Rama area. Using traditional production techniques and a family based labor force, they have been able to expand production beyond the amount needed for family consumption. The Rama Road has facilitated the transport of the marketable surplus out of the area as well as the import of consumer goods. The suggestion has been made by some persons that better results could be obtained by constructing improved feeder roads from the Rama Road to the surrounding farms. In Section VI it was shown that within the area studied distance from the road has little effect on output per worker. Consequently, an attempt

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[30] Hla Myint, op. cit., p. 28.

[31] Ibid., pp. 38-52.

at raising the output of labor in traditional agriculture through roadbuilding will have to take place in regions that lie outside of the impact area of the Rama Road, involving new settlers or persons living in these areas and producing primarily for their own consumption. Roadbuilding will do nothing to overcome the duality existing in the Rama area and the low incomes characteristic of the subsistence sector in general.

The role of roads in accommodating population growth also needs to be looked at more carefully. Migration into parts of Nicaragua not served by good roads, such as the Pantasma Valley in the department of Jinotega, as well as the flow of settlers from the Meseta Central of Costa Rica to parts of the country not served by infrastructure, indicates that a substantial migration may take place without the benefit of good public roads. This point needs to be taken into account when measuring the cost-benefit ratios associated with roadbuilding. For those settlers who would have migrated without the attraction of an all weather road, the production for home consumption cannot be counted among the benefits derived from the road.

As Myint recognizes, a country can go just so far through an expansion of the market-served land area cultivated under traditional methods of production--"Sooner or later the extension of cultivation will press against the limits of cultivable hinterland, and thereafter population growth will outstrip export expansion and lead to a situation of overpopulation and 'disguised unemployment' in agriculture."[32] Nevertheless, he argues that peasant production should not be written off as a source of future economic growth in favor of some other line of production, such as manufactured goods, because the peasant sector still has a capacity to expand through better technology. Myint attributes the failure to modernize peasant production to the fact that "with unused land easily available, it was so much easier to expand along existing lines than to try to introduce improved methods of production."[33] The classical case of the upgrading of peasant productivity through modernization occurred in Japan at the turn of the century.

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[32] Ibid., p. 51.

[33] Ibid., p. 52.

The Japanese Model

The Japanese model has been set forth as an example of how a country may obtain rapid growth in agricultural output at a relatively low cost and with a minimum of social displacement and reorganization. Bruce Johnston has compared this with the Soviet experience which emphasized costly machinery, organization of collective farms, and the replacement of price incentives with administrative orders.[34]

The Japanese experience emphasized the development and implementation of yield increasing technologies. The major effect of these technologies was an increase in the productivity of the physical land base, rather than the addition of more units of capital (land) through an extension of the area under cultivation. To a large extent this involved the intensive use of fertilizers and the breeding of new strains of rice that were responsive to fertilizers, but improvements were also made in irrigation, pest control, cultivating, transplanting, and weed control. Over the forty-year period, 1880-1920, the caloric yield of six major crops rose by 77 percent. As the agricultural labor force actually decreased over this span of years, labor productivity was more than doubled. The area of land expanded during the same period by only 21 percent.

Johnston points out that this achievement was carried out within the framework of small-scale and fragmented agricultural units, utilizing human rather than mechanical power. He classifies the investment in experimental and educational institutions which provided the technological basis for the expansion of output as "moderate" or "little." An increase in working capital at the farm level was needed to acquire greater quantities of fertilizer, but this could be provided for without difficulty because of the rapid turnover of working capital as opposed to an investment such as machinery.[35]

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[34] Bruce F. Johnston, "Agricultural Productivity and Economic Development in Japan," Journal of Political Economy (Chicago: University of Chicago, December 1951), pp. 498-513.

[35] Ibid., p. 501.

In addition to the above measures land taxes were implemented to assure that increments in agricultural production were allocated to industrial development. The land tax was fixed. While this may have induced greater output, it imposed a fixed tax burden beyond the means of many small farmers to pay in adverse agricultural years, and resulted in their losing their properties. It is doubtful, however, that taxation of peasant agricultural gains for industrial development needs to be implemented in Nicaragua. The slowness of manufacturing growth in the Central American area seems to be attributable to the lack of mass purchasing power rather than a shortage of capital. Fortunes that have been made in export agriculture, plus international funds, would undoubtedly be used for such purposes if the internal market existed. Therefore, the relevance of the Japanese model reduces to raising the productivity of the subsistence sector.

Does the necessary technology already exist, or will it have to be developed through research? Our field study revealed a uniformly primitive level of technology in the production of agricultural crops. This could mean that more profitable techniques exist, but have simply not been brought into use; however, a few things have been tried. A long time resident of the area recalls an attempt to introduce hybrid corn which failed because the husk of the corn did not give the ear sufficient protection against spore-bearing precipitation, which resulted in fungus diseases. An extension worker tried to introduce a variety of corn which gives greater protection against fungus infection than varieties used by campesinos. He utilized ten demonstration plots, but not a single plot produced corn as they were all ruined by pests. This same extension agent, who now works in another region of the country, reported that during his assignment in the Rama area he encountered many problems, but no solutions.

The experience of a U.S. farmer, who took up farming in a pioneer area of Costa Rica not unlike the Rama area, demonstrates the frustrations attendant to the transferral of techniques that work well elsewhere to the ecological setting of the rainy tropics:

> We felled the forest, cleared the land, and planted the first crops. They were a failure from the beginning. We weren't discouraged; we began experimenting--using fertilizers, lime, manure, insecticides, fungicides, varieties of seed, cover crops, various methods of tillage. We consulted agronomists, farm research and extension agencies, and farmers' publications, and called upon the experience that had enabled us to farm successfully in the United States. We discovered that other settlers in our area were making similar efforts with equally unsatisfactory results. . . .

> Where rain drives month after month through loose, permeable soil, where terrain is hilly and erosion carries soil away, where sunlight burns fiercely into the land, it requires an art beyond the ability of most farmers to grow crops well over sustained periods, even with fertilizers and modern techniques. What is more to the point, such methods applied to soils divested of their original forest cover are seldom profitable.[36]

The consensus of professional opinion regarding the state of knowledge of how to upgrade food productivity in the tropics seems to be expressed in a recent proposal to create an agricultural experiment station in Colombia--"Much of the knowledge which might permit rational utilization of the lowland tropics for food production remains to be developed."[37] Agricultural research has not been completely neglected in the tropics; on the contrary, it has been carried out with some success for a limited selection of crops, but the products involved have been almost exclusively those which are normally exported from the tropics to developed temperate zone economies.

It appears that the major research breakthroughs remain to be accomplished. Of course, the Japanese effort was not restricted to a mere transplanting of improved methods that were already developed in the West, but involved plant breeding and experimentation with fertilizer results. Nevertheless, it would not be realistic to expect Japan's experience to be duplicated in the wet tropics. Japan is a temperate country. The traditional or pre-scientific agriculture practiced in Japan was capable of supporting a large sedentary population. While it is claimed that the Mayas and other indigenous groups of Latin America were able to support relatively high population densities in such areas as the Petén in Guatemala, there is no modern evidence that traditional agriculture in the

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[36]Daryl G. Cole, "The Myth of Fertility Dooms Development Plans," The National Observer, Volume 7, No. 17 (Silver Spring, Maryland: Dow Jones and Company, 1968).

[37]Lewis M. Roberts and Lowell S. Hardin, "A Proposal for Creating an International Institute for Agricultural Research and Training to Serve the Lowland Tropical Regions of the Americas," (unpublished monograph on file in Land Tenure Center Library, University of Wisconsin, October 1966), p. 1 of summary.

humid tropics of Latin America is capable of supporting anything other than an extensive shifting agriculture. The obstacles to improvement in the wet tropics appear to be more severe and numerous. "Inhospitable in themselves, these conditions /heat and high rainfall/ foster others even more hostile: plant diseases, pests and weeds which prosper better than food crops, poor soils, lack of drainage, absence of land transportation, and diseases which attack both man and animals."[38]

The limited use of fertilizers in tropical regions is partially a problem of cost, partially a problem of lack of knowledge required for effective use of fertilizers--"Moreover, little work has been done to establish meaningful correlations between the physical characteristics of different types of soils and their cropping potentials, much less the response to fertilizers that can be expected for different crops grown on various soil types."[39]

Recent articles on tropical agriculture have stressed the importance of complementary interactions among different classes of inputs. The development of higher yielding varieties may be of little help in the absence of measures to reduce the acidity of leached soils and control weeds. In the Rama area, higher yields of rice or beans would probably require more efficient techniques for storage and harvesting to prevent losses due to precipitation and humidity during the harvest and post harvest seasons.

