

AGRARIAN REFORM AND DEFORESTATION IN NICARAGUA
THE SOMOZA AND SANDINISTA CASES

by

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Table of Contents

	Pages
Chapter I: Introduction	1-7
Chapter II: Capitalist Development and Agrarian Reform: Implications for Deforestation	8-45
Chapter III: Economic Growth Under Somoza: Accelerated Social Differentiation and Deforestation	46-103
Nueva Guinea: Colonization, an Alternative to Reform	
Chapter IV: Non-Capitalist Development: Prospects for Saving Tropical Humid Forests	104-131
Chapter V: The Sandinista Reform: Confronting the Differentiation Process	132-236
Nueva Guinea: Sandinista Reform of Somoza Colonization	
Chapter VI: Conclusions, Interpretations and Policy Options	237-256
Sources	257-266

List of Tables

Table 1:	Extent of Forests and Tropical Moist Forests in Mexico and Central America, and Primary Causes of Deforestation	11
Table 2:	Concentration of Land According to Size of Farm in 1950	19
Table 3:	Central American Agrarian Reforms	44
Table 4:	Nicaraguan Exports of Fresh Beef 1960 - 1975	50
Table 5:	Use of Land and Credit for Export vs. Domestic Market Crops	53
Table 6:	Nicaragua: Class Structure by Percent Farms and Percent Land and Change 1963-1971	59
Table 7:	Stagnation and displacement of Corn and Beans (1956-1977)	63
Table 8:	Growth in Land Area Devoted to Pastures vs Crops	65
Table 9:	Nicaragua: Agricultural Family Income According to Socioeconomic Groups	66
Table 10:	Gross Value of Agricultural Production	69
Table 11:	Relative Distribution of Pastures and Cattle Production by Tenure Strata	75
Table 12:	Relative Distribution of Pastures and Cattle Production by Tenure Strata	75
Table 13:	Nicaragua: Labor Requirements	77
Table 14:	Nicaraguan Agrarian Reform Under Somoza	82
Table 15:	Survey on Migration to PRICA Area	87
Table 16:	Land Use According to Farm Size 1965	91

Table 17: Land Tenure in Nueva Guinea	97
Table 18: Land Use Change	139
Table 19: Origin of the Land Fund	147
Table 20: Land Acquisition	147
Table 21: Land acquisition in the Pacific and Interior Regions	151
Table 22: Growth of Agricultural Cooperatives 1978-1985	156
Table 23: Credit	158
Table 24: Growth in the Cooperatives Membership 1978-1986	159
Table 25: Land Acquisition	163
Table 26: Land Redistributed	163
Table 27: Evolution of Land Tenure	165
Table 28: Agrarian Reform Titles from 1981 to 1985	169
Table 29: Establishment of Permanent Crops	174
Table 30: Growth and Decline of the Nicaraguan Herd	181
Table 31: Selected Cattle Sector Indicators	182
Table 32: Relocation away from the Agriculture/Forest Frontier	186
Table 33: Recolonization of Abandoned Frontier Lands	191
Table 34: Nueva Guinea: Source of Land in CAS - 1984	202
Table 35: Nueva Guinea: Incorporation of the Landless Households to CAS	202

Table 36: Nueva Guinea: Participation of Land-Ownning Families in Production Cooperatives	206
Table 37: Nueva Guinea: Land Use in Production Cooperatives vs Individual Households . . .	209
Table 38: Nueva Guinea: Comparison of Areas Planted in Annual Crops by CAS Members and "Landless"	209
Table 39: Nueva Guinea: Land Tenure in Credit and Service Cooperatives	212
Table 40: Nueva Guinea: Distribution of Cattle in CCS 1983/4	212
Table 41: Nueva Guinea: Credit for Purchase of Cattle in CCS 1983/4	213
Table 42: Nueva Guinea: Private Land Market	215

Map

Nicaragua by Regions	149
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Chapter I

Introduction

Deforestation is rooted in the inequalities of resource distribution, therefore, any solution to the problem of deforestation must address the problems of the rural poor and the underlying inequalities of resource endowments. Nowhere are the futures of tropical humid forests (THF) and of poor peasants more intimately tied than in Central America. Within the struggles for economic democracy possible solutions for both deforestation and rural poverty are found.

All of the land use problems of the humid tropics deserve attention, but the conversion of tropical humid forests to pastures is particularly pressing. Numerous factors contribute to deforestation, but by far the most important in Central America is the relationship between cattle producers and poor peasants. Government policies of resource distribution in most of the five Central American nations threaten to virtually eliminate remaining forests by the year 2000 (Leonard 1988; Jimenez, 1985). By promoting pasture expansion on the ranches of the rich, these governments become important accomplices in forcing poor peasants to clear remaining forests.

Often the problem of deforestation has been seen as a strictly ecological one and solutions have been sought in the technical methods of agricultural land use or forest

management. The present analysis is consistent with a very different view, namely that "contradictions in the appropriation (and reproduction) of nature can only be properly grasped through analysing the social relations through which nature is appropriated" (Bernstein, 1986:3). Deforestation of the humid tropics is seen here in terms of the economic system (peripheral capitalism) and its relations of production. Marxian analysis of capitalist development is employed in analysing the dynamics of deforestation and the roles states may play in aggravating or attenuating the problem. In Central America, the relationship of pauperized peasants to the upper strata of the peasantry and the agrarian bourgeoisie is the most important factor in explaining why peasants clear forests. The dynamics of this relationship are aggravated by government policies of resource distribution which favor cattlemen to the detriment of peasants and forests. Ranchers, who raise beef for export, exploit and displace peasant grain producers initiating repeated migrations in what has been called "terminal shifting cultivation" (Denevan, 1981:31). The continuing transfers of labor and land from poor peasants to more well-to-do peasants and large cattle ranchers are part of a process of social differentiation which causes subsequent migrations and provokes unrelenting deforestation.

At a time when efforts to attain peace in Central America have become the major focus of attention, many of the results of revolutionary economic policy in Nicaragua may escape the attention they deserve. Both the positive achievements of the Sandinista Agrarian Reform and policies that might appear to be contradictory to its objectives are of central importance to understanding the economic problems of poor farmers and the potential of revolutionary agrarian reform to stop undesirable deforestation in Nicaragua's Interior and Atlantic Regions.

Research for this thesis was conducted from 1983 to 1987 in conjunction with a major OAS/EEC-sponsored study in a number of areas of Nicaragua where cooperative development was being implemented. The social orientation of this study has had to do with my concern with finding and developing effective solutions to deforestation. Examining the processes of agricultural expansion with an eye toward solutions, required field work in an area which would allow comparisons between different approaches to agrarian reform. As the principal site of Somoza's most ambitious agrarian reform project, the "Proyecto Rigoberto Cabezas" (PRICA), Nueva Guinea provided an opportunity to examine the results of Somoza's agrarian reform. As a member of the OAS/EEC/MIDINRA research team sent to study cooperative development in the municipality, I became familiar with the

current process of agrarian reform and cooperative development. In the course of this work, I was able to refine my thinking about the potential of agrarian reform as a solution to deforestation. I was also able to observe and take into consideration a number of obstacles to the implementation of agrarian reform and other policies of resource distribution. As the area of agricultural expansion which most threatened the large, nearly undisturbed, rain forest of Southeast Nicaragua, Nueva Guinea provided an appropriate setting for this research. This thesis covers considerable ground, from the analysis of the social source of deforestation to the policy obstacles impeding one promising solution. My research also provides insights into the complexities of policy making for collectivization which might be helpful to those who continue to work in cooperative development, or regional and environmental planning in the humid tropical regions of Nicaragua and elsewhere in Central America.

This thesis analyzes why two approaches to development and agrarian reform have had considerably different impacts upon socio-economic differentiation among the peasantry and, consequently, upon the rate of deforestation. Beyond overt measures of land reform, policies regulating credit and the land market have had a palpable impact on deforestation. My analysis concludes that, because of the different class

commitments of the two governments, the Somoza approach and reform aggravated and the Sandinista reform attenuated the problem of deforestation.

Because of the urgency of the deforestation problem, my research places major emphasis on the opportunities presented by the Sandinista agrarian reform. This reform, begun in 1979, demonstrates potential to alter the social determinants of "terminal shifting cultivation."¹ Under this reform, the voluntary collectivization of land-holding frontier peasants appears to transcend the social relations cause of peasant migration and to permit the establishment of stable and renewable forms of agricultural and forest production. My thesis demonstrates how the economic conditions (socio-economic differentiation) that led peasants to migrate and clear forests under Somoza's policies persisted for some peasants under the Sandinista government; the latter was able to provide many with an attractive alternative--namely to form production cooperatives. Finally, my analysis explains how certain policies may promote social differentiation and consolidate opposition to the revolutionary alternative.

1. Terminal shifting cultivation is used to describe slash and burn agriculture which, rather than maintaining a stable rotation of forests, cultivation and back to forest before repeating clearing and cultivation, ends in pastures, removing forest from the land-use cycle.

Chapters II, III and IV present the theoretical foundations of and empirical support for my focus on the progress of the agrarian reform initiated by the Sandinista National Liberation Front, as well as a number of obstacles influencing the success of cooperative development as a solution to terminal shifting cultivation. Chapter II describes the theoretical links between deforestation and peripheral capitalism. Chapter III illustrates this theoretical approach by presenting the project and results of Somoza's agrarian policies and reform, and particularly the colonization of Nueva Guinea. Chapter IV presents the theoretical potential of revolutionary agrarian reform to attenuate the differentiation process. Chapter V presents two levels of analysis of the current Sandinista agrarian reform. The first documents the ways in which, on a national level, the Sandinista Agrarian reform contributes to arresting the process of spontaneous settlement of the remaining THF of Nicaragua's Atlantic region. The second presents some of the relevant results of my field research at the regional level in Nueva Guinea. Chapter IV summarizes my findings and suggests some potential corrective measures.

As the process of deforestation extends into Central American national parks, forests and biosphere reserves, the need to confront the cause of unplanned peasant migrations

becomes ever more pressing. Although many agree that practical, durable and desirable alternatives to terminal shifting cultivation are required, mere agreement is not sufficient to resolve the related problems of peasant poverty and deforestation. Rather a societal alternative to peasant poverty and frontier migration must be fostered by a government committed to revolutionary social change. The Nicaraguan revolution of 1979, with both its errors and advances, has provided an opportunity to begin. This government is in a position to develop workable solutions to these most pressing problems.

Chapter II

Capitalist Development and Agrarian Reform: Implications for Deforestation

"Un ganadero con cinco peones que vive en la ciudad y tiene 80 por ciento del consumo importado, vive casi sin "derrame" hacia su entorno rural empobrecido y hace celula de intercambio con la ciudad y el extranjero".

Raul Sendic, (1985:62)

Capitalist social relations produce inequities among agricultural producers. In the humid tropics, one consequence of these inequalities is deforestation. This Chapter presents the general theoretical case for this assertion. It explicates the reasons for expecting a causal relationship between capitalist social relations and deforestation in peripheral¹ capitalist nations.

The chapter is divided into three sections: the first defines deforestation. The second explains why capitalism causes deforestation in Central America by: 1) displacing peasants, forcing them to migrate; 2) preventing stable settlement; and 3) ultimately compelling agricultural intrusion of forested lands. The third section posits that there are at least two kinds of "agrarian reform," capitalist and non-capitalist, and argues that capitalist

1. "Peripheral capitalism is not a distinct mode of production with its own laws of motion, but is only a historically specific stage in the development of capitalism in the periphery" (de Janvry, 1981:37).

reform in Central America accelerates deforestation.