No one, least of all the present writer, would argue against undertaking large scale programs of scientific research related to food production in the wet tropics. However, because of the apparent complexity of the problems, there is every reason to believe that a long time would pass before significant scientific and economically important breakthroughs occurred. Therefore, it behooves us to simultaneously search through other means by which incomes and productivity may be improved for the large number of people working in subsistence agriculture.

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[38] Ibid., p. 8.

[39] W.W. McPherson and Bruce F. Johnston, "Distinctive Features of Agricultural Development in the Tropics," in Herman M. Southworth and Bruce F. Johnston (eds.), Agricultural Development and Economic Growth (Ithaca, New York: Cornell University Press, 1967), p. 205.

A few comments are in order regarding the possibility of a transition from shifting agriculture to permanent tree crops on the subsistence units. This, it is frequently pointed out, is one area in which tropical agriculture has demonstrated its comparative advantage, particularly in so far as many of these crops are not grown in temperate climates. Besides the fact that tree crops have root systems that extend down below the leached area to acquire necessary nutrients, Johnston and McPherson point out that "Fertilizer is being used in increasing quantities on tropical tree crops where the combination of high yielding varieties, fertilizer application, and modified cultural practices produce very large increases in yield."[40]

There are no ongoing experiments within the Rama area from which inferences could be made with respect to the economic viability of an expansion of permanent type crops. The area was once a center of banana production, which ceased with the onslaught of the Panama disease. The production of bananas was concentrated on alluvial soils along the rivers of the eastern portion of the study area. Most of the farms studied are situated on lateritic soils of doubtful capacity to support banana production. The cultivation of African oil palm has been attempted on the former banana lands and has been seriously affected by a disease which the present owner has not been able to identify. The successful development of African oil palm plantations in Colombia and Costa Rica may portend a future for this crop in Nicaragua. One advantage of tree crops such as the oil palm is that the land may be simultaneously utilized for grazing livestock. Whether or not this type of operation can be extended beyond the fertile and level river banks of the Atlantic Region remains to be seen.

Growth Within the Two Sectoral Framework

If the limits of per capita production through traditional agriculture have already been attained, and a modernized peasant agriculture is not a reasonable expectation, at least for the near future, we are faced with the question of alternate means by which the subsistence producers may experience higher productivity and incomes. Broadly speaking, we may distinguish two strategies. One is incorporation; the other is transformation. Incorporation entails

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[40] Ibid., p. 206.

the expansion of units on which the subsistence farmer participates in the capacity of a laborer, while the managerial and investment functions are performed by those presently involved in such activities or new investors. Transformation involves the active participation of the subsistence producer in converting his enterprise from labor to capital intensive production, or modernization using better quality inputs.

The economic growth model of W.A. Lewis is a two sector model which deals with growth through investment and incorporation. The investment of profits or other sources of capital within the capitalist sector raises the marginal productivity of the existing stock of labor, thereby increasing the demand for labor. Persons employed in the subsistence sector, responding to an increase in the number of workers demanded at the institutional wage (which is equal to average productivity in the subsistence sector plus a slight mark up to induce labor to make the transfer), hire out their labor services, thereby becoming involved in the growth process. According to Lewis, the process stops, or is slowed down, when enough redundant labor has been bid out of the subsistence sector to raise average subsistence productivity, and hence, the reservation wage. After this point has been reached, further growth is not possible without balanced growth to provide demand complementarity.

Can the Lewis model be employed where there is <u>not</u> a surplus labor supply that could be removed without decreasing total subsistence product? I would say yes, under the following two conditions: 1) Average and marginal productivity of labor are equal in the subsistence sector. In this way the removal of part of the labor supply from the subsistence sector will not result in an increased average productivity and consequently, a higher reservation wage; 2) The capitalist sector produces for export markets. With positive marginal productivity in the subsistence sector, the capitalist sector would be adversely affected by changing terms of trade if it depended on the subsistence sector as a market for its goods while simultaneously reducing the total product of that sector by bidding labor away from it.

The above conditions are found in the Rama area as well as in other, though not all, regions of Nicaragua. The production of beef is largely for the export market, as well as other products sold by the non-traditional sector such as coffee, cotton, sugar, and sesame. The extensive, shifting agriculture practiced in the Rama area as well as in other parts of the Central and Atlantic Region is, in my judgment, generally characterized by constant

marginal, hence average, productivity of labor. In areas where sedentary, intensive production of food products takes place on minifundios, such as in the department of Masaya, the original assumption of surplus labor may be a valid one.

Another possible reason why agricultural expansion through investment by existing economic elites is not threatened by rising average productivity in the subsistence sector as the labor force is transferred out of that sector is the lack of property rights for so many subsistence producers. A subsistence producer whose annual income exceeds the average agricultural wage may eventually be forced to join the labor market if he is compelled to abandon his land because as a renter or "squatter," he has no defense against persons who see an investment opportunity in the land which he works.

I would argue, then, that a considerable expansion of the type depicted in Lewis' classical model is conceivable in Nicaragua; that is, it is not threatened by the possibility of rising wage rates. The possibility of further mechanization of cotton harvesting, which is cheaper in monetary terms than hand picking, reinforces this potential.

It is not unreasonable to expect that an expansion of capital intensive production will occur in the Rama area. As shown, about 80 percent of the producers have not undertaken this expansion of their own volition. Therefore, the land under their control would have to be transferred to owners of existing capitalized farms or new investors. Assuming that land acquisition and incorporation proceeds until the entire area has been converted from subsistence cultivation to ranching, we may ask what the results would be in terms of employment and income levels.

The labor force required would be considerably lower than that required at present with most of the population engaged in crop production. With specialized livestock production, probably not more than about four to five thousand man units of labor would be required for the entire 300,000 hectare area. The labor force presently engaged in the same area totals about eight thousand units. A great deal of labor would be used during the interim period of transition, when lands transferred from shifting cultivation to livestock grazing are cleared of natural and secondary forest vegetation, and fences and corrals constructed, but once these tasks are completed the labor requirement for the area would stabilize at a figure substantially below what the area is able to absorb when used for crop production. The excess labor would presumably acquire land or employment in new pioneer areas. The new

frontier areas would also have to absorb new migrants from the Central Region (and possibly the Pacific) as well as natural population increases occurring within the Atlantic Region.

The wage rate for workers employed on the cattle haciendas would be determined by the national labor market for unskilled labor and would consequently be quite low, not much greater than $1.00 per day. Since productivity would be considerably higher than is presently the case, the unequal distribution of income would be reinforced.

The effect of the growth of production through the expansion of capital intensive farming characterized by incorporation rather than transformation cannot be fully appreciated without taking time into account, and without reference to developments in other settlement areas. As mentioned, the growth of cattle ranching in the Rama area would undoubtedly result in a partial displacement of labor to other areas. Will an expansion of capitalist employment in new settlement areas occur rapidly enough to absorb this displaced population, as well as continued migration from other areas of the country due to population growth and other factors? This is somewhat doubtful. One limitation is available capital, but this can be overcome through credit from national or international sources. A more important limitation is the number of individuals in Nicaragua that are able and willing to undertake the organization of agricultural enterprises, other than traditional subsistence agriculture, under existing forms of economic organization and policy. They are too few in number to create gainful employment for the rest of the population. In certain lines of production, labor saving equipment complicates the employment problem. Also, many of the agricultural entrepreneurs that have contributed to Nicaragua's postwar economic growth are persons who have an urban based occupation or business. They prefer agriculture properties that are located on the Pacific coast or near a major artery such as the Rama Road or the Pan American Highway. Most parts of the Atlantic Region may not attract this type of investor because of remoteness. Thus, the agricultural "bottleneck" in Nicaragua is the level of skills of the campesino masses. There is a discontinuity between the primitive shifting agriculture practiced by the typical campesino and the abilities required for the successful production of many products that Nicaragua's natural resources would permit her to sell to the world's markets.