Deforestation Defined

Deforestation ranges from degradation of forests to the permanent conversion of forests to other uses. In Central America, both degradation from logging practices and permanent conversion to agricultural uses occur. Conversion of species-rich tropical humid forests to pasture predominates (See Table 1). This conversion is permanent because many endemic species become extinct and because micro-climatic changes associated with the loss of forest cover prevent the reproduction of the species-rich forest. Conversion of forest to pastures suppresses post-clearing growth and prevents species from reproducing themselves. Unlike tropical dry forests, many tree species of the tropical humid forest will not reproduce in large clearings and particularly where pastures have been established (Jantsen, Daniel pers. com. 1987). Diverse genetic resources are critical to maintaining forest in humid tropical areas. Because both forestry and beef production practices have been land extensive, changes are necessary to improve the short and long-term productivity of these lands. The rewards of improved forestry practices cannot accrue if too many tree species are lost through thoughtless conversion of forests to pastures.

TABLE 1
EXTENT OF FORESTS AND TROPICAL MOIST FORESTS
IN MEXICO AND CENTRAL AMERICA, AND PRIMARY
CAUSES OF DEFORESTATION

Area	Tot. Area (Km2)	Forest (Km2)	TMF (Km2)	Conver. Rate	Principal Causes
Belize	22,965	20,000	16,300	-	Timber
Costa Rica	49,132	22,000	16,000	300-500 Km2/yr. (5)	Pasture Exp.
El Salvador	21,393	2,600 (degraded)	-	-	Agricul.
Guatemala	108,889	53,000	43,000	-	-
Honduras	112,044	70,500	40,000	-	Pasture Exp.
Nicaragua	147,943	64,000	35,000- 50,000	400-800 Km2/yr	Past.Exp., Timber
Panama	75,474	40,816	30,000- 40,000	-	Agricul., Past.Exp.
Mexico	1,963,133	400,000	110,000(1) 16,000(2)	-	Colon.
Central America(3)	537,840	272,900	180,000-(4) 215,000	-	Past.Exp. See above

Source: Ballard, 1982:2
(From Norman Meyers 1980:131-145.

1 Subtropical

2 Tropical

3 All above except Mexico.

4 Estimated to be one-third of prior tropical moist forest coverage.

5 Dan Jantzen (pers. com. 1983) estimated that Costa Rica's forests were being reduced at the rate of 3 percent/year.

Too often the response to chaotic destruction of the humid tropical forests has been to ignore its cause and to propose ineffective remedies. Plumwood and Routley (1982:5) assert that attribution of the problem to overpopulation is

flawed. Population growth, even at 3.5 percent (Torres Rivas, 1980:260) would not, by itself, account for observed rates of migration to tropical humid regions. Emphasis on "the population problem" has led to the emphasis on population control and indirectly to the creation of national parks as a stop-gap measure which could, at best, preserve some biological resources while giving over the bulk of forests to severe degradation and/or conversion to pasture to accommodate the "inevitable population pressure."

National parks and biosphere reserves are necessary components of a strategy to preserve the genetic diversity of tropical forests. However, parks established for such purposes have been vulnerable to the same social processes which cause deforestation in unprotected areas. And, in fact, the preserves themselves are being violated. "By 1992, despite its efforts at conservation, even Costa Rica could be almost treeless" (Omang, 1987:57). Even with significant success in slowing population growth the creation of parks will not ensure adequate reserves of the tropical humid forest unless other causes of deforestation are understood and dealt with. Plumwood and Routley emphasize that focus on population growth "occurs at the expense of recognition of other major [and] much more controllable social reasons for the world wide tragedy of rain forest destruction" (original emphasis).

The Social Cause

The reasons for conversion go beyond population growth per se and cannot be found in sheer numbers of people. They are equally if not more importantly found in social relations among and between people, in the hierarchy of ownership with large landholders at the top and landless peasants at the bottom (Clark, 1974; Wood, 1981). This social hierarchy is the direct result of the development and maintenance of a peripheral capitalist economic system in the largely agricultural economies of Central America. Capitalist relations of production and the ways they are extended and reproduced are central to understanding the principal cause of Central American deforestation. Two factors have encouraged and maintained capitalist relations of production in Central America: 1) the institution of a post-colonial development model by the the United States wherein an interim "structure of supply" or "international division of labor" prevailed; and 2) the maintenance of a class structure dominated by a landed elite which secured its position through hegemonic control of state power and government policies.

Post-colonial development in Central America extended the region's prior role as a provider of primary goods to the First World. The emergence of a national bourgeoisie

accompanied the development of agro-export production for the U.S. market and provided the local partner for U.S. economic interests (Enriquez 1985:6). A combination of cheap labor and ready access to natural resources provided the basis for "coincidences of interests between local dominant classes and international ones" (Cardoso and Faletto, 1979). Pursuing mutual interests in agro-export production, the allied U.S. and Central American investors competed successfully for land and labor, "push[ing] millions of small farmers off the most productive land..." (Enriquez 1985:17).

Enriquez (1985:29) asserts that "extreme inequality and poverty are...central features of agro-export capitalism... [which] only heightened [colonial] inequality in the distribution of the region's resources." The Latin American regional FAO (United Nations Food and Agriculture Organization) panel reported that "there was consensus that one of the principal causes that generated the appearance of peasants without land was the adoption of agro-export economic models, capitalist development and modernization." (FAO, 1985:48). The complementary interests of international and local elites have been responsible for perpetuating inequalities between large land holders and poor peasants.

Inequality among agricultural producers is reflected in

the term "differentiation." Shanin (1972:47) writes of "the socio-economic differentiation of the peasantry [as] the extent of diversity in wealth of peasant households and the consequent stratification by wealth..." More than stratification by wealth, differentiation yields a differential relation of people to the means of production, and as a result to each other. Through differentiation, opposing classes and the relations between them are formed. Understanding the social relations which structure the transfers of resources and create the resulting inequalities is important for analysing the ways different policies of resource distribution can either promote or arrest deforestation.

The primary analytical categories produced by differentiation of agricultural producers are "capitalists" and "workers." However, Lenin (1972:178) warned "that our literature frequently contains too stereotyped an understanding of the theoretical proposition that capitalism requires the free, landless worker. This proposition is quite correct as indicating the main trend, but capitalism penetrates into agriculture particularly slowly and in extremely varied forms." The emergence of capitalist development of agriculture creates the material basis for the proletarianization of a few, the ascent to the class of agrarian capitalists of still fewer. On the periphery of

capitalism, the majority do not fit either the pure worker or the capitalist category, yet they form part of the capitalist social formation and permit the extraction of economic surpluses from direct producers (Torres Rivas, 1980:204).

Why are peasants whose lands are bought by capitalists not employed in the growing sector? Because as Marx explained, "as soon as capitalist production takes possession of agriculture, and in proportion to the extent it does so, the demand for an agricultural laboring population falls absolutely..." (Marx as cited in Harris, 1978:11). This was born out by Dorner and Quiros (1973:218) who showed that larger farms employed a substantially smaller portion of the rural labor force in the Central American region by the early 1960s. At that time seventy-eight percent of all farms occupied only 11 percent of the farmland but employed 60 percent of the rural labor force, while 6 per cent of farms controlled 72 percent of farm land but employed only 28 percent of rural workers (From Enriquez 1985:30). This comparison of the demand for labor reveals that the difference in demand has to do with the profit logic of the capitalist vs. the reproduction aims of the peasant household. The micro-theoretic argument for shifting away from labor-intensive enterprises asserts that capitalists are constrained by the supermacro costs of

buying "effective" labor. Mechanization and crop patterns with "seasonal" labor requirements allow capitalists to avoid the supervisory costs entailed in maintaining a permanent "hired" labor force and reduce the risk of social and political unrest among workers on their farms. On the other hand, the peasants have few assets and cannot acquire more capital or expand their land base. Their only choice is to use their own labor (their abundant resource) more intensively on their small plots. Increased labor is absorbed in production and yield increases in per capita consumption in the peasant household, even when their marginal utility approaches zero (Jon Jonakin, pers. com. 1987). However, this strategy is not sufficient for long-term peasant household reproduction because of pressures generated by capitalist development of agriculture. Try as they might, peasants are unable to compete with capitalist agro-export producers and are forced to sell their land and the portion of their labor which can be employed on the capitalist farms, while completing household reproduction on less productive lands (de Janvry 1981:37).

By 1950, the "coincidences of interests" between the U.S. and the oligarchy in agro-export development had already substantially concentrated cultivated lands in Central America (See Table 2). This concentration caused land to be underutilized and human resources to be under

employed (Torres Rivas, 1980:190). Latifundios (large landholders) disguised as Large multi-family units, "multifamiliares grandes," cultivated only 9 percent of their land while small parcel holders tilled 75 percent (Torres Rivas, 1980:194). This trend in land use which concentrated agro-export income in the hands of a few compounded the displacement which resulted from the use of capital intensive inputs and "explains the paradox that productivity levels are inversely proportional to the size of productive units (Torres Rivas, 1980:194). Because of its abundant capacity to exclude the rural population, agro-export development became an obstacle to expanding the internal market and the articulated economic growth which could have been expected from more equitable development.

TABLE 2
CONCENTRATION OF LAND ACCORDING TO SIZE OF FARM IN 1950
(percentages)

Size		Central America	Costa Rica	El Salv	Guate	Honduras	Nicaragua
Subfamily	Area	0.7	0.3	3.9	0.8	-	-
Micro farms	#	24.1	43.7	47.2	21.3	-	-
"	Area	9.1	2.9	18.0	13.5	12.4	3.5
"	#	54.8	24.3	44.2	67.1	67.5	48.6
Family	Area	16.2	14.2	20.6	13.5	27.5	11.2
	#	15.0	19.8	6.7	9.5	26.4	27.4
Medium	Area	35.6	41.2	19.8	31.4	32.7	44.1
Multifamily	#	5.6	11.3	1.5	2.0	5.7	20.3
Large	Area	38.4	41.4	37.7	40.8	27.5	41.2
Multifamily	#	.5	.9	.4	.1	.4	1.5
Total (Number or Area)		100.0	100.0	100.0	100.0	100.0	100.0
Total # of Farms*		20,322	3,826	2,261	5,320	3,452	5,461
Area in Manzanas*		971	114	226	348	178	102

* In thousands

Source: Torres Rivas, 1980:191

The concept of articulated economic growth refers to "links between supply and demand... [which] on the sectorial/supply side, [imply] that an increase in production of consumption goods leads to a growing derived demand for capital goods [and] a "direct relation between

the rate of profit and real wages" (Jonakin 1984:64/5). Reciprocally, disarticulated economic growth is characterized by an absence of these linkages. In Central America's disarticulated economies, agricultural development emphasizes production for export and creates a situation in which profits do not rise if real wages increase. Articulation between the agro-export sector and domestic food production is limited to peasant production of cheap food for underpaid workers in the export sector. Industrial development is likewise disarticulated with the primary agricultural goods and with the peasant economy. Little value is added to the cotton, sugar, beef, and coffee exported from the region, and industries are limited to facilitating the shipping of these export commodities in their raw form. Finally these factors combine to prevent the growth of a "home" market for industrial goods since such growth depends upon increased returns to labor and the peasantry. Nevertheless, agro-export production provides the ruling elite with a short-term solution to the problem of stagnation.

Why did industry fail to employ the peasants who couldn't find employment on the capitalist farms and ranches? The answer is to be found in the disarticulated economic development which followed this concentration. When discussions of regional economic integration reemerged

in the early 1950's, two options for development existed: First, integration through expansion of Central America's internal market and development of the forward and backward linkages which had been absent. This option would have reversed the concentration process through profound reforms of the agrarian structure and a break with the region's dependency on its northern neighbor (Torres Rivas, 1980:270-2), in short, political and social revolution. The second option was to promote continued economic growth without social change. This second option would rationalize regional industrial capacity by engaging in some import substitution. Historical trends of agro-export development would serve as a foundation for capital accumulation. Agro-exports would be increased by expanding agricultural production horizontally through the current process of land and capital concentration. This second option required sacrificing the tropical humid forests. But this was no sacrifice to agro-export capitalists for whom agro-export production was the "key generator of wealth" (Enriquez, 1985:32). The region's ruling elites chose this second option, pursuing disarticulated "opportunities" in industrialization through the Central American Common Market (CACM).