If we were to be optimitistic and assume that the country's economic elites will undertake an enormous expansion of agricultural production which provides employment for everyone, the question might

still be raised, what would this solve? The complete incorporation of subsistence laborers into large, modern units of agricultural production may have a negligible effect on wage levels. As long as the wage paid to labor is geared to the opportunity cost, and there are few opportunities outside large scale agriculture other than shifting cultivation, why should wages rise? We cannot expect the development of light manufacturing industry producing for the internal market to provide an alternate opportunity for labor, since low agricultural wages is itself a factor holding back such a development. In addition, internally balanced growth is not necessary for the further growth of the agricultural economy, as Nicaragua has not reached the limits of growth through agricultural exports.

Transformation--An Alternative?

It has been shown that the typical migrant to the Rama area practices a poverty agriculture and that there is scarce evidence that the production of typical food crops can be substantially improved, given the present state of scientific knowledge regarding tropical agriculture. For a variety of reasons, the possibility that the campesino population will be incorporated into the process of economic growth through an expansion of agricultural wage labor opportunities is neither assuring nor necessarily desirable. If this is the case, the alternative of transformation should be examined.

Transformation would involve creating the conditions whereby the campesino acquires an ownership and managerial interest in the more productive enterprises, such as cattle ranching in the case of the Rama area. Historically, and at present, his role has frequently been that of contributing towards the development of someone else's production unit, clearing of land for pasture and construction of corrals and fences, while making no progress towards his own economic and social improvement.

A central issue is social organization during the transitional period, when the transformation process is underway. In my judgment, it is a mistake to conceive of the subsistence sector as thousands of atomized, individual units, to which the traditional socially-provided development services of the U.S. experience (credit, roads, extension workers, titles), may be made available with the expectation that free and rational individuals will make economic choices, the sum total of which will contribute to accelerated growth of national income. In the first place, few governments possess the resources needed to undertake such a

strategy. Furthermore, the historic role of the Nicaraguan campesino, created through the institutions of the conquest and continued after independence, will not be easily altered through his own "entrepreneurial" efforts. In particular, he cannot be expected to take the initiative in new productive ventures that involve an abrupt departure from traditional products and techniques. He can be allowed to become an organic part of viable economic units that are capable of providing both security of expectations and a learning experience, which allows for evolution toward independence from the very institutions that were created to permit the transformation to take place. The particular economic organization of the agricultural economy which would permit such a development should be simple in order to be practical.

One type of arrangement which has had considerable success in areas of underdeveloped agriculture is the "satellite system." It is found particularly in connection with crops that are processed prior to sale to consumers, and for which uniform quality is an important consideration. Under the satellite farm system "farmers around a processing plant receive all non-labor inputs from the processing firm and carry out all field operations under its supervision."[41] This system has been criticized because it reduces the farmer practically to the level of a hired laborer of the processing plant. However, it has been successful in getting supposedly tradition bound peasants to use a whole array of new inputs and practices, and as such constitutes an invaluable learning experience. This experience provides the basis for the "satellite" farmer to become a successful independent operator should the opportunity arise or be created. I would suggest that a modification of the satellite farm system be undertaken in the settlement of those areas of the Atlantic Region where the most profitable agricultural product or production technique is not one that is part of the traditional subsistence complex. This concept might be employed in settlement of areas suited primarily for cattle production in the following way.

The nuclear physical and administrative unit would be a farm rather than a processing plant. The nuclear or central farm would be surrounded by the satellite units. The central unit would be administered by a private individual or government agronomist, with demonstrated ability in livestock production. The satellite farms would be occupied by typical campesino settlers. Initially

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[41] Marvin P. Miracle, "'Subsistence Agriculture:' Analytical Problems and Alternative Concepts," in American Journal of Farm Economics (May 1968), p. 293.

all financial and technical assistance would be channelled directly to the central unit from a government agency, such as the National Development Agency (INFONAC) or the National Bank. The satellite farmers would make contractual arrangements between themselves and the central unit. The contracts would vary over time, as the satellite farmers gain experience, with both decision-making authority and capital being transferred to them as they move towards maximum independence from the central unit.

The physical transformation of the area would involve land clearing, establishment of pastures, construction of homes, fences, and corrals. The central unit would be developed before the other units. A breeding herd would then be acquired for the central unit. Once pastures have been seeded on satellite units, they would receive young stock, the offspring of the breeding herd, to be pastured until ready for market.

The satellite farmers would provide the labor required for the physical development of the land. For this, they would receive a wage, paid out of the loan between the development agency and the manager of the central unit. Thus, at the outset, the satellite farmer would work in the capacity of a wage laborer. Once the physical plant has been established, the satellite farms would "rent" pasture land to the central units. The satellite farmers would maintain the fences, corrals, and pastures on their own units. For performing similar tasks on the central units, they would receive a cash wage.

In the second phase, when the satellite farmers receive a rental payment for the use of their pastures by the central unit, the control of the animals remains with the manager of the central unit. This is to assure that necessary practices such as vaccination, insect control, supplementary feeding, controlled breeding, and perhaps artificial breeding are carried out. When advantageous, these practices may be carried out on the central unit itself. Through observation and wage employment on the central unit, the satellite farmers will become aware of these practices, their purposes, and how and when they are carried out. Once a certain degree of familiarity with the essentials of animal care has been acquired by the satellite farmers, they may progress from "renting" their pastures to the central units to a profit sharing arrangement whereby they share the gains of young stock transferred from the central unit to the satellite farms. Finally, they can choose to retain their profit share in the form of mature animals with which to start their own breeding herds. After this point they may continue to use certain services provided by the central units

because it is cheaper or more convenient to do so than to provide themselves with the same services.

The contractual arrangements between the central and satellite units would be determined with the participation of the development agency, so as to mitigate the influence of power on either side. Limitations regulating the transference of land would be needed, particularly to avoid the absorption of the satellite units by the central units. The income share resulting from the various contractual arrangements should be high enough to represent a substantial improvement in campesino income levels, while at the same time leaving enough for the central units to attract able personnel.

The central unit could be, in addition to a productive service center, the site of several community services, such as an elementary school, a chapel, and a sports field. Regional central units could provide services to smaller central units, such as agronomists and secondary schools.

The basic idea of contractual arrangements between satellite and control units is no departure from what actually occurs in the countryside. "Capitalist" and subsistence farmers are continually using one another's services; however, the initial distribution of power and wealth is such that the latters' efforts earn little other than survival in poverty and ignorance. The real payoff of a satellite farms scheme would come when the children of the first generation of participating farmers are able to manage newly established central units.

Many details would have to be worked out before such a scheme could be put into action, and it would have to be flexible enough to adjust to unforeseen circumstances, particularly conflict between participants. Basically, the idea may be expressed as changing the exploitative relationship which exists in the rural areas into a symbiotic one, by placing physical limits on the property of the central units and providing financial and technical assistance to them on the condition that they enter into contractual arrangements with the satellite units. Income, technological and entrepreneurial "spillovers" result. This scheme explicitly recognizes the duality that exists in Nicaragua, and to a certain extent defers to it as a historical reality with the hope that it can be made to serve a new purpose.

IX. SECURITY OF PROPERTY AND ECONOMIC GROWTH

The provision of secure property rights to the actual occupants of agricultural land has received as much, or more attention than the question of land distribution. This is undoubtedly due to the rather frequent occurrence of conflicting land claims and dissatisfaction with the manner in which the conflicts are settled. Conventional economic arguments are often presented as a rationale for providing property rights to persons squatting on private or public lands, especially the contention that a title will set off a chain reaction by qualifying them for institutional credit, which will then be used for purchasing improved inputs, and lead to higher productivity and income levels. However, the need for extending the system of property rights to include campesinos that do not possess the means to legally defend their possessions is also recognized as a social measure necessary to prevent their dispossession at the discretion of other parties.

Types of Land Ownership in Nicaragua

In Nicaragua property is owned by four entities: the state, municipalities, indigenous communities, and private persons or corporations. Public land is of two types--lands whose use belongs to the public at large, such as roads, bridges, coastal waters, etc., and a residual category defined as "all land not devoted to public use and not belonging to individuals, communities, or corporations under legitimate titles."[42] This land covers a large proportion of the total area of Nicaragua; and is located mainly in the Atlantic Region and to a lesser extent in the Central Region. An increasing number of farmers actually occupy and cultivate units of public land.

Acquisition and Possession of Public Lands

Until 1939 there was a clearly defined procedure whereby individuals could acquire private property rights to areas of public domain, as detailed in the Agrarian Law of 1917. The first step was the acquisition of a provisional title, obtained by submitting a claim of intent to acquire ownership of the land to the

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[42] Alfonso Blandón, "Land Tenure in Nicaragua" (Unpublished Master's thesis, University of Florida, 1956), p. 46.

political chief of the department in which the land is located, giving 30 days public notice of the claim to permit it to be contested, and carrying out a survey. With a provisional title, the claimant could qualify for a permanent title after a lapse of five years, providing that he had actually cultivated the land (an inspection was to be carried out to verify this). Next, a permanent title was issued by the state for a cost which was based on the quality of the land.

According to the Constitution of 1939, the lands of the state were declared to be imprescriptible; that is, they were no longer subject to a claim to private title after being used for a specified period of time.[43] This assertion regarding the inalienability of public lands through prescription was repeated in subsequent constitutions.

The authority to distribute such private titles was left to the discretion of the executive, though congressional approval is necessary in certain cases.[44] The declaration that the national lands were imprescriptible did not, however, prohibit people from utilizing the natural resources of the public lands.[45]

An observer from the United States, writing in 1961, claimed that acquisition through prescription was discontinued because it gave rise to abuses:

> The legal procedure was clear and relatively simple, as it placed upon the prospective settler the responsibility of locating the property, making a preliminary determination of boundaries, and undertaking a formal declaration before the administrative head of the department in which the property was located. This law gave rise to abuses, however, as it was used to create latifundia and those without education or the resources to retain a lawyer did not benefit. For these reasons, it was suspended . . . .[46]

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[43] José Lugo M., A Statement of the Laws of Nicaragua in Matters Affecting Business (Washington: Panamerican Union, 1957), p. 35.

[44] Ibid., pp. 35-36.

[45] José A. Martínez P., "Reforma Agraria en Nicaragua" (Unpublished thesis, Leon, Nicaragua, 1960), p. 31.

[46] Lloyd Barber, "Nicaragua," in Latin American USOMs Seminar on Agrarian Reform (Unpublished report of U.S. Operation Missions' seminar held February 21-24, 1961 at Santiago, Chile), p. 148.

The Agrarian Reform Law of 1963 repealed the Agrarian Law of 1917. The new law empowers the Agrarian Institute of Nicaragua to acquire national lands from the state for the purpose of carrying out programs of land settlement, and gives persons that had been occupying national lands for more than one year prior to the passage of the law the right to acquire a title to the land which they have actually cultivated. The law contributes nothing in the way of orderly procedures for future spontaneous colonization.

Because of inadequacies in the system of recording and describing landed property, the identification of lands still belonging to the public domain is a difficult job. The head of the legal department of the Agrarian Institute observed that:

> With respect to the national lands . . . . one can only say that they are not known because of the lack of a cadastral survey, and that when the Institute has apparently succeeded in isolating some of this type of land, an owner suddenly shows up to make the corresponding claim.[47]

In spite of the fact that the provisional titles are no longer convertible to permanent titles after a five year period, they are still issued in the departmental capitals, and are accepted as evidence of the legal possession of land by credit institutions. However, the majority of the settlers do not possess a legal or provisional title to the land which they occupy and use. Some have written evidence, of questionable legal value, that they purchased land from the previous occupant. (Legally, the settlers cannot buy and sell the land, since it is the property of the state. They may, however, sell the improvements that have been made on the land. In actual practice, they also sell land that has not been improved.) The various tenure situations of the farmers interviewed were grouped into three broad categories, as shown in Table 11.

In interpreting the figures in Table 11, the following facts should be borne in mind: 1) The information was provided verbally by the persons interviewed. They were not requested to show their documents, nor was any check made through official records in the departmental capital. 2) There is movement from one category to

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[47] Ricardo Hidalgo J., "Labor Jurídica," in Memoria, 10 de Julio de 1964--31 de Diciembre de 1965 (Managua, Nicaragua: Instituto Agrario de Nicaragua, 1967).

Table 11. Tenure and Evidence of Possession of Land, 272 Farms, the Municipio of Rama, 1965

Type of Possession	Number of Farms	Percent of Farms
A. Possession with Written Evidence		
1. Legal title of private ownership	9	3.3
2. Provisional title	57	21.0
3. Document related to purchase or sale of land[a]	65	23.9
B. Possession Without Written Evidence	51	18.8
C. Occupation of Someone Else's Holding as a:		
1. Renter	27	9.9
2. Usufructuary	18	6.6
3. Squatter (Precarista)	14	5.1
D. Combined Tenures	31	11.4
Total	272	100.0

[a]The most common of these (56 cases) is the promise of sale, a written and legally witnessed document by which the previous occupant obligated himself to sell the land to the present owner for an agreed upon amount.

another which may alter the percentage distribution over time. For example, some of the renters interviewed expressed a determination to continue occupancy of the land without paying rent, in which case they will become squatters. 3) In certain instances it was very difficult to obtain a reliable estimate of the number of squatters.

The relative importance of the various forms of tenure, the size of the farm units, and the frequency of conflicting claims varies with respect to location. The occurrence of rental and squatting is concentrated in the townships that are close to the Rama Road. In general, units in these tenure classes are well below

average in size. The largest holdings are also concentrated near the road. These generally belong to persons who possess a provisional or permanent title. As one moves away from the highway, there is much less dispersion of farm size, fewer cases of rental and squatting, and greater frequency of farms in the category "possession without written evidence." The occurrence of conflicting claims is greatest near the highway.

The conflicts that occur near the highway are generally between a single individual who possesses a title to a relatively large holding, and any number of precaristas in actual possession of all or part of the property. In some cases the precaristas occupied a plot to which a title had previously been issued to the owner; in others the precaristas claim prior occupancy. In no case was it claimed that the campesinos usurped lands which the alleged owner was actually using, confirming the observation of one large landowner that problems of squatting arise only where land has been left idle.

There are two basic working rules as to what constitutes a claim in the areas of public lands. One is the rule that idle land should be available to anyone who undertakes to cultivate it. The squatters on titled (provisional or permanent) lands accept this rule and in one case have organized and declared their willingness to physically resist any attempt to divest them of their holdings. This rule of property undoubtedly functioned well under conditions that prevailed years ago in areas of extensive public lands: few roads, lower population density, and less competition with cattle ranching. The other rule is that land belongs to the person who possesses a title. The difference between the two rules of tenure seems to be that of customary versus legal procedures, but this distinction is poorly defined. The so called customary rules may in some cases have legal sanctions in the constitution and the agrarian reform law (particularly with respect to the social function of property), which are ignored or unknown when local conflict resolution takes place. Also, titles may be acquired and defended by public authorities in violation of procedures and requirements outlined by the law.

It is not altogether surprising that resolution through violence has occurred in the absence of adequate procedures. A former priest of the Rama parish informed us that he had learned of 15 deaths resulting from disputes over land in the municipio of Rama in 1964, and tales of violence in rural Nicaragua are common.

Generality of Tenure Conflicts

Tenure problems have not been limited to areas of national land. In summing up the land tenure situation in Nicaragua, Dr. Ricardo Hidalgo, head of the Legal Department of the Agrarian Institute observed:

> Our daily experience indicates to us that the land tenure situation in Nicaragua is unstable. Consequently, farmers without property rights continually invade the offices of the Agrarian Institute, soliciting the state to intervene and legalize their uncertain situations, whether they are located on private lands, municipal lands, or lands that are supposedly national.
>
> As far as the municipal lands are concerned, these have been monopolized by the small capitalists of the respective municipalities through concessions, rental, or simple deforcement, generally without the municipalities obtaining in return the small sums contemplated in their tax plans.
>
> The indigenous communities are rich in lands and centuries old titles given by the Spanish Crown, which refer to vast comarcas covering many thousands of manzanas of land . . . .
>
> Lately, these lands of such vague limits and imprecise measurements have come to be in the power of people outside of the indigenous communities because of the weakness and lack of responsibility on the part of their directors.[48]

In 1958, when Ycaza Tigerino submitted his agrarian reform law for the second time to the Chamber of Deupties, he tried to impress upon the deputies the urgency of the situation by citing some of the cases of land conflict that had recently appeared in the Nicaraguan press. The cases and comments are quoted below, to give the reader a sense of the types of situations which arise in Nicaragua:[49]

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[48] Ricardo Hidalgo J., op. cit.

[49] Julio Ycaza T., Hacia la Reforma Agraria en Nicaragua (Matagalpa, Nicaragua: Imprenta "Minerva," 1959), pp. 98-101.

Eleven months have passed since I presented my proposed law . . . .

Since then a series of incidents . . . have occurred in an uninterrupted sequence.