The primary goal of the CACM was to promote agro-export production and to expand industry to the benefit of existing

elites. However, emphasis on industrial growth, by concentrating capital resources and even accepting a reduction in the rate of growth in agriculture, would not be sufficient to reverse the disarticulated development which had characterized primary agro-export production. CACM was unable to free the region from its subordinated role as a producer of primary materials. In 1900, 98.2 percent of regional exports were raw materials and agricultural commodities destined to the same U.S. market. In 1965, these categories still accounted for 94.8 percent (Torres Rivas, 1980:258). During the period from 1950 to 1965, employment in manufacturing increased from 10.8 to 11.4 percent of employed workers, far short of need.

Unemployment increased from 1.4 to 5.1 percent of the work force (Torres Rivas, 1980:261). Underemployment also grew.

Had industrial sectors of the national economies grown and absorbed peasants expelled by expanding agro-exports, neither rural poverty nor deforestation would have reached the levels they did. But peripheral capitalism does not develop along the same lines as the capitalist center. CACM failed to provide the desired economic take-off that eluded Central America as it had so many other regions of the developing Third World. The disarticulated relationship between domestic food production and agro-exports confined industrial development to preparing raw material exports for

shipping and minor import substitutions.

Throughout the 1950s, 1960s, and 1970s, capitalist development became synonymous with agro-export expansion. Growth in the production of cotton, sugar and beef resulted primarily from horizontal expansion of these activities. Of these agro-export activities, pasture expansion for increased livestock production was the most devastating to tropical humid forest regions (Denevan, 1981:26; Shane, 1980:3). Due to the extensive land use associated with beef production, growth in this sector² consumed more land and displaced more peasants than any of the prior waves of export expansion.

Existing inequalities of resource endowments and government policies of resource distribution combined to accelerate socio-economic differentiation and expulsion of smallholders from their lands. Close, direct links between the Central American bourgeoisie and national governments yielded the exclusive participation of this sector in state policy making. The FAO report found the same general trend throughout Latin America: "In general terms, it is estimated that the policies applied by the majority of governments do not favor the small producer, much less the landless peasant" (FAO:85:49). Government policies

2. Central America provided 13 percent of all U.S. imports of beef (Barry and Preusch, 1986:20).

exacerbated inequalities of land and capital endowments by developing policies of "credit, adoption and transfer of technology, generation of employment, prices, inputs and services" in favor of the more well-to-do producers. These government policies aggravated existing inequalities to promote accelerated pasture expansion. "A general absence of the peasantry and particularly of the landless, was observed in the definition of these national policies" (FAO, 1985:49). This lack of participation in decision-making and the resulting lack of access to the resources which effectively controlled who would participate in the agro-export opportunities brought a decline in the living conditions of the rural poor and undermined peasant agriculture (Enriquez, 1985:31). The "failures" of the labor and credit markets in the presence of a cropping pattern dominated by agro-export production resulted in income inequalities which increased over time. According to United Nations figures, "of one hundred dollars per capita increase in wealth gained during the sixties, only two dollars reached the poorest 20 percent of the population." (LaFeber, 1984:192/3). The combination of landless and minifundistas increased to 82.5 percent of the rural population of Central America by 1950 (Torres Rivas, 1980:204).

As a significant factor in tropical humid forest

conversion in most Central American countries and most of the rest of Latin America (Ballard, 1982:1), pasture expansion for beef exports has received increasing attention by those concerned with stopping deforestation. A U.S. ban on imports of beef from the region was proposed in 1986 as a strategy to combat deforestation of Central America's remaining tropical humid forests (Citizens Conference on Tropical Forests, Indigenous People and the World Bank, Washington D.C., 9/1986). This action might depress short-term beef exports from Guatemala, El Salvador, Honduras and Costa Rica which currently export beef to the United States. The strategy has not offered a long-term solution to regional deforestation. Deprived of the U.S. market, Central American nations may well be capable of increasing their sales to other countries, or circumventing the embargo by exporting to intermediate countries. Nicaraguan exports of beef to the U.S., its most important buyer, were curtailed as a result of the U.S. trade embargo implemented in 1984. However, curtailing beef exports has not been among government, peasant and private sector proposals for the cattle sector in Nicaragua (MIDINRA/DGRA, 1985d). Alternative export markets have been available and the income elasticity of demand within Central America has remained high (de Janvry pers. com. 1987).

More important than beef production per se are the

social causes of extensive land use and private appropriation of national forest lands in tropical humid regions. Viable solutions to the problem of Central American deforestation involve transforming the social relations which have made the clearing of forests for pasture expansion profitable for the rancher in spite of low stocking rates, and necessary for peasants due to extremely limited economic benefits. The social relations of pasture expansion are themselves shaped by agro-ecological processes.

The initial production of pastures requires clearing forest and either permitting the spontaneous growth of natural pastures or seeding. In the process of cattle grazing, pastures degrade, requiring a brush fallow period to restore soil fertility. When this period is completed, the brush is cut and burned, and again, either natural grasses are allowed to return or improved grasses are planted. The production of beans and corn in THF regions requires forest or fallow lands which release high quantities of nutrients upon clearing and burning. Production of beans per unit land area planted is low, but, per man day worked is high, making extensive bean production a viable source of limited income for poor peasants who lack alternatives. Because of the leaching caused by heavy rains, after 2 years of planting beans and corn, soil

nutrients are depleted and yields fall precipitously. The problem of falling yields is compounded by competition by natural grasses. Their durable seeds are easily dispersed and lie dormant until forest clearing stimulates germination. The combination of these two problems makes continued planting unfeasible. In addition to these physical requirements of pasture expansion and maintenance, social relations between ranchers and peasants³ make cheap beef a lucrative endeavor for the former and grain production a meager means of survival for the latter.

On the agricultural frontier, landless peasants gain access to land by squatting on undeeded national lands, or by renting land from ranchers. Owning little more than their labor, peasants are able to plant grains for subsistence and commercial sale, but most are unable to develop cattle herds to take advantage of pasture, the natural by-product of their grain production. Ranchers achieve their ambitions of accumulation through the "appropriation of the major part of the economic surplus generated by these producers through ground rent, commercial exchange and usurious loans" (Baumeister, 1984:6). Grains are purchased by intermediaries who keep farm-land prices

3. I have simplified these categories to aid in clarifying the problem, not to mask diversity. A more detailed description of the multiple peasant and rancher categories is presented in Chapter III.

down by controlling transport and storage. Small cattle producers face similar constraints, making it difficult to expand their herds.

In cattle production, a stratified control of land and herds distinguishes small producers from the large. An internal division of labor within cattle production has the smaller producers involved in the more labor intensive production of milk and young animals, and the larger landholders extracting profits from fattening and direct sales to meat packers. The more well-to-do peasants raise steers to a point beyond which little more weight can be gained on pastures of the humid lowlands, particularly during the dry season, without a supplementary feeding. The larger producers buy animals from the smaller, keeping prices low by virtue of their relative control of transportation. They then move these animals and those they have raised to summer pastures in the mountains. The richest producers fatten and sell directly to slaughter houses in which some have invested, obtaining the most favorable prices.

The poverty of frontier peasants makes them vulnerable to the ranchers' strategy of pasture expansion. Ranchers rent degraded pasture and/or forested lands to poor peasants in return for in-kind payments of grain (commonly one hundred pounds of grain per manzana) and the clearing and

seeding. Because these idle lands provide no income or rent to the landlord, renting land in this way involves no cost to the owner. The ability of larger, rancher "landlords" to command economic rents⁴ (in-kind and labor) makes it possible for tropical beef to be priced competitively.

When peasants are displaced, they migrate to unclaimed forested lands and/or associate themselves with cattle producers in ways that permit them to retain, to a greater or lesser degree, the peasant character of their households (Torres Rivas, 1980:213/14). On the surface, the peasant-rancher relationship appears to be mutually beneficial. However, beneath the superficial appearance of cooperation between grain-producing peasants and beef-producing ranchers, there is a structural inequity which produces wealth for the rancher and perpetuates landless poverty for the peasant. Because access to land and capital is unequal, poor peasants have no option but to supply "cheap" labor to ranchers, and then to migrate again.

It is immaterial whether the peasants clear and sell uncontested national lands, or, as colonos⁵, clear new lands every year or two on cattle estates. Poor peasant grain cultivation is temporary, requiring new land at least every

4. Publicly-subsidized, private accumulation is discussed by Marx in Capital Vol. III "Genesis of Capitalist Ground-Rent" and Lenin, 1972, Vol III, Ch.II.

two years. In the case of colonos this relationship may continue until they become fully proletarianized, or until the rancher's lands are all cleared. They must then seek a new "patron" or migrate to unclaimed national lands. Even peasants who occupy national lands and those who own land find themselves obliged to sell out and move on to uncleared forest. Once the frontier farm is completely cleared, and is surrounded by other farms, grain production can only be continued by clearing new land.

Through the rancher's exploitation of poor peasants, "tropical forest regions... have become part of the resource frontier of the advanced capitalist nations..." (Plumwood and Routley 1982:6). This is illustrated by the fact that beef exports from Central America increased from less than 2 percent of the U.S. market in 1958 to 12 percent in 1968 (USDA 1969). United States meat import law 88-482 allows Central America to export beef to the U.S. because of the absence of hoof and mouth disease. This law and the presence of the disease elsewhere in Latin America are responsible for the large share of the U.S. market held by Central America. The expansion of cattle ranching contributes to peasant migration and deforestation by displacing peasants from their lands and incorporating only

5. The colono exchanges labor for access to land, often living on the landlord's estate.

a few of them into ranch work or industry.

Ecological conditions yield decreasing returns from pastures in humid tropical regions and induce ranchers to expand their scale of operations. The dominant market position of ranchers (vis a vis peasants) continues to make pasture expansion profitable. Attempts to resolve the problem of deforestation must address the hard reality of this relationship. Because of ecological conditions, deforested lands are ill-suited to sustain traditional annual crops. Due to market failures (especially credit) and social relations, poor peasants cannot change their farming practices to take advantage of the pasture they have produced as a by-product of their forest clearing and their grain production. Without capital, access to export markets and secure tenure, they are also unable to invest in permanent crops which tolerate humid tropical climatic conditions and conserve tropical soils. Capitalist development has been devastating to both peasants and forests.

Capitalist Agrarian Reform

Agrarian reform has long connoted radical redistribution of land from rich to poor. For this reason it attracts attention as a possible solution to unplanned peasant settlement of the agricultural frontier. The basic

rationale for reform-as-solution is that it either gives peasants land already in agriculture, thus preventing migration to the frontier, or settles peasants on the frontier in a more orderly and stable fashion, thus controlling the flow and direction of migration.

This rationale is important. Reform may play a role in changing the process of deforestation. In fact, as closer examination of capitalist reform here and revolutionary reform in Chapter III reveals, the political power of the government and the economic interests it represents are primary in determining the potential of the reform process. Whether social differentiation and deforestation are accelerated or attenuated by reform is, therefore, dependant upon whether reform is undertaken in the ultimate interests of a capitalist minority or the popular majority.

Capitalist agrarian reforms range from those which redistribute resources by sacrificing the interests of some capitalists or groups thereof, (Peru, Mexico, El Salvador for example) to those which avoid sacrificing capitalist resources entirely (Nicaragua 1963, under Somoza). Others (Honduras 1968) lie in between. The major distinguishing feature of capitalist reform is that redistribution does not sacrifice the political and economic hegemony of capitalist producers. This limit to reform expresses the peripheral state's fundamental commitment to national and multinational

capitalism.