In 1957 the newspaper of Managua told of the dispossession of the 20 campesino families in the village of Quebrada Honda, located at kilometer 42 of the North Highway . . . .

Next came the anguishing problem of 200 campesino families of Santo Domingo and La Libertad, threatened with expulsion from their lands and homes, where they had worked and lived for over 40 years, by the pretensions of the mining company "El Jabalí" to the possession of about 14,000 manzanas of land for which the company alleges to have property rights . . . .

The beginning of 1958 has seen a return of the agrarian problem in our country. From one extreme of the national territory to the other the cases of dispossession occurred almost without interruption . . . .

In the March 31 issue of La Prensa we read "Complaint of theft of lands in Posoltega;" and in a letter directed to the President of the Republic a group of small landowners accuse a mayor of acquiring for himself a thousand manzanas of municipal lands, dispossessing the legitimate occupants.

The same newspaper, in its April 2 edition, stated: "One more plunder of lands in Nandayosi." This time a rich hacendado put up fences on the land of his neighbors, smallholders of 50 and 60 manzanas, whom he dispossesses of their lands in the village of Tatahuitepe . . . to the west of Managua . . . .

The next day, the third of April, it tells of the campesinos of Terrabona, of the villages of San Pedro Mártir, La Picota, and Cerro Grande . . . . They told the newspapermen that "People we had never known appeared with titles of ownership over our own lands. We have been bound and beaten. We have complained from one place to another demanding justice, and no one has listened to our clamor."

> Also in April, La Prensa published a letter . . . about the dispossession of 35 families of the valley of Vilan, this time involving a valley 20 leagues within Jinotega. The geófagos /literally meaning "consumers of land"/ are already arriving to the most remote parts of our hinterlands . . . . The 35 families cannot find a lawyer to defend them because the lawyer of the despoiler is a powerful politician in Jinotega . . . .
>
> The 16 of April it was in Boaco where 20 families of the township of Salgado complained of a Liberal leader who attempted to take over their lands, intimidating them with the National Guard. On the 29 of April the daily Novedades informs of 40 families threatened with dispossession in Río Tamarindo, municipio of La Paz.
>
> The headlines of the third page of the April 2 issue of La Prensa takes us to another extreme of the national territory, Chinandega, denouncing the insensible agitation of campesinos in the township of La Grecia, when 50 residents presented themselves to the authorities in order to protest the closing of roads by a few landowners bottling in the usufructuaries of municipal lands which the government donated to the municipality of Chinandega in 1915 . . . . No one is unaware that the closing of roads often forces the small farmers to abandon their lands or sell them to large landowners . . . .
>
> The information in La Prensa sent by their correspondent in Chinandega ends by stating "There is real concern among the sensible people of this city that the events that occurred in Leon are not repeated here."
>
> These events of Leon . . . were at the point of degenerating into a true armed conflict when more than 200 campesinos of the indigenous community of Subtiava, organized in armed squads, took over the lands which they considered usurped . . . .

Measures to Deal With Tenure Insecurity and Conflict

In its attempt to deal with disputes that have reached a stage requiring immediate attention, the Agrarian Institute of Nicaragua has developed a procedure for obtaining voluntary settlements. After an examination of the facts relating to the case, "an arrangement is generally suggested to the owner whereby enough land is

acquired from the owner to establish the squatters on individual family units, or in the case of a large group of campesinos, to organize an agricultural colony."[50] The lands acquired through this process are frequently donated by the owner, or sold to the Agrarian Institute at a price considerably lower than market value. In 1965, 7,611 manzanas of land were acquired at no cost through this process. However, the quality of land so obtained has been questionable. The IAN can convert a reluctant owner into a cooperative one in cases where the physical area occupied by the latter exceeds the area specified in his title.

Attempts at voluntary settlement have been fairly successful in the Pacific Region. In frontier zones, such as the area covered by this study, campesinos have in some cases refused to accept voluntary settlements arranged by the Agrarian Institute and landowners on the grounds that the proposed settlements were unfair.

This procedure often takes a great deal of investigation and time to resolve individual disputes; consequently, the number of cases attended to have been small in relation to the magnitude of the problem. Several persons have suggested that a procedure is needed to prevent both private persons and public authorities from taking action on a case before the Agrarian Institute has had a chance to intervene and suggest a resolution in accordance with the Agrarian Reform Law. To accomplish this, a proposed law of "status quo" has been formulated, but has not to my knowledge been presented to the legislature. This law would permit the Agrarian Institute to issue a decree ordering the law enforcement authorities, as well as the parties to the dispute, to do nothing to alter the existing state of affairs until the case has been submitted to the investigative and conciliative procedures of the Institute.[51] It has been indicated, however, that such a law might violate the jurisdictional section of the Civil Code, a factor that could impede its passage or implementation.[52]

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[50] Hidalgo, op. cit.

[51] Ibid.

[52] Luis A. Somoza, "Origen, Aplicación y Problemas de la Ley de Reforma Agraria," in Instituto Agrario de Nicaragua Memoria (Managua, Nicaragua, 1967).

Although the "status quo" procedure is not law, IAN, when it cannot immediately attend to a dispute, provides campesinos with a letter requesting all parties to respect the status quo until it has had a chance to investigate the case. However, local authorities sometimes ignore these requests.

Some have pointed to government sponsored settlement projects on national lands as a means for bypassing the approach of handling conflicting claims on an individual case basis. This way, campesinos settled on private lands might elect to receive parcels of national land rather than await the outcome of an investigation of their tenuous claims as squatters. As shown by this study, the first site chosen for the location of a government sponsored settlement project has already been claimed by spontaneous settlers. Whether or not a substitute site will be developed remains to be seen. President Somoza, who began his term in May 1967, has indicated that the distribution of titles to settlers presently occupying national lands will take precedence over government sponsored settlements designed to induce new migrants.[53]

The matter of designing effective and unambiguous procedures by which new spontaneous settlers may establish a legal claim to public lands has not been dealt with to the author's knowledge.

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[53] Novedades, 5 de Julio de 1967 (a daily newspaper).

X. THE DUAL PROCESS OF DEVELOPMENT PLANNING IN NICARAGUA

The Two Approaches

Within the field of economics, one may distinguish between two broad approaches towards the cognition of problems and desirable behavioral alternatives. One may be called the commodity approach, the other the institutional approach. The former deals with quantities, combinations, and prices of physical objects (including money), and attempts to determine their ideal values according to criteria which are deemed to reflect the social philosophy of the day, as well as some objective welfare standards that are thought to be independent of any particular social philosophy. The ideal values acquire the status of immediate ends to be attained by altering the absolute and relative quantities of the factors that enter into the commodity flow.

Another approach to economic problems is to view the economy as a system of social relationships, with rules which define these relationships. Since the rules which regulate economic transactions are created and enforced through collective action, we may call this second approach "institutional economics," after Commons.[54] Under this approach, the identification of a problem requiring investigation is frequently guided by an experienced or anticipated human difficulty; an attempt is made to understand if, and how, this difficulty may be overcome through the alteration of the social environment which controls the commodity flow. The public and private purposes which direct economic activity are included more explicitly in the analysis than is generally the case in theoretical economics. An excellent example is the economic aspect of the U.S. civil rights movement. To eliminate poverty and relative deprivation of opportunity, recommendations have been made for modifying the "working rules" which the economic system of firms and labor unions apply in determining which persons quality for employment. The frame of reference for the spokesmen of the civil rights and anti-poverty movements has been the economic system rather than the marginal productivity theory of wages and employment.

The two approaches to the study of economic problems are complementary rather than contradictory. The production, distribution, and consumption of physical goods and services cannot take place

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[54] John R. Commons, Institutional Economics (Madison, Wisconsin: The University of Wisconsin Press, 1934), p. 902.

without a system of state and economy that is capable of carrying out these functions. Likewise, institutional changes designed to alleviate poverty and redistribute opportunity cannot ignore the limitations of the physical relationships of production.

In spite of reciprocity between the two approaches, economists and policy makers often behave as if they were mutually exclusive. The discussion that follows outlines the formulation and implementation of development policy, as it relates to Nicaraguan agriculture, within the two frameworks outlined above and with emphasis on how they have been coordinated in solving the problems of widespread rural poverty and relative deprivation.

The Commodity Approach

Nicaragua has made impressive advances in productivity under this approach, and may continue to do so for some time into the future. The Nicaraguan government has played a central role in providing investment opportunities to the private sector. One's evaluation of this performance may be sobered by the suggestion of the ECLA economists that the achievements of the postwar period were a function of the degree of underutilization of resources that existed prior to the decade of the fifties,[55] or by Anderson's admonition that:

> Although we are accustomed to nations where there is a close relationship between economic elites and policy-makers, in Nicaragua, where policy-making and major economic activity has been so dominated by a single family, only a fuzzy and arbitrary line separates public and private policy performances.[56]

Still it is conceded, even by technicians who do not sympathize with the Nicaraguan political system, that the government has done an effective job of stimulating agricultural production, especially in the export field.

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[55] Comisión Económica Para América Latina, El Desarrollo Económico de Nicaragua (New York: United Nations, 1966), p. 2.

[56] Charles W. Anderson, Politics and Economic Change in Latin America (Princeton, New Jersey: D. Van Nostrand Co., Inc., 1967), pp. 255-256.

Some of the specific economic measures undertaken in the post-war period included: currency devaluation which stimulated exports by altering relative prices of imports and exports; an intensive effort at improving infrastructure during the decade 1945-1955, which included highway construction, improvement of port facilities, and electrification; the development of agricultural marketing and processing facilities, including the country's first milk pasteurizing plant (four private companies followed suit), and a modern slaughterhouse from which beef is exported to the United States; and the direct financing of agricultural production coupled with technical assistance. Financial and technical assistance by the government's credit institutions has been particularly important in the production of cotton. Since 1952, about three-quarters of the area dedicated to cotton has been financed by banks, particularly the National Bank of Nicaragua.[57] Nicaragua now has the world's highest yields of unirrigated cotton.[58]

One shortcoming of the pure commodity approach in a country such as Nicaragua is that the beneficial social results which the western historical experience and ideology associate with the profit maximizing criterion often do not materialize, due to the economies of modern capital-intensive technologies, nonpecuniary reasons for preferring machinery to labor, a distribution of land which exaggerates the real cost of labor, and other reasons.

Take, for example, cotton. Until 1962-1963, the cotton harvest in Nicaragua was entirely a hand operation. It was, and still is, an important source of seasonal employment for agricultural laborers. In spite of the existence of agricultural underemployment during most of the year, labor shortages have been experienced during the peak of the harvest season. Consequently, 62 mechanical harvesters were imported into Nicaragua for the 1963-1964 harvest. A study of the comparative costs of harvesting by hand and by machine showed that the latter method cut the harvest cost by almost 50 percent. Furthermore, the machine harvested cotton was found to be cleaner, whereas hand-picked cotton frequently receives a penalty for containing a high percentage of foreign matter, particularly when the

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[57] Departamento de Estudios Económicos, La Economía Nacional y El Algodón (Managua: Comisión Nacional del Algodón, March 1968), Chapter VI, p. 5.

[58] Ibid., Chapter XII, p. 1.

harvest is delayed until late in the season due to labor shortages. By the 1966-67 season, a total of 200 cotton harvesters had been imported, and almost one-fifth of the cotton was machine harvested.[59] This trend is expected to continue because of the forementioned advantages to cotton growers. The National Cotton Commission optimistically reports that:

> It can be expected that there will be a displacement of labor which is traditionally dedicated to this task, nevertheless, this labor tends to be reallocated to the other sectors of the economy.[60]

The other sectors were not specifically mentioned.

Another commodity which has recently come under the aegis of public development efforts is rice. In recent years, Nicaragua has had to import rice. It hopes to eliminate the import deficit, and sell rice to other deficit Central American countries, particularly El Salvador. Purchasers from U.S. rice companies have gone to Nicaragua to investigate the country's supply potential.

In the sixties a National Rice Program was undertaken with the participation of the National Bank, the National Development Institute, the Inter-American Development Bank, and private entrepreneurs. In 1963, there were about 7,000 manzanas of irrigated rice. There were plans to expand this area to 23,000 manzanas by 1968, and eventually to 76,000 manzanas or more.[61] Much of the actual and planned expansion is located on the eastern border of Lake Nicaragua, an area that had been primarily used for livestock pastures. Whereas in the past rice was typically grown under traditional techniques, the development of irrigated rice growing has been accompanied by large scale and highly mechanized production by producers with "greater ability and resources."[62]

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[59] Ibid., Chapter VI, pp. 2-5.

[60] Ibid., Chapter VI, p. 5.

[61] Inter-American Committee on the Alliance for Progress (CIAP), Subcommittee on Nicaragua, Domestic Efforts and the Needs for External Financing for the Development of Nicaragua (Washington, D.C.: Pan American Union, October 1966), pp. 45 and 164.

[62] Comisión Económica Para América Latin, op. cit., p. 109.

Other commodities for which a considerably expanded production is being evaluated for feasibility or actually planned include forest products, cattle production, dairy products, and bananas.

Bananas: The National Development Institute (INFONAC) has attempted to stimulate banana production on the Pacific Coast to diversify the essentially one crop export economy of the area. Irrigation costs are high and the government is interested in a return of banana production to the naturally irrigated (high rainfall) Atlantic Region, this time under national ownership. A beginning has been made at the Tierra Dorada plantation near Bluefields.

Dairy Products: INFONAC, in conjunction with the Nestle Company, has planned the construction of a dairy plant in the Matagalpa area for manufactured dairy products. As a complement to this program, 454 kilometers of farm to market roads are to be built. Unless the larger producers undertake machine milking, this project should increase the demand for labor in the region. There are many hillside "slash and burn" cultivators in the area to be served by the dairy plant; dairy farming could provide them with an alternative enterprise which will be less destructive of the land. It is doubtful, however, that INFONAC contemplates working with this class of producer.

INFONAC is also considering the construction of another slaughterhouse, this time in the Atlantic Region, to facilitate the export of beef from the Atlantic Coast. As suggested by this study, beef production may be the best alternative for large areas of the Atlantic Region, with the exception of the alluvial soils along the rivers which are suited to more intensive use.

The growth of cotton production dominated the development effort of the fifties and sixties, but it is likely that increasing attention will be given to cattle production in years to come.

The types of producers who will become involved in these newly created opportunities, and the degree to which the opportunities are to be utilized for the proliferation of managerial skills and improving income distribution is something which is generally not made explicit. After reviewing Nicaraguan agricultural policy, the Subcommittee on Nicaragua of the Inter-American Committee on the Alliance for Progress (CIAP) concluded that:

> The agricultural policy of the plan for immediate action concentrates on providing credit to the large, efficient producers, and will try to eliminate marginal operations. The country has a program designed to

> promote and expand production of commodities for export and consumption in which Nicaragua may have a comparative advantage. It will also try to reduce costs and increase productivity in cotton and coffee. It is hoped to partially solve some of the seasonal employment by means of the rice project. However, the agricultural policy does not specify the amount and quality of the human inputs needed.[63]

This is basically what has been referred to as the commodity approach, applied by government institutions which seek not only to identify specific economic opportunities, but also to provide financial, technical, and infrastructure services to the persons and groups that will exploit these market opportunities for particular commodities. In Nicaragua, the persons best situated to take advantage of such opportunities by virtue of their wealth, education, and skills make up a rather small proportion of the total population. Under the commodity approach, in its purest form, the social system which determines the distribution of these attributes is taken as given. Consequently, the recipients of the development services of the state tend to be those who least need them. This tendency is essentially what Anderson calls the "conventional approach," in his typology of development policies adopted by Latin American countries during the postwar period. Under this policy:

> . . . government is to establish a climate propitious for further investment, and to provide appropriate, in some cases extensive, services within the modern sector. However, government need not self-consciously concern itself with bringing change to the pre-modern community. Gradually, the fruits of productivity will "filter down."[64]

The "filter down" effect is the "best foot forward" rationale behind the conventional approach. There are, of course, other pressures for implementing this approach. One set of pressures for continuing this policy consists of the very difficulties which it generates in a dual-export economy. Balance of payments problem due to-- 1) fluctuating prices or yields of major export crops like cotton; 2) the high propensity to import on the part of upper income groups (which is difficult to overcome through import substitution because of the small size of the internal market); and

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[63] Inter-American Committee on the Alliance for Progress, op. cit., p. 157.

[64] Anderson, Politics and Economic Change in Latin America, op. cit., p. 163.

3) the use of international credits to finance production and infrastructure--exert a continual pressure to find short run solutions, and in the short run the desired results can only be obtained by working with the "modern sector."