Maintaining this commitment involves state action to exclude peasants from effective political participation and to yield to them only as many resources and as much participation as is either economically convenient or necessary to avoid provoking revolution. As has been discussed earlier in this chapter, the class in power implements policies of resource distribution which favor its economic and political aims while minimizing the cost of their pursuit. Hence, colonization has often been selected as a surrogate for agrarian reform: "a few showpiece projects may be offered as a substitute for institutional change in the countryside" (Thiesenhusen, 1971:211). When political opposition threatens the capitalists' hold on state power, governments may require abrupt changes in specific aspects of the general trend of resource concentration and demand sacrifices from property owners.

Indemnification has helped to unify fractions of capitalist classes by making agrarian reform politically acceptable to large landholders. The immediate objective of indemnifying landlords is to reduce their resistance to reform. Once accomplished, their consent to reform permits the state to act. The essence of capitalist agrarian reform, and therefore indemnification, is to pay a small price to pacify peasant movements and to therefore ensure

that substantial power-altering redistribution does not occur. Indemnification makes it possible for those whose lands are sacrificed to avoid suffering the cost of redistribution. When properties are expropriated, indemnification converts land into liquid capital, facilitating reinvestment in areas of an economy or in countries which are unaffected by reform measures. Given the continued investment rights of these less obvious beneficiaries of reform, indemnification may also assure that prior owners have the means to reassert their interest in land.

Nevertheless, the promise of indemnification does not ensure acquiescence on the part of landed elites. Alternative capital investments or land purchases are not always attractive. However, broader opposition to reform comes from sectors of the bourgeoisie who do not have an immediate interest in land. The fact that capitalists themselves must bear the costs of indemnification, implementation, and administration, at least temporarily, is an important stimulant to resistance by these groups. Agrarian reforms are also opposed because they resemble the generalized process of social transformation accompanying socialist revolution. Finally, reforms can alter power relationships between fractions of the dominant class, thus threatening to alter pre-reform access to privilege and

profit. Thus, indemnification is hardly a panacea for resistance.

When reformists prevail, class fractions struggle to determine both how much redistribution will occur and who will bear the costs. Capitalist resistance has therefore influenced the source of lands and the amounts and distribution of investment credit made available to peasant beneficiaries. This resistance has had direct and indirect consequences for deforestation. Whether the source of land for reform is 1) already deforested land from the large estates, or 2) forested indigenous or state land, it will directly influence the short-term trends of migration toward the remaining forest. Settling peasants on the lands of existing estates may reduce the short-term pressure for migration by providing an alternative access to land which does not involve clearing more forest. On the other hand, colonizing frontier forest lands accelerates settlement and the growth of capitalist development on the frontier, not only deforesting the lands transferred but threatening the adjacent forests as well. Another policy of some reforms is to give support to land holding peasants. Not an alternative to giving land to the landless, this action may slow the pauperization process, or make it more gradual and less politically viable. Providing credit may allow peasants to increase their output and income, reducing the

rate of migration. However, legalization might conversely stimulate an increase in the value of peasant parcels and promote more rapid sales and migration.

Based on this conclusion, an observer may be inclined to deduce that if lands already in agriculture were transferred, support for existing small holders given and colonization avoided, reduction in the rates of peasant migration and deforestation would occur. However, only short-term positive impacts should be expected in even the best case scenarios. Within the continuing economic dominance of the capitalist class, and their resistance to reform, we find the reason why more appropriate transfers are rarely forthcoming and why even when they are, they cannot be counted upon to substantially reduce deforestation.

The form of the political class struggle as well as the strategies and possibilities for capital accumulation determine the extent and form of reform actions without undermining their fundamental capitalist nature. When the holdings of large private landowners have been used as a source of land for capitalist reform, care has often been taken to avoid redistributing the most profitable properties. However, capitalists do not have to retain direct ownership of land or control of the production process in order to retain their capacity to derive profits

from export-agriculture. Primary production of domestic and even export agriculture may be conceded to peasants. Many large banana estates in northern Honduras were transferred to plantation worker cooperatives without affecting the flow of profits to the national and multinational corporations that owned the estates prior to the transfer (Slutzky, 1982). In fact, they increased their profits by shifting the risks involved in primary banana production to the peasants, maintaining monopoly control of the export market.

Despite the obvious sacrifice of forest resources in the areas of settlement, governments have promoted colonization projects as stable solutions for the landless. On some occasions, the reform parcel size has greatly exceeded the accustomed area per household in the dry tropical regions of origin, implying increased production and social ascent for beneficiaries. The fact that use would be temporary and fallow cycles unsustainable has not often been disclosed. Plans for private investments and the role of peasants in them have also been concealed. These investments have depended upon infrastructure paid for under the guise of support for colonization, and land clearing and eventual migration by peasant beneficiaries.

The form of land tenure and the social organization of the reformed sector might be anticipated to influence the stability of land tenure and to determine whether social

differentiation and capitalist penetration follow. In fact, they do. The individual form of production and the private nature of property have predominated in capitalist reforms and have ensured renewed differentiation among beneficiaries. Theisenheusen (1974:325) asserts that "some [beneficiaries of agrarian reform] make considerable income progress while others stagnate." Expulsion, migration, and subordinated articulation with capitalist agriculture are common results. The results of social differentiation have been rationalized and the individual form promoted by maintaining that "...a certain proportion of the new peasant beneficiaries will probably fail as entrepreneurs. Because some of the new entrepreneurs are going to fail does not mean that it will be unnecessary to carry out agrarian reform. But it will be necessary to caution against too rigid an institutional link between the beneficiaries and the land, so that a natural selection may take place later which will allow those who fail to be eliminated" quoted by Chonchol 1970:160, in Bernstein 1986:16).

Nevertheless, initiatives such as the nationalization of land and the collective organization of production have been taken by the state to ensure the stability of the reformed sector and to curtail social unrest. Experience has shown, however, that through loopholes in the controls, a relaxing of controls, and even in spite of controls,

differentiation and expulsion reemerge. Mexico is a case in point.

Under the leadership of Lazaro Cardenas, Mexico first implemented reforms of an anti-latifundio nature by nationalizing the vast holdings of the haciendados. But reconcentration through renting and differentiation in the minifundios and "ejidos" created new pressures for land, resulting in colonization of Mexico's THF lands in the 1970's and 80's (Cloud, 1985:23). Gutelman's study of the Mexican ejido system, a product of the revolution of 1910, maintains that "in principal, the rigid legal dispositions that crystallized the egalitarian distribution of land to beneficiaries of the agrarian reform would have prevented the functioning of the laws of the capitalist market economy in the ejido sector" (Gutelman, 1974:261). But much "like private land, ejido land has entered the circuits of the market [and] the mechanisms of social decomposition are manifested." Regardless of the source of resources or the form of social organization promoted, capitalist reform does not alter surplus extraction and accumulation by and for a minority of the population. Without a commitment and actions to control differentiation, its reemergence can be expected to produce exploitive social relations and undermine the temporary distributive effects of reform.

Alternative forms of social organization implemented

within capitalist reforms may produce differences in the rate of differentiation but not over the long term. While the immediate relations of production may change, freeing poor peasants from selling their labor, or land and even from paying usurious interest for a time, neither nationalization nor the creation of production cooperatives prevents the reproduction of exploitive relations of production.⁶ Regardless of how apparently radically different the new forms of social organization may be, political power is not redistributed and participation of popular sectors is never permitted to become decisive in policy formation. The elites continue to control resource decisions. Cases such as Mexico and Peru where large amounts of lands were reformed and production cooperatives have been implemented have become the anomalies of history in this respect, yet they lend support to the assertion that neither very large land transfers nor cooperative forms of social organization prevent differentiation from reemerging in capitalist reforms.

Because the bourgeoisie maintains political power, economic reforms, which at one moment concede land to the

6. See for example: 1978 Agrarian Reform Law of Honduras established by the Government of the Armed Forces. Articles 18-20 establish the conditions under which salaried labor may be employed. The conditions established do not prevent or prohibit but regulate the exploitation of a salaried work force.

poor to stifle political opposition, at the next moment reassert the specific interests of the capitalist minority in reform lands. Cooperatives can acquire capitalist characteristics through the employment of wage labor (Baumeister, 1984:5). More often, the production cooperatives created under capitalist reforms are subdivided, (i.e., Peru) and lands are once again concentrated in the hands of capitalist producers. In Peru, a significant portion of peasants received land, but neither the dominant class nor its capacity for accumulation were altered, and deterioration of the egalitarian nature of cooperatives followed. Rather than a reflection on the ineffectiveness of the cooperatives as an instrument of equality, these distortions are products of a political commitment to maintaining inequality.

Since the 1930's, Central American reforms have, with the exception of Nicaragua since 1979, all fallen within the realm of capitalist reformism. In spite of strong political pressure from organized peasants in Honduras, El Salvador and Guatemala, little land has been transferred from the dominant agro-export producers to the rural poor (CECOH 1988:10). In 1971, Thiesenhusen commented on options available to peasants in these circumstances. "In the absence of agrarian reform, which would make available substantial areas of land in presently farmed areas,

movement to cities or to the frontier may offer the best possibilities" for peasants who loose their land or grow up on small farms that can not possibly support them (Thiesenhusen, 1971:209). With the exception of El Salvador, where no agricultural frontier remained, agrarian reform came to mean colonization, itself a supplement to spontaneous migration and settlement. It is no accident that the Costa Rican institution responsible for implementing agrarian reform was called "Instituto de Tierras y Colonizacion" (ITCO) (The Lands and Colonization Institute). To avoid changing land tenure on the most fertile and productive lands - even those that are underutilized - regional governments have turned to their ever more distant agricultural frontiers and to violent repression to deal with peasant discontent.

According to Garcia (personal communication, 1987), distributive reforms with seemingly alternative social organization did not occur in Central America until 1980 in El Salvador, in the wake of the victory of the Sandinista National Liberation Front (FSLN) in Nicaragua, a year earlier. After the "soccer" war between El Salvador and Honduras, many Salvadoran migrants who had made their way to Honduras' agricultural frontier were forced to return; Honduras would no longer be El Salvador's agricultural frontier (Becerra, 1987:185). In the absence of this easy

solution to peasant pressure and in combination with many other factors, civil war pushed the government to finally begin reforms in spite of opposition. Although substantial amounts of land have been distributed, it has been too little and too late to resolve the political crises or the peasants' demands. Diskin (1987:28) concludes: "for the rural poor in El Salvador, most of whom received no benefit, agrarian reform remains a distant goal, one yet to be achieved." Throughout the region, capitalist agrarian reforms have had greater impact in the law books than on the countryside⁷.

7. James P. Rowles (1985) describes the "struggle of Costa Rican Reformers" and the "failure of the law to bring about major change."

TABLE 3
CENTRAL AMERICAN AGRARIAN REFORMS

Country	land area transferred	number of families	Type of Reform
Costa Rica a 1967-74	35,412 has	1,222	colonization
El Salvador b phase I	218,566	25,000 - 31,259	redistributive
phase II	not implemented		
phase III	96,566	47,000 - 63,668	"
Guatemala Quiche'			
1953-4 c1	53,268 has	-	redistributive
National 1975-1982 c2	69,000 has	2,000	colonization
Honduras d 1962-1986	311,124 has	70,379	colonization/ legalization
Nicaragua Somoza e1	<127,000 mz	2,551	colonization
Sandinista e2 1979-1987	1,979,000 mz	60,000	
redistributive			

Sources:

- a. Seligson 1980:127
- b. Diskin 1987:21
- c1. Libot 1976. Following the overthrow of the Jacobo Arbenz government in 1954 most of the peasant families who received land were forcibly expelled (Libot 1976:92).
- c2. Maloney (1981). Of the total of 69,000 hectares, most of land transferred was land redistributed in the Arbenz reform, and taken back following his ouster.
- d. CEDOH 1988. Of this total, 76 percent were arable. The total for the 25 year period is less than 40% of the goal established for the 1975-79 period.
- e1. Table 10 in Chapter III. Estimate of land area transferred (50 mz x # of beneficiaries).
- e2. Table 27 in Chapter V. The land area transferred includes lands to production cooperatives and to state farms, and does not include the amount transferred to individual peasants. The number of families includes individual families and members of production cooperatives,

but does not include families working on state farms.

In summary, government policies betray a strong class bias in resource distribution. In the pursuit of economic growth, the wealthy few control a disproportionate amount of land, much of which is underutilized. Neither peasants or forests have ever been a priority. Although the term "agrarian reform" has become common in Central America since the early 1960's, it has usually meant colonization of remaining tropical forests and has never involved a change in the profound structural inequalities or social relations of peripheral capitalism. The merchantability of private land transfers and inequalities of access to credit have promoted reemerging social differentiation on reformed lands. Capitalist agrarian reform has failed to limit social differentiation because this would be antithetical to development in the interests of the rich. Capitalist agrarian reform has thus been a tactical action designed to preserve capitalist hegemony. For these reasons, the effect of capitalist reform on frontier migration has been, at best, minimal and temporary, while capitalist social relations of have remained essentially intact as a primary cause of deforestation.

Chapter III

Somoza's Agrarian Reform:

Accelerated Social Differentiation and Deforestation

This chapter analyzes the social process underlying deforestation in Nicaragua during the 1950 to 1979 period, in light of the theoretical framework explicated in Chapter II. General trends in land concentration and displacement of peasants are analysed first on a national scale, and then in Nueva Guinea, Zelaya, the principal site of Somoza's agrarian reform program.

Deforestation of Nicaragua's tropical humid forests began when permanent agriculture was first established in the Atlantic coast region late in the 19th century. Social differentiation of peasants from the Pacific coast and demand for labor in the forest and rubber industries initiated the settlement of mestizo peasants in Central Zelaya and other areas of Nicaragua's agricultural frontier (MIDINRA, 1984a:4). When forest and rubber companies pulled out, many workers turned to full-time agriculture, producing a limited amount of deforestation.

However, the problem did not end there. Settlement of the Atlantic region's tropical humid forests increased dramatically when agro-export production expanded. Nicaragua's agro-exports increased substantially when the Second World War and the Korean conflict stimulated demand in the United States for coffee, cattle, sugar, cotton, irrigated rice, and tobacco. As elsewhere in Central

America¹, the settlement in tropical humid forests that resulted from postwar agro-export expansion was much different from earlier settlements. Post-war agro-export production accelerated deforestation because of the failure of this 'modern' sector of agriculture to employ the peasants it expelled from the lands it took over and because it was not accompanied by sufficient employment-generating industrial development (Taylor 1968:iii).

This latter failure was common in the Central American Common Market's (CACM) industrial development push which was, in general, less successful in Nicaragua than in neighboring² countries. In Nicaragua, few displaced peasant families were fully employed, and most pursued survival strategies that depended on urban or frontier alternatives and which combined seasonal wage labor with petty commodity production.

While the opportunities for non-agricultural industrial expansion in Nicaragua were more limited than in El Salvador

1. The rapid expansion of agricultural land in Nicaragua was consistent with regional trends discussed in Chapter I. The general similarities between Nicaragua and its regional neighbors make it a useful case for examining the process of agro-export expansion and deforestation occurring well beyond Nicaragua's borders. I have been more careful to account for the ways in which the Nicaragua case is different or unique in order to facilitate comparison with and extrapolation to other countries in the region.

2. Only Honduras fared worse than Nicaragua in CACM ventures.

and Guatemala, the opportunities for agro-export production were wide open. Cheap land and labor and favorable international prices for agro-exports made investment attractive and, as elsewhere in Central America, agro-export expansion became the essence of capitalist development of agriculture².

This new trend of agro-export expansion had its most important impact on deforestation when a growing fast food industry created a U.S. market for "cheap beef"⁴ in the 1950's (Enriquez, 1985; Ortega, 1986). The U.S. became Nicaragua's most significant buyer by 1960 and maintained this position through 1975 (See Table 4) importing 92.6% of Nicaraguan exports of fresh beef. Nicaragua became "the largest supplier of beef to the U.S. in all of Latin America" (New Scientist 1986:112).

3. For a more detailed account of the causes and consequences of agro-export expansion in Nicaragua see: Enriquez, 1985, Jonakin, 1984 and Nunez 1982).

4. The cost of Central American meat is about 40 percent lower than comparable meat in the U.S. (Barry and Preusch, 1986:154).

TABLE 4
NICARAGUAN EXPORTS OF FRESH BEEF 1960 - 1975
Value in U.S.\$

Country	Year						
	1960	1965	1970	1972	1973	1974	1975
Germany	-	4.3	-	-	13.0	-	23.3
Salvador	-	13.8	21.3	170.4	87.2	52.9	218.0
U.S.	2,876.6	5,044.6	23,212.0	35,916.2	42,829.2	21,212	25,376.8
Great Briton	-	1.2	-	-	-	-	-
Honduras	-	12.4	-	23.0	185.0	22.6	-
Holand	-	-	-	3.3	-	-	-
Puerto Rico	95.5	1,389.5	3,339.0	2,151.8	1,305.3	532.2	1,203.1
Japan	-	-	-	-	90.6	-	-
Others	-	198.5	-	7.1	19.7	-	13.4
Total	2,972.1	6,664.3	26,572.3	38,271.8	44,530.0	21,819.7	26,834.6

Source: MIDA-OAS, 1980:11 (Banco Central: Informe Anual 1975:88)

In addition to the U.S. demand, other factors contributed to making Nicaragua such a significant supplier of beef. First, meat, along with sugar, produced the highest net return in foreign exchange of all export products (Harris, 1985:76). Second, the tropical forests of the central interior and Atlantic regions provided land for pasture expansion. Third, the existing social structure

offered a cheap and mobile work force. Finally, international loans financed expansion. But these factors were not simply objective conditions. They were not independent from one another or from government support. The Somoza government, like others in the region⁵, used these factors to expand beef exports with a particular class bias. State policies promoted the growth of larger, less efficient ranches by promoting social differentiation.

Somoza Support

In Somoza's Nicaragua, "state power generally expressed itself in institutions and policies which promoted the agricultural export landowning class at the expense of the non-landowning or small landowning classes" (Jonakin, 1984:6). According to Jonakin (1984:19), "it was clearly the smaller, peasant sector farms (sub-family and family) which produced most of the basic grains, especially beans and corn. On the other hand, the larger estates (multi-family and multi-family large) produced the vast majority of export products--91.2 percent of cotton, 77.1 percent of coffee, 95 percent of sugarcane, and 73.8 percent of cattle." This inequality of emphasis is reflected in Table

5. The governments of El Salvador, Honduras, Costa Rica and Guatemala also supported beef export production. Meat exports "hold the third position among leading exports from Costa Rica and Honduras" (Barry and Preusch, 1986:154).

5 which compares the distribution of land and credit between export and domestic crops. However, the "larger-estates" should not be understood as a monolithic sector. Nicaraguan agro-export expansion involved unusually high participation of rich peasants and the lower stratum of the agrarian bourgeoisie (Baumeister, 1983:54/55). This is especially true in comparison to Costa Rica and El Salvador⁶.

The involvement of these strata in the agricultural development process in Nicaragua is evident in Table 6. Their participation did not ameliorate the predicament of the poor and middle peasantry who continued to receive no support from the state to change their economic status. These two strata continued to produce grains for the domestic economy. Control of the domestic prices for grains was exercised by the agro-export sector in order to keep wages down. As a result, most middle and virtually all poor peasants were adversely affected, and, as a consequence, subordinated to the agro-export orientation of larger producers. In the beef export sector, subordination was accomplished through policies affecting credit, public and private investment, and national and indigenous lands.

6. In Coffee, 58 percent of the Nicaraguan producers fell in this category, compared to 38 percent in Costa Rica and 33 percent in El Salvador. In cotton, these strata constituted 60 percent in Nicaragua, while in El Salvador they comprised 28 percent (Baumeister, 1983:56).

TABLE 5
USE OF LAND AND CREDIT FOR EXPORT VS. DOMESTIC MARKET CROPS
(in percentage)

Year	Export Crops		Domestic Crops	
	Land	Credit	Land	Credit
	%	%	%	%
1960-61	41	91	59	9
1961-62	42	93	58	7
1962-63	45	93	55	8
1963-64	46	94	54	7
1964-65	47	94	53	6
1965-66	45	92	56	8
1966-67	46	91	54	9
1967-68	42	86	58	14
1968-69	41	80	59	21
1969-70	44	86	56	14
1970-71	40	86	60	14
1971-72	41	86	59	14
1972-73	49	90	51	11
1973-74	49	87	52	13
1974-75	42	85	58	15
1975-76	44	75	56	25
1976-77	47	85	53	15
1977-78	50	88	50	12
1978-79	46	88	54	12
1979-80	40	81	60	19
1980-81	38	70	62	30
1981-82	38	71	62	29
1982-83	42	75	58	25
1983-84	41	76	59	24
1984-85	47	69	53	31

Land: The percent of harvested land area used for export crops (cotton, coffee, sugarcane, and sesame) vs. domestic market crops (corn, beans, rice, and sorghum).

Credit: The percent of short term bank credit allocated for export crops vs. domestic market crops.

Source: Enriquez and Spalding, 1985:6 Banking Systems and Revolutionary Change: The politics of Agricultural credit in Nicaragua.

The Somoza government responded to the international beef market by channeling the flow of international credit in the interests of the Somoza Debayle family and other factions of the Nicaraguan bourgeoisie. The state's general bias in its distribution of credit is evident in Table 5 which illustrates the focus of credit on export crops. Of Interamerican Development Bank loans for agriculture and related agro-industries, an average of 10% went for cattle and meat packing plants during the entire period from 1961 to 1977 (MIDA-OAS, 1980:13). Credit openly favored larger producers (Enriquez and Spalding, 1985:5; Jonakin, 1984), exacerbating prior inequality of access to the beef export market. Enriquez and Spalding (1985:2) claim that "the financial assistance provided by the banking system was crucial for the growth of agro-export production." This was particularly true of the cattle sector's expansion. From 1975 to 1977, the cattle sector received well over 35 percent of all government and private credit for agro-exports (FAO 1984:3-6). Indirectly this support intensified the existing inequalities of land ownership and promoted its further concentration.

In addition to credit to finance the cattle elite, Somoza channeled public and private investment to support the cattle sector's expansion. International financing was used to build new roads into the Atlantic region. These

roads facilitated the migration of peasants to the frontier and the extraction of grains and beef. As elsewhere in the Nicaraguan economy "there was a high degree of concentration of ownership among the capitalists involved in agro-industry, commerce and finance" (Baumeister, 1985b:14). Somoza made his own investments in USDA approved meat-packing facilities, and together with his allies attained monopoly control of the export market for Nicaraguan beef. "The owners of the slaughter houses most of whom were tied to Somoza would finance the purchase of cattle by their suppliers and then process and export the end product." This allocation of public and private resources helped the rich manipulate and control the two most important factors for their beef-export expansion: Land⁷ and Labor.

The tropical forests of the interior departments were an obvious source of land to the Somoza government. The lands were considered national, and apart from indigenous populations concentrated along major rivers and on the Atlantic coast, and a relatively small population of peasant settlers, they were unoccupied. However, vast amounts of labor were required to clear forests and establish and maintain pastures and manage herds. If Vilas, (1985) is

7. "The Somoza family and their associates also owned extensive cattle haciendas (Baumeister, 1985b:16).

correct, the beef industry as a whole, despite its extensive nature, employed more labor than any other agro-export sub-sector. Frontier migration offered the solution and was easily encouraged. The increasing need for basic grains to feed the growing rural proletariat employed in the production of export crops gave Somoza a facile justification for his expansionist policies. He could expand grain production at the same time that he subsidized the cattle sector by encouraging peasant migration to the agricultural frontier.