The other pressure to continue the commodity, or conventional approach is the very effective integration of the representatives of the capitalist sector of agriculture with the state. As elected or appointed employees of the government, through commodity and producer groups such as the National Cotton Commission, and through the bonds of friendship and family, their integration with the government is thorough and effective. The flow of information and feedback has few impediments.

The commodity approach to economic development does not offer very promising results when confronted with the constraints that characterize the subsistence sector. Referring to the revision of the production goal for beans established by the National Planning Office for the 1965-69 period, the "Comité ad hoc" observed:

> The nomadic nature of these farms makes it very difficult to offer them better technical assistance. In addition, the Banco Nacional considers it impossible to help this crop through credit. Taking this into account, the Planning Office decided to reduce its objective by 35 percent.[65]

A revision was also made for corn. Originally the program called for planting a smaller area to corn, but sharply increasing yields on 20 percent of the remaining area. The revised plan no longer called for reducing the area--"perhaps because of the tendency to produce this crop on minifundias,"[66] nor did it insist on upgrading productivity on 63,390 manzanas "taking into account the necessity of allocating the scarce resources available to other programs of development."[67] The committee pointed out that the decreasing corn yields would be a difficult trend to reverse, given an uninterrupted

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[65] Comité ad hoc, Evaluación del Plan Nacional de Desarrollo Económico y Social de Nicaragua 1965-1969 (Washington, D.C.: Comité de los Nueve, Alianza para el Progreso, 1966), p. 177.

[66] Ibid., p. 177.

[67] Ibid.

process of degradation of soils and displacement of the campesinos with least resources towards less productive zones, due to the advance of more profitable crops.

The Institutional or Reform Approach

The specific measures that have been taken by the institution empowered with implementing the Agrarian Reform Law have been discussed in other parts of this study, and will be repeated here in summary fashion.

1. Voluntary settlements between landowners and precaristas in cases of conflicting claims so as to avoid hostility and possible violent resolution. The campesinos involved in such settlements are frequently organized into small agricultural colonies administered by IAN. (Several colonies were organized as deliberate experiments in reform by the Ministry of Agriculture before IAN was established.) These efforts have been very costly and have affected an extremely small proportion of the campesino class.

2. Titles for settlers on public lands to prevent their being dispossessed and to qualify them for agricultural credit.

3. Promotion of a law of "status quo" to bar private and public authorities from taking action on agrarian conflicts until the Agrarian Institute has had an opportunity to intervene. IAN has also supported modifying the constitution to permit payment with long term bonds for expropriated land. To the author's knowledge, neither measure has been incorporated into the law of the land, and expropriation has never been resorted to.

4. The design of government directed settlement projects to induce migration from problem areas to the sparsely settled Atlantic Region. The first area selected was the object of this study. It had been presumed that the area could absorb 3,500 families, in addition to those families already settled there, and that food crops such as beans, corn, rice, and others could be profitably grown in the area. The field survey showed both presumptions to be extremely doubtful. A second area immediately to the south was selected as a possible site, and another study undertaken. The new site has better soils and a more level topography. However, it is almost completely devoid of infrastructure, being for the most part virgin forest without roads or villages. The cost of roads, schoolhouses, medical facilities, homes, land clearing, correcting the acidity of the soil, storage facilities, and other initial costs could amount to tens of millions of dollars.

Over three years have passed since the above settlement project was originally proposed. If the project meets the approval of the Nicaraguan government, it will have to be submitted to an international development financing institution, such as IDB, a step which will require more time. Since the President has indicated that the distribution of titles to settlers already located on public lands and the improvement of production in areas already served by infrastructure should precede additional heavy investments in infrastructure designed to attract new settlers,[68] this project may not be carried out for many years, if it ever is.

In brief, the reform approach has not been implemented so as to achieve the objective as stated in Article 1 of the Reform Law:

> . . . The social and economic transformation of Nicaraguan agriculture through a fundamental modification of the legal structure, tenure, and the methods of exploiting the land, so as to obtain, with the equitable distribution of the cultivable area and its income and with the increase in production, the raising of the standard of living of the campesino masses and their incorporation into the process of transforming the national economy and the integral development of the nation.

The procedural as well as the substantive accomplishments of the two approaches may be compared, particularly with reference to the participation of affected groups in the process of identifying problems and opportunities, and suggesting solutions and formulating plans. The very thorough integration of the country's economic elites with the institutions and processes of government is not shared by the campesino sector. As a matter of fact, the latter is barely represented in the one organization which was created to serve his needs.

For the purpose of informing the Agrarian Institute of problems and conflicts related to land tenure in the various departments of the country, as well as to propose solutions, the board of directors may establish departmental agrarian committees with seven members, including four landowners from various regions of the department but only one representative of the campesinos. Decisions

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[68] Novedades, 5 de Julio de 1967.

of this group are decided on the basis of a majority vote.[69] (It is not clear whether the campesino in this case is to be a landless agricultural laborer, a precarista, a tenant, or a small landholder.)

Campesino representation on the Agrarian Institute's Board of Directors at the national office in Managua is no heavier than at the departmental level. The six man board includes one representative of the "workers of the countryside."[70] The representative of the agricultural workers is to be appointed by the President of the Republic. There is no requirement that he represent a campesino organization.

Campesino organizations are practically nonexistent in Nicaragua. In 1963, less than 1 percent of the agricultural labor force was unionized.[71] The poor sector of agriculture is truly what Anderson refers to as an "invisible sector"--"that part of the society whose demands are largely uncommunicated to decision-makers."[72]

The only attempt which the author can recall towards organizing a fairly large group of campesinos from various parts of the country, for the purpose of confronting the Agrarian Institute with specific grievances, was carried out by an alleged communist who had recently returned from Russia.[73] The organizer was accepted by the campesinos as the group spokesman, but not recognized as such by IAN, whose officials insisted on speaking only with genuine campesinos. After a short-lived hunger strike the campesinos were returned by trucks of the National Guard to the various departments from which they had traveled to Managua on foot.

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[69] Instituto Agrario de Nicaragua, "Solicitud de Préstamo al Banco Interamericano de Desarrollo" (Managua, 1965), Anexo 8.13.

[70] Article 5, Ley de Reforma Agraria.

[71] U.S. Department of Labor, Labor Law and Practice in Nicaragua, BLS Report No. 265 (Washington, 1964), p. 21.

[72] Anderson, Politics and Economic Change in Latin America, op. cit., p. 167.

[73] La Noticia, 19 de Noviembre de 1966 and La Prensa, 23 de Noviembre de 1966 (newspapers).

Complementarity of the Commodity and Reform Approaches

In a society whose major groups have a unity of purpose with respect to the ends to be achieved through economic policy, knowledge regarding the productivity of physical resources and the opportunities afforded by the market for commodities is used for attaining those ends. The institutional and commodity approaches are complementary to one another.

As a test case for evaluating the degree of complementarity attained through the two approaches in Nicaragua, we may examine the role played by two development projects that were both begun in the mid-sixties--the irrigated rice program and the colonization project planned for the Rama area (Rigoberto Cabezas Project).

The projects have been sponsored by different government organizations, working independently of one another. IAN, seeking an area where campesinos could be settled on family operated farms, selected the Rama area. The justification of the program in terms of the commodity (productivity) approach was that the soil resources of the region could be profitably used for producing commodities such as corn, rice, and dairy products which Nicaragua began to import in the late fifties and early sixties. The greatest deficit was in rice, a product for which the growth in consumption has exceeded the rate of population growth.[74] Two observations with respect to the difficulties confronting food crop production in the original settlement area, the greater relative profitability of livestock production, and the present man-land ratio (which sheds doubt on the wisdom or feasibility of settling additional migrants) have already been mentioned.

The growth, through public and private initiative, of irrigated rice production on the eastern shore of Lake Nicaragua and various parts of the Pacific Region has also been a response to the excellent market for this product in the Central American area. With irrigation two crops are possible per year, whereas there is only one yearly rice harvest in the Rama area. The irrigated areas are well served by infrastructure.