Somoza encouraged peasant migration by maintaining policies which undermined peasants' claim to the lands they farmed. Legal titles, largely unavailable to peasants, were frequently issued to larger landowners. Nevertheless, in the more rare cases when title was issued to small holders, holding title did not sufficiently protect peasants against the policies promoting land concentration. The National Development Bank maintained a policy of foreclosure on peasant lands for delinquent loans. This crystallized the process of differentiation into a quiet, "legitimate" stimulation of the land market. These simple real estate transactions greatly accelerated the differentiation process, concentrating lands in the hands of the more powerful agro-export groups, and leaving poor peasants with few options (Nunes Soto, 1981:19,20). Ballard (1982:25,26)

maintained that the number of farms in the smallest category, less than 1 manzana (1 manzana = 1.72 acres), grew by 203 percent over the 1963 - 1971 period. This reflects the growth of the Pacific minifundio and indicates the limited agricultural options available to peasants in that region. Between 1950 and 1963, 14 percent of the population migrated within Nicaraguan territory (Espinales, 1974:188). Forty percent of this migration was absorbed by Managua, and in particular by its informal sector. Twenty-five percent migrated to other departments (Espinales, 1974:188). For too many, frontier migration and spontaneous settlement remained the only option⁸.

Frontier migration was the major contributor to the unusually high population growth rates registered in the Atlantic region. Between 1950 and 1971, the Atlantic

8. "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" (Taylor, 1968:5,6).

region's population density more than doubled while it increased by only 80% in the rest of the country. In the same period, rural population decreased everywhere except in the Atlantic region where it grew by 7 percent (National Census data). During the last 8 years of this period, the nation's population growth rate was 2.85 percent while the population of the state of Zelaya grew at 6.66 percent. According to Marvin Ortega (1986a:3), this migration trend is significant since the birth rate was considerably lower in Zelaya than in the nation as a whole.

The cause of frontier migration is evident in Table 6 which presents changes in land tenure during the 1963-71 period. Ballard explains that "during this period the average farm size declined in all size categories except for 2,500+ manzanas, by from 9 to 20 percent. All categories except for the large bourgeoisie lost area as a percent of the total agricultural area indicating that the largest farms grew relatively faster than other strata" (Ballard 1982:25,26). Part of the gains made by large landowners in this period were made possible by Somoza's policy of unlimited frontier expansion.

TABLE 6
NICARAGUA: CLASS STRUCTURE BY PERCENT FARMS
AND PERCENT LAND AND CHANGE 1963-1971*

	% FARMS	% CHANGE	\$ LAND	% CHANGE
Poor Peasants (0 - 20 manzanas)	57.0	-3.6	4.9	-14.9
Medium & Rich Peasants (20 - 200 manzanas)	37.3	+33.3	32.6	+16.0
Medium bourgeoisie (200 - 1000 manzanas)	4.9	+28.2	26.3	+13.7
Large bourgeoisie & latifundio (1000+)	.8	+48.1	35.8	+48.8
	100		99.6	

* excludes Zelaya

Source: Ballard, 1982

Studies of land use capabilities and climatic conditions indicated that pasture expansion should have been, but was not limited to tropical dry and transitional regions (Miguel Caseres pers. com. 1985). Largely due to the expansion of pastures, the land area cleared of forests doubled between 1950 and the 1960s (Baumeister, 1983:53) and showed no sign of stopping. More specifically, in the period from 1950-1963 the land area in farms and ranches increased by 37 percent in the Pacific, 64 percent in the interior and 146 percent in the Atlantic (240 percent in Zelaya alone) (Espinales, 1974:187). Between 1961 and 1971,

1.3 million manzanas were deforested, half of this in the Atlantic region.

Somoza was not unaware that his development policies would lead to the destruction of the nation's tropical forests. In 1970, Jaime Incer wrote, "the development of Atlantic Coast cattle production can only be justified in terms of local consumption." He explained that the ecological conditions required for the establishment of Savanna grasslands were lacking (Incer, 1970:373). This warning was lost on the Somoza government which continued to support pasture expansion into the eastern frontier. According to an Organization of American States (OAS) report, the deforestation rate was 100 square kilometers per year between 1975 and 1979 (MIDA/OAS:1980:29). In 1980, Norman Meyers claimed that "of Nicaragua's 147,943 km², forest lands are officially designated to cover 64,000 km², much of which can be categorized as moist forest - approximately 50,044 km² in the early 1970s, now reduced to some 35,000 km². Nicaragua still includes the largest tract of Tropical Moist Forest remaining in Central America, a small portion of what is reputed to have existed half a century ago." Meyers estimated that tropical forests were "eliminated at a rate of at least 400 km² per year...", a rate substantially greater than the OAS report. The immediate cause of this accelerated deforestation was the

increased migration of peasants seeking land on which to grow their grains.

Relative to this rapid deforestation and the changes in the domestic production of food grains is Taylor's assessment of the limitations on agricultural development. Taylor stated that "the agricultural "bottleneck" in Nicaragua is [due to] the level of skills of the campesino masses" (Taylor, 1968:135). Although he also referred to the unequal distribution of land and capital, like others he blamed peasants for their predicament. In reality, productivity figures in the cattle sector show that smaller producers use pastures more productively than do larger producers. Likewise, the productivity of labor in frontier grain production rivals that of capitalist producers (Deve, pers. com. Managua, 1984). Rather than skill, the problem is found in the unequal distribution of resources and the social relations of production between poor peasants and larger landholders.

Documentated geographic shifts in corn and bean production indicate peasant migration in the period 1956 to 1977. Table 7 presents these shifts. In general stagnation is evident in the Pacific departments and dramatic growth in Zelaya and Rio San Juan. The repeating process of displacement and migration is evident the area of corn planted per rural population on a department basis. The

first displacement from Pacific departments is evident in the decreasing amounts planted in the Pacific departments and corresponding increases in the Interior and Atlantic in the period 1950 to 1963. In the period 1963 to 1971 the exodus from the Pacific departments (Chinandega, Leon, Managua, Granada, Rivas) slows, while notable increases continue in the Interior (Boaco, Chontales) and Atlantic (Zeleya and Rio San Juan). Finally, in the period 1971 to 1977 displacement of corn and bean producers is evident in the Interior region while the only substantial increase is found in the Atlantic. In Boaco and Chontales of the interior, growth, followed by a decline to near 1950s levels, reflects the impact of the temporary wave of slash and burn cultivators whose lands were transferred to pastures. Among the departments of attraction, with the exception of Managua and Chinandega, the greatest migration was toward the agricultural frontier (Espinales, 1974:188).

TABLE 7
STAGNATION AND DISPLACEMENT OF CORN AND BEANS (1956-1977)

Departments:	Corn (mz/rural pop.)*				Beans(mz/rural pop.)*			
	1950	1963	1971	1977	1950	1963	1971	1977
1. Chinandega	0.49	0.23	0.21	0.21	0.06	0.02	0.02	0.02
2. Leon	0.27	0.25	0.24	0.16	0.06	0.02	0.02	0.03
3. Managua	0.53	0.21	0.23	0.16	0.21	0.05	0.02	0.04
4. Masaya	0.18	0.23	0.20	0.15	0.07	0.08	0.10	0.07
5. Carazo	0.17	0.14	0.15	0.17	0.13	0.08	0.08	0.09
6. Granada	0.31	0.16	0.21	0.15	0.15	0.09	0.09	0.10
7. Rivas	0.28	0.12	0.19	0.12	0.09	0.04	0.03	0.10
8. Nueva Segovia	0.26	0.30	0.35	0.26	0.06	0.07	0.09	0.11
9. Madriz	0.23	0.20	0.22	0.20	0.12	0.08	0.16	0.16
10. Esteli	0.18	0.25	0.25	0.20	0.08	0.10	0.29	0.17
11. Boaco	0.23	0.31	0.37	0.31	0.04	0.04	0.10	0.09
12. Chontales	0.46	0.51	0.64	0.43	0.06	0.07	0.11	0.10
13. Rio San Juan	0.16	0.36	0.48	—	0.06	0.12	0.16	0.37
14. Zelaya	0.08	0.31	0.40	0.57	0.03	0.07	0.07	0.29
Nicaragua/average	0.27	0.28	0.30	0.23	0.08	0.07	0.09	0.13
Averages without Rio San Juan and Zelaya	0.30	—	—	—	0.08	—	—	0.09

* The rural population includes residents living in the open countryside and in villages with fewer than 1,000 people.

Source: (Stanfield, 1982:27)

At first glance, growth of beans and corn would appear to have been sufficient. Bean production grew at an average annual rate of 4.2 percent and corn at 4.1 percent between 1960 and 1979 (BCN:1979:79,80). Together, spontaneous migration and directed colonization to the Atlantic departments contributed most of this growth, and averted the consequences of declining production in the departments of

expulsion. In 1979, after years of Somoza's reform, Zeleaya, had grown to become the department with the highest ratio of corn planted per rural population and second only to Rio San Juan in Beans. In 1950, before the reform, Zeleaya, the largest of Nicaragua's departments had had the lowest levels of corn and bean crops, indicating the relatively small population of settlers prior to the expansion of agro-export crops. Despite the effectiveness of this shift in production, the temporary and unstable nature of peasant land tenure indicated that the gains in grain production would be temporary. Despite the fact that peasants were the most immediate cause of forest clearing, Meyers cited "the encroachment of man-established pasture" as the principal cause (Meyers, 1980). Pastures followed peasants into the humid tropical lowlands, once again displacing grain production and expelling peasant producers.

Expanding pastures consumed most of the lands which had been cleared by peasants and dwarfed the amount of land devoted to crops. Although figures vary widely, none refute the predominance of pasture growth or the direction of its expansion. As presented in Table 8, during the period 1963 to 1971, pastures expanded from approximately 5.7 million to 9.9 million manzanas using more than 10 times more land than both domestic and export crops combined. According to Sandigo, by 1971, pastures occupied 49 percent of all lands

in agriculture and they continued to do so through 1978 (Sandigo, 1985:6). Most of the expansion in this period, as well as the one that followed, occurred in the interior and Atlantic departments. Between 1971 and 1979, the area of land devoted to crops or pasture grew by 1.3 million manzanas, 36 percent in Matagalpa and 34 percent in Zelaya (Espinales, 1974:165-206).

TABLE 8
GROWTH IN LAND AREA DEVOTED TO PASTURES VS CROPS

LAND USE	1963	1971	1978
Domestic and export crops	--	.8	--
Pastures	5.7	9.9	11.0

Calculated from Quintanilla, 1977; DIPSA 1974; Ballard, 1983

With the diverse forms of government support, the Nicaraguan herd grew from 1,182,000 head in 1952 (Quintanilla, 1977:112) to peak at 2,850,000 in 1978 (Ballard, 1982) having sustained an average annual growth of 5.7 percent between 1960 and 1978 (Cajina Loaisiga, 1985:27). During the period 1970 to 1974, beef exports grew at an average of 10.2% annually (MIDA-OEA, 1980 Vol IV:10). Meat exports grew from 5% of total Nicaraguan exports in 1960 to 15 percent in 1972 (Wheelock, 1980; Nunes Soto, 1981:17) making beef an important new contributor to export

earnings. However, most of these earnings were attained by a limited sector of privileged cattle producers and meat exporters.

Table 9 shows the income disparity between socioeconomic groups within which the cattle sector had its place. The family income of the largest landowners was 49 times that of their workers' families. While the number of animals slaughtered increased from fewer than 1 million in 1952 to more than 1.5 million in 1963 and more than 3 million in 1979 (National Census Data) meat consumption by Nicaragua's rural poor, like the rest of Central America was about 6 percent of that consumed in the U.S. (Barry and Preusch, 1986:153,4).

Table 9
NICARAGUA: AGRICULTURAL FAMILY
INCOME ACCORDING TO SOCIOECONOMIC GROUPS
(1961 Central American Pesos)

Total	Number of Families	Average income
	148,901	902
Large Multifamily	1,495	18,226
Medium Multifamily	20,794	2,248
Family	27,976	716
Subfamily	49,678	445
Microfincas	2,258	380
Landless workers	46,700	370

Source: Nunez, 1981:62

A further reflection of social differentiation was the

fact that by 1979, "large cattlemen constituted 1.9 percent of all the country's cattlemen and possessed 27 percent of the national herd" (FIDA, 1980). On the frontier the largest landowners held 15 percent of the land. In Rio Blanco, an area of spontaneous settlement, the cattle elite had an average ranch size of 1,750 mz. In PRICA their average ranch size was 1,260 (Ortega, 1986a:5). The difference between the mean ranch sizes in spontaneous and directed colonization areas was of little significance. Perhaps directed colonization produced a slightly slower rate of social differentiation.

Throughout the Interior and Atlantic regions, poor Mestizo peasants were forced to move, and move again, encroaching on the forested lands of the east. However, they were not the only losers. Indigenous groups (Sumo, Rama and Miskito also lost their lands to pasture expansion. They constituted Somoza's "frontier." An example of this occurred when the Nicaragua Mahogany and the Rubber Reserve companies who were operating in the area of the Sequia and Grande rivers exhausted resources and fired their workers. When workers switched to slash and burn agriculture, Sumo Indians were expelled from the edges of the rivers (MIDINRA 1984b:4). Brown (1985:179) affirms that "many Miskito and Sumos were displaced from their lands" in this way.

However, Somoza did not bear the political consequences

of such actions, because most of the Atlantic region's indigenous groups had not yet felt the results of Somoza's policies of pasture expansion. The lands occupied by native communities were relatively limited in quantity and concentrated along river banks and Atlantic coastal lagoons. When the rest of the country united against Somoza in 1978, remaining unsettled forested lands were still functioning as an effective buffer for Somoza's policies. These lands accommodated the approaching ranchers and peasants and forestalled direct conflict with native peoples. Nevertheless, the process of spontaneous and directed colonization Somoza set into motion in the 1950s promised to absorb the lands occupied by even the most distant native communities by the year 2,010.

Beyond the questions of income distribution and human displacement, the resource allocations associated with beef export production contrasted sharply with the relatively small contribution to export earnings. A disproportionate share of land devoted to the cattle sector, was approached by its share of labor. According to Vilas data, total employment in the cattle sector was from 38 to 42 percent of all labor employed in corn, beans, coffee, cotton, and cattle combined⁹. Devoting at least half of the nation's

9. While it appears that these figures reflect substantial employment in the cattle sector, in reality many more

land, and at least a third of the nations labor force to produce only 15% of export earnings in the sectors best year could hardly be justified by any one but the few who gained from the unequal distribution of this income.

The explicit contradiction in the growth of the cattle sector is reflected by the general trend in Nicaragua's changing agricultural economy. Growth in the value of production for domestic consumption did not keep pace with the expansion of agro-exports (See Table 10). In 1974, Espinales asserted that "The transformations that have occurred in agriculture do not respond to a process of industrial development, ...[in part this was the result of] the maintenance of non-capitalist forms in the agricultural sector necessary for maintaining luxurious advantages for the dominant" social sectors (Espinales, 1974:188).

TABLE 10
GROSS VALUE OF AGRICULTURAL PRODUCTION
(millions of Cordobas)

	1950	1955	1963
Export Production	195.1	371.5	506.7
Internal Consumption	290.2	340.9	379.1
Total	485.3	712.4	855.8

Source: Jonakin, 1984:20, from Jarquin, 1975:141
peasants were displaced than employed. The large percentage of employment in these crops is a reflection of the cattle sector's large share of land.

Given the open frontier and vast availability of land, one might expect that the frontier peasants would increase their control of land and become more homogeneous than before. However, social differentiation was at the heart of the frontier migration phenomenon. Taylor studied the migration and settlement process in the Rama area of Zelaya as early as the mid 1960s. He found support for his hypothesis: "the availability of land is not a sufficient condition for producing changes in the economic structure ...; [and] old economic patterns follow the settlers as they relocate in another part of the country" (Taylor, 1968:7). Social differentiation was evident in the stratified production of beans and corn as described in a study of frontier peasants of Central Zelaya (Midinra, 1984b:11).

Examination of the social structure (Midinra, 1984b:13-17) of the frontier reveals that at least five social strata had emerged early on in the differentiation process: 1) medium cattle bourgeoisie, 2) rich peasant, 3) medium peasant, 4) poor peasant, and 5) proletarian ranch hands. The medium cattle bourgeoisie were characterized by ranching activities in which meat production was primary, milk secondary, and the hiring of year-round labor essential. On ranches which exceeded 300 mz (some larger than 1,000 mz), ranchers tended to live on and own land in dry tropical

zones. Expansion of land area was accomplished through purchases of smaller parcels. Milk herds averaged between 50 and 100 cows, and beef herds between 100 and 200 steers (some had as many as 500). These ranchers were not direct producers. Instead they supervised hired labor, did their own accounting, and handled sales, functioning as commercial intermediaries between countryside and city. They were not at the top of the economic order. Slaughter houses, such as those owned by Somoza, determined prices and controlled access to foreign markets. Nevertheless, given its access to capital and knowledge of the market, the medium cattle bourgeoisie took advantage of the rich peasant cattle producers by buying young animals at below-market prices (Midinra 1984b:13; MIDA/OAS, 1980:17-20).

A notch down in the system was the rich peasant rancher who also managed his herd for milk and meat, using household labor as well as seasonal workers. Among these producers, the upper stratum fattened up to 30 steer per season. This group controlled from 50 to 300 manzanas. Milk herds had between 5 and 50 cows. The rich peasants dedicated an average of 12 mz of their land to corn and 5 mz to beans for household and hired-labor consumption. Pastures were established and maintained and grains produced through hired labor and the renting of land to poor peasants.

Middle and poor peasants occupied the next rung on this agricultural frontier ladder, dedicating themselves and their lands to basic grains (beans, corn and rice). A few owned cattle, but they produced meat and milk only for family consumption¹⁰. Owning cattle distinguished two substrata of peasants. The upper stratum was made up of middle peasants who owned up to five cows and did not sell their labor. The lower stratum did not own land, but gained access to it by paying rent in the form of produce and labor. These families also sold their labor on a seasonal basis, making them semipeasants/semiproletarians (Stanfield, pers. com. 1987). Land ownership ranged from 0 to 50 manzanas. Grain production ranged from 4 to 8 mz of corn, primarily for consumption and raising pigs, and 4 mz of beans, a small portion of which was sold commercially. Below these strata of peasants was yet another stratum of agricultural households which sold the labor of one or more members and who produced little or nothing for themselves. These frontier proletarians were frequently engaged as ranch hands, repairing fences and managing herds.

Social differentiation and frontier migration had resulted from each of the agro-exports, but none imposed

10. Consumption is manifested in a broad sense. Rather than being consumed directly, the cattle provided cash for basic consumption needs.]

more devastating consequences to Nicaragua's small farmers and forests than the expansion of pastures. On the expanding frontier the fates of poor farmers and tropical forests were intimately linked to the extensive form of land use.

Unlike the United States, where beef production had been intensified¹¹ through the use of feed grains to produce a product of higher value, Nicaragua increased production of competitively-priced beef by expanding pastures. Although average stocking rates improved from 4.6 manzanas/head in 1963 to 3.87 mz/head in 1971 (Quintanilla, 1977:116) the rate of improvement was slow. Moreover, the difference between the two rates may well have reflected a lag in herd growth following initial pasture expansion, rather than an improvement in pasture management techniques. With the exception of replacing natural grasses with improved varieties, pasture management had not changed substantially since the colonial period. Furthermore, stocking rates reflected in national averages hid the important influence that ranch size and spatial location had had on stocking rates. Stocking rates corresponded inversely to farm size (Sandigo, 1985:3). On ranches of 200 mz, stocking rates averaged 2.4 mz per head. Producers owning fewer than 200

11. While Nicaragua produced an average 164 kilos/head, the U.S. average was 271 kilos/head.

mz had 1.4 mz of pasture per head. Stocking rates were lower in the tropical humid soils of the Atlantic than the Pacific and Interior departments.

These disparate stocking rates are reflected in the distribution of pastures and cattle production. Among the different stratum of cattle producers, the smallest controlled a small amount of the nation's pastures but were more efficient users of land than the larger landowners. The small producers held only 1 percent of the nations pastures, while producing 4 percent of the nation's beef (Vilas, 1984). In the medium, multi-family category, cattle production is equivalent to the share of pastures owned (See Table 11. Producers holding more than 500 mz, those holding more than 1,000 mz of land made the least productive use of their pastures (See Table 12). In the latter case, the share of land was twice the share of production.

TABLE 11
RELATIVE DISTRIBUTION OF PASTURES
AND CATTLE PRODUCTION BY TENURE STRATA

Farms	% of Pastures	% of cattle production
Sub-family (0-10 mzs)	1	4
Family (10-80 mzs)	10	15
Medium Multifamily (50-500 mzs)	40	43
Large Multifamily (500 and more)	49	38

Source: Carlos Vilas, 1984

TABLE 12
RELATIVE DISTRIBUTION OF PASTURES
AND CATTLE PRODUCTION BY TENURE STRATA

Farms	% of Pastures	% of cattle production
up to 200 mzs	34	52
200 to 1,000 Mzs	29	29
More than 1,000 mzs	37	19

Source: Warken (1975), and Valdivia (1974) as presented by Vilas, 1984. 7.1 Imagenes Existentes Sobre La Estructura Del Empleo En El Sector Agropecuario.

While the common assumption that the cattle sector involves little labor is challenged convincingly by Carlos Vilas (1984), this premise does not contradict the general

trend of displacement which resulted from land concentration. Like other agro-exports, in areas of pasture expansion, fewer peasants were employed than expelled for each manzana of grains converted to pastures, producing a continuing exodus to the agricultural frontier of Central Zelaya (MIDINRA 1984b:5). Vilas' figures, presented in Table 13, show that, in absolute terms, the Nicaraguan cattle sector employed more labor than basic grains (corn and beans), and as much or more labor than coffee and cotton combined. Viewed alone, these figures obscure the larger impact of cattle sector growth on both peasants and forests. Far more peasants are expelled by pasture expansion than employed in the cattle sector. Using Vilas' 11 days/head and Sandigo's (1985:3) national average stocking rates of 2.4 mz/head on ranches of 200 mz and above, and 1.4 mz/head on those of less than 200 mz., we find that only 4.58 days of labor/mz were required on ranches over 200 mz. and 7.86 days/manzana on smaller farms. Basic grain production required at least five times as much labor¹² and coffee, Nicaragua's most significant permanent crop, required at least 10 times as much labor as pasture. This situation is even worse in the humid tropical lowlands.

12. Calculated .85 days/mz (9.2 days/head, .09 heads/mz).

TABLE 13
NICARAGUA: LABOR REQUIREMENTS

Activities/1	Area or # of head	Labor Requirements	Millions of workdays/year
Corn	300,000	40 days/Mz	11
Beans	100,000	40 days/Mz	4
Cattle	2,600,000-	9.2 or 11	25.8 to
	2,800,000	days/head/2	30.8
Coffee	135,000	80 days/mz	11
Cotton	250,000	60 days/mz	15

1: Rounded figures.