The thousands of manzanas of newly irrigated lands bordering Lake Nicaragua, and the tens of thousands of manzanas to be incorporated into irrigated production in the future, represent an opportunity to create thousands of new small scale or cooperatively organized farms, using labor intensive methods of production,

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[74] IAN, op. cit., p. 20.

simultaneously supplying the rice market and improving the economic perspectives of such potential beneficiaries as small cultivators on badly eroded hillsides, precaristas, and underemployed agricultural laborers. To do this would be to combine the commodity and reform approaches under advantageous circumstances, low cost land due to its extensive former use (primarily grazing), and few infrastructure or land clearing problems--this last reason making it in all likelihood a project whose cost per campesino settled would be less than that associated with directed settlement in the Atlantic Region. Of course, this is essentially a judgment on my part; it would have to be put to the test of experiment and cost-benefit analysis. Yet apparently it has not been seriously evaluated as an alternative. The CEPAL economists, finding a strong presumption in Nicaragua in favor of carrying out the irrigated rice production on a highly mechanized large scale basis warned that this policy will widen even more the breach between commercial and subsistence agriculture, and may use capital and managerial skills which could be put to use more productively in other endeavors (presumably where they will not compete with existing skills and low opportunity cost labor).[75]

A similar counsel was expressed by the "Committee of Nine" regarding the involvement of the subsistence sector in the expansion of cattle production. Because of the abundance of lands that are suitable for grazing, they consider this to be the principal means by which the traditional-subsistence sector can modify its structure, and suggest that the type of livestock development programs actually being carried out by the National Bank and the National Development Institute "be expanded to the level of a great national enterprise," incorporating all classes of producers.[76] This is, in essence, the conclusion reached as a result of this field study in the Rama area.

As things stood in July 1967, the commodity and institutional (reform) approaches towards economic development in Nicaragua have not been used in a complementary and coordinated fashion. They have worked at cross purposes, or so it seems, with different degrees of success. The reform policy has done little reforming, the commodity policy has been successful in strengthening the capitalist sector of agriculture in an era when the "trickle-down" argument has lost much of its validity.

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[75] CEPAL, op. cit., pp. 109-110.

[76] Comité ad hoc, op. cit., pp. 180-181.

The lack of complementarity between the two development philosophies is evident only if we assume a unity of intent between statements of public purpose and actual ends being pursued by the state. If the development efforts of the state are being utilized to serve narrowly defined private ends, the "reform" programs that have been proposed and carried out take on the aspect of protecting the existence and expansion of the "modern sector" from the threat of popular rebellion, by defending the campesino against the more ruthless excesses of power, bringing about the voluntary settlement of local disputes which threaten an outbreak of violence, and providing a refuge for the landless and unemployed on marginal lands. In short, it could appear, if only by accident, that the independent development efforts of the agencies of the state have been coordinated so as to preserve and encourage the dual structure of the economy.

XI. SUMMARY AND CONCLUSIONS

The passage of the Agrarian Reform Law of 1963, and public statements with respect to the need for the law demonstrated an apparent conviction that a restructuring of Nicaragua's agrarian society was needed. Even if this was only "paper legislation," whose enactors did not seriously intend to face up to its full implications, it is clear that the law was a response to a realistic situation of internal tensions and disequilibrium.

Along with the decision to enact agrarian reform legislation, a judgment was made that more egalitarian distribution of economic opportunity in agriculture could be fulfilled through the government sponsored settlement of public lands, as opposed to other means such as a redistribution of privately owned lands.

This study began as a survey of existing economic and social conditions in the first area selected as the tentative site of a large scale government sponsored settlement project, but at the outset of the field work, it was apparent that the number of spontaneous settlers and natives of the area occupying farms on the settlement site was much larger than had been anticipated.

The focus of the study therefore became an examination of existing conditions and development possibilities within the original area of the Rigoberto Cabezas Project, so as to suggest a constructive role for the Nicaraguan government in this and other pioneer areas of the Atlantic Region which have received, or will receive, an influx of agricultural settlers.

The following hypothesis was formulated: the type of economy which emerges from "spontaneous settlement" tends to reproduce the economic duality which is characteristic of the rest of the country. The key variable used for distinguishing between the two sectors of the dual economy was the degree of investment in reproducible capital (from the W.A. Lewis theory of economic development). It was also hypothesized that the classification of the units of production according to the degree of investment and associated income would serve to differentiate them with respect to legal-tenure status, educational level of the producer, participation in the market economy, and the use of nonconventional inputs.

Value of product added per unit of labor, as an index of economic performance, was found to be closely related to the level of reproducible capital utilized with each unit of labor. By classifying capital according to its components, it was seen that the type of capital largely responsible for variations in the level of labor productivity was cattle and associated inputs (fences, corrals, and pasture).

It was analytically fruitful to divide the various crop and livestock enterprises found in the area into two broad groupings, the first consisting of cattle (mainly for beef, but also for dairy products), the other consisting of all other enterprises. The last category was made up primarily of basic food staples (corn, beans, and rice), as well as small livestock and a wide variety of semi-permanent and permanent crops. Relative involvement in these two sets of enterprises was as effective a device as value of capital invested for distinguishing high from low labor productivity.

Income and capital levels were also found to be correlated with the variables which indicate the degree to which each sector is integrated with the broader system of state and economy (use of nontraditional inputs, legal-tenure status, education, and dependence on the market economy). A related observation is that the greater participation of the capitalist agricultural producer in the economic life of Nicaragua is not merely one of degree, but includes another dimension--involvement in urban-type economic activities, including commerce, government, and others.

An examination of alternative means by which the subsistence sector might increase its level of productivity and income was undertaken. The alternatives included:

1. Increasing the output of typical subsistence crops through improved production techniques and more serviceable farm to market roads.

2. Growth of the present capitalist sector (cattle production) so as to incorporate the land and labor presently devoted to subsistence farming.

3. Transformation of subsistence producers towards emphasis on cattle production.

With respect to the specific enterprises which can contribute to increasing the productivity of labor, cattle production appears to have the greatest potential. This conclusion was based on the data of this study, a review of literature on tropical agriculture, and

the fact that severe soil erosion will undoubtedly result from continued production of crops. Among alternatives two and three, transformation was judged as preferable to incorporation, considering the need for a better distribution of income earning opportunities and a proliferation of managerial skills.

The transformation of the subsistence sector in a pioneer area is not a natural phenomenon which occurs over time through the process of internal savings and the physical transformation of the land. This was demonstrated through a cross sectional analysis which compared levels of labor productivity attained by farmers who had been operating their farms for varying lengths of time. It showed that a minority achieved relatively high levels of labor productivity through the early years of operation while the majority (80 to 85 percent) maintain subsistence levels of productivity. Transformation would require inducement through the creative efforts of the state. As a possible experimental strategy for change, an organizational scheme patterned after the "satellite farm system" was suggested.

The improvement of the economic pssition of the spontaneous settlers through pastoral enterprises may be coordinated with the intention of the national government to increase and diversify exports through an accelerated expansion of cattle production. For the latter purpose, the government has sought the technical advice of international consultants and has considered opening a slaughter-house on the Atlantic Coast to facilitate the export of meat from that region. The coordination of these two objectives (transformation of subsistence farmers and increased meat exports) will require the design of forms of economic organization which explicitly take into account such variables as income distribution and the proliferation of managerial and technical skills, in addition to the usual cost-return considerations.

The problems of 1) increasing the output of commodities, and 2) of providing expanded opportunities for the majority of the rural people are treated as if they were separate issues rather than as part of a single means-end continuum; this dual process of policy works to frustrate rather than further the objectives of public policy as stated in the Agrarian Reform Law of 1963.

The social and economic pressures which preceded the introduction of agrarian reform legislation in the latter part of the fifties (a high rate of population growth and the mechanization of agriculture) have not abated. Mechanization has continued to make inroads both on lands that have been improved through publicly financed irrigation

facilities, and in the harvest of cotton--the one cotton operation which provided substantial seasonal wage employment. Population continues to grow at a rate of 3 percent (or more) per year. The capacity of urban industry to absorb the population growth is limited by the capital intensive character of modern industry, the limited internal market (very much related to distribution of agricultural income), and apparently greater comparative advantage for manufacturing in other member countries of the Central American Common Market.

Economic growth in the context of a social and economic organization of agriculture under which machines, airplanes, and centralized management and control of land are preferred to the use of ordinary human resources would have reached its limits by now if Nicaragua depended on internal rather than external markets. Sustained economic growth in a closed economy demands a high degree of interdependence among all producing sectors, and a dependence of these upon the purchasing power of the public. Production in Nicaragua for markets in Japan and the U.S. does not require the internal interdependence of the balanced growth model. This means that Nicaragua may continue to register impressive increases in GNP without involving the growing subsistence sector to a significant degree.