2: The figure of 9.2 days per head is taken from Robert Finley (1974) Analysis of Livestock Farms in Nicaragua: A Detailed Study of Costs and Returns p.25. The figure of 11 days/head/year is estimated by Vilas.

Source: Carlos Vilas (1984)

The greatest expansion during the period occurred in the Interior and Atlantic departments where department-wide stocking rates ranged from 2.08 mz/head in Boaco to 5.33 mz/head in Jinotega and 10.88 mz/head in Zelaya. In Zelaya, the average demand for labor in the cattle sector was less than 1 day of labor per manzana of pasture. Given that the labor requirements of basic grains calculated by Vilas are based on already cleared lands, the labor required in initial frontier crop cycles is higher than the 40 days/mz. The amount of local unemployment and subsequent migration for each manzana of grains converted to pasture is that much more severe.

This reduction in employment was anticipated by Taylor (1968:132,133). He expected that the demand for labor "would be considerably lower than that required at present with most of the population engaged in crop production." He explained that:

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.

Much as Taylor anticipated, land use shifted from grains to pastures as social differentiation continued. This

migration could be characterized in a number of ways. Because peasant migration and settlement of the frontier were not officially organized by the government, they have been referred to as spontaneous and anarchic. However, because of the government's role in developing policies of resource distribution which expelled peasants, government responsibility could hardly be denied. Because of the rapid rate of spontaneous settlement in Taylor's Rama study area, the major site of agrarian reform could not be located there, but just to the south. Although there were differences, much of the social and land use change analyzed by Taylor were repeated in Somoza's agrarian reform.

Somoza Agrarian Reform

Agrarian reform supplemented spontaneous settlement of the agricultural frontier by choreographing peasant subordination in even more explicit ways. Development of the Atlantic region was a primary goal of Somoza's agrarian reform and labor requirements of pasture expansion were a primary factor in the government's development strategy (MIDA-OAS, 1980:5). Nevertheless, peasant resistance to displacement in the Pacific region is often cited as the catalyst for the Somoza agrarian reform; however, according to Ortega (1986a:4), Nicaragua's peasant movement was the least organized and radicalized in Central America before

1979. More important than resistance was the fact that the eruption of Cerro Negro intensified prior displacement of peasants from agro-export expansion in Leon to create a willing group of settlers who would accept distant frontier settlement.

This peasant willingness to relocate reflected the desperation of peasants at the time¹³ and facilitated Somoza's avoidance of alternative sources of land for reform. Barring a self-sacrifice of Somoza's own lands, the dictator's options were limited to redistributing the lands of the agro-export producers (who were intra-class rivals) or the state's lands on the agricultural frontier. Similar governments representing privileged classes have "sacrificed" land in exchange for substantial indemnifications when alternative investment opportunities i.e., agro-industry, provided a way to maintain their relative economic and political power. Somoza did not elect this option. The reason may be found in the fact that profits available through alternative investments in industry were particularly limited in Nicaragua. Since Somoza's own investment strategy involved control of an important share of agro-export industries, and opportunities

13. Our 1985 survey and case studies of Masaya peasants showed that relocation to the Atlantic coast was the least desirable of acceptable alternatives to desperate families (MIDINRA, 1985b).

for other, non-agricultural industrial development through the Central American Common Market were limited, Somoza was hard put to convince the national bourgeoisie to give up lands in the Pacific region. As a consequence, only national lands were available for "agrarian reform." Somoza initiated frontier colonization and credit programs. Begun in 1963, these reforms promised to reduce political pressure and organization among peasants who were expelled from their lands in the Pacific region without sacrificing the lands of the region's elite. The key to making this reform viable for the peripheral capitalist economy was the labor it would provide, thus, guaranteeing unlimited pasture expansion for large cattle producers and land speculators.

Colonization was initiated by a decree which transferred 41,118 km² (5,854,500 manzanas); "all those national lands located in the center and Atlantic" to the Nicaraguan Agrarian Institute, (IAN) for distribution to dispossessed peasants (MIDINRA, 1985c:1). Distribution was greatest in the two-staged Rigoberto Cabezas Project (PRICA) in the municipality of Nueva Guinea¹⁴, where more than half of Somoza's reform beneficiaries were relocated.

14. Nueva Guinea is located on the western edge of the Atlantic Coast department of Zelaya, southeast of Chontales, the department which experienced the greatest herd growth in the 16-year period following the establishment of the National Agrarian Institute (IAN) in 1963.

Table 14 presents Somoza's colonization projects. Access to land was to be complemented by credit.

TABLE 14
NICARAGUAN AGRARIAN REFORM UNDER SOMOZA

Year	Project	Area	# Families settled	Population
1963-1974	Rigoberto Cabezas (First Stage)	30,306	753	4,662
1979	Rigoberto Cabezas (Second Stage)	84,502	1,480	8,294
1963 - 1974	Rio Escondidio and Rio Grande*	16,486	318	1,491

* These two projects were not completed.

Source: Ortega M. FAO, 1985:30

The Somoza credit program extended credit to 22,000 peasant households which as a group received only 4 percent of the agricultural credit (BNN, 1978). This highly skewed distribution of credit which had characterized the Somoza years prior to the reform was not substantially altered and few peasants benefited. Both colonization and continuing unequal distribution of credit favored the bourgeoisie. The reforms which were supposed to increase peasants' access to land and credit, in fact, accelerated concentration of land and capital in the hands of large holders. Expansion of the

middle and rich strata of peasants did not hinder Somoza's personal strategy of accumulation and promised to forestall peasant resistance.

Nueva Guinea:

Colonization as Alternative to Agrarian Reform

Located in southeast Nicaragua, (See map: Nicaragua in Chapter V), the Municipality of Nueva Guinea was established as a result of the Rigoberto Cabezas Colonization Project¹⁵ (PRICA) itself a product of the Agrarian Reform Law of 1963. The first settlers arrived in 1965. The project was implemented by the National Agrarian Institute (IAN) of the Somoza government with considerable assistance from the U.S. Alliance for Progress. Organized into 28 colonies, 753 peasant families were settled by 1974 in the project's first stage. Nearly 1,500 were settled by 1979. In humid tropical Nueva Guinea¹⁶, parcels of 50

15. The project fit into the overall development plans for the region. These included a road to the coastal city of Bluefields and construction of port facilities at Bluff to facilitate expansion of the export economy on the Atlantic coast.

16. The physical characteristics of Nueva Guinea are those of a humid tropical life zone. Rainfall increases from east to west. The annual average is 3,129 millimeters in La Esperanza, the center of the zone (Incer, 1970:341). A rainy season of 10 months is followed by a pronounced three-month dry period. Until settlement, the entire area was

manzanas were distributed to most families, who had been transported with government assistance from the Pacific region.

Both the human and the environmental consequences of colonizing Nueva Guinea became clear well before the first stage was completed. Made clear by Taylor in the mid 1960's, the facts were reiterated by local experience well before the project's first stage had ended. In the first stage of the project, grain production predominated as forests were cleared. Pasture expansion began to increase toward the end of the 1960s and its effects were palpable by the end of the first five years of the project. The fact that grain production could not be sustained, and would require either substantial fallow periods or new lands, became clear to most peasants after they arrived. Project promoters had neglected to tell them of the unusual characteristics of tropical soils and the declining yields that would result after only two years. Before the first covered by mixed tropical forest. According to a recent land-use potential study (IRENA, 1983), in Nueva Guinea only 12.5 km² are suitable for annual crops, while 18.5 km² are suitable for permanent crops and larger areas are apt for silviculture/pasture. The majority of lands are described as suitable for pasture, tree crops, and forest production, and small areas have no potential economic use (IRENA, 1983:18, Annex 2: 1-10). Average temperatures range from 24 to 27 degrees C, with little annual variability. Soils are deep Ultisols and Alfisols, ph 4.5 to 5.5, have low base saturation good structure, low fertility and are very susceptible to nutrient loss by leaching when forest cover is removed (MIDINRA-DGRA, 1984a:47-50).

stage of the project had been completed, Incer warned that "direction of settlement toward the Atlantic Coast has important environmental consequences." He explained that these consequences would include extreme fluctuations in river flows, the siltation of marine estuaries, and the loss of Nueva Guinea's tropical humid forests. Incer also recognized and warned against the threat to the forests¹⁷ of the southeast which the project entailed.

The life zones of the forests of southeast Nicaragua which were identified in the field by IRENA, (1983a) are four with five transitions. These are: 1) Tropical humid forest, (THF); 2) transition THF to "perhumedo"; 3) tropical very humid forest (TVHF); 4) transition TVHF to premontane (PM); 5) very humid premontane forest (VHPMF); 6) transition VHPMF to tropical basal floor (TBF); 7) transitional Very humid premontane to rainforest; 8) premontane rainforest; and 9) transitional premontane rain forest to tropical basal forest (IRENA, 1983a:18, Annex 2:4). Part of this forest is among the six wettest forests of the western hemisphere. Average annual rainfall measured in San Juan del Norte is 6,043mm (Incer, 1970:313).

In spite of Incer's warning, the National Planning

17. Waters from the lower southeast region of Nueva Guinea feed the Indio river which drains the forests of the Nicaragua's southeast including the wettest in Central America (Incer, 1970:341).

Committee gave top priority to PRICA in 1972. Stage II began 2 years later. Twice as many families were settled in the period that followed and cattle production increased. Population growth due to migration was 13.2 per cent in PRICA between 1972 and 1980, while the national growth rate was 3.38 per cent. It was clear that migration was more important contributor to frontier expansion than population growth.

Taylor's 1968 survey of migration to the northern part of the PRICA area (Table 15) indicates that most spontaneous migration was from the interior regions where cattle sector expansion was greatest. Seventy four percent of the early migrants were from the central and northern interior, 23 percent had moved from within the Atlantic region and only three percent had migrated from the Pacific. The reasons for migration indicated a relationship with the cattle sectors growth. At least two thirds migrated because they had lost in the process of social differentiation. One third of the migrants had lost their land and another third had either lost work or access to rented land. Almost half moved because of these losses and the lack of alternative employment or land, while one third made specific references to degradation of resource quality. That this process would be reproduced in the frontier areas and within the colonization project was indicated by the government's

distribution of credit.

TABLE 15
SURVEY ON MIGRATION TO PRICA AREA

Question	Response	
	Number	Percent

Where were you born? (N=271)*		
Central and Northern Interior	201	74.2
Atlantic	62	22.9
Pacific	8	3.0

What was your previous occupation? (N=177)		
Non-agricultural	20	11.3
Agricultural		
Worked on parents' or other relative's farm	41	23.1
Worked own farm	61	34.5
Worked on someone else's property** or performed salaried work	55	31.1

Why did you leave?		
Scarcity of land or employment	89	47.3
Resource quality	65	34.6
Personal reasons	8	4.2
No reason	17	9
Uninterpretable response	9	4.8

Source: Ballard, 1983:24 and Taylor 1968:47-51

* excludes persons born in the region.

** Includes rented, borrowed or squatter land.

Project financing and the trend in credit disbursement indicated the project's true purpose, namely, to assist Somoza's class and political allies expand pastures and

cattle herds on the frontier (Ortega, 1986a:1,2). Of the 11.7 million dollars budgeted, 53.9% had been spent by the end of 1976. However, the rate of expenditure was considerably uneven. Of funds budgeted for pastures, cattle and fences, 74.3 percent had been spent by 1976, while only 14.6% and 17% of the funds allocated for plantain and potable water had been spent (MIDA-OAS, 1980:15,16). While a reasonable facade of assistance to peasants was maintained, in fact, peasants became tools for pasture expansion. The 50 manzana parcels were considerably larger than the average peasant parcels in Pacific minifundios. Housing was built for many beneficiaries and roads linked the colonies, if not the parcels of most beneficiaries. In spite of the larger than average parcel size and housing, the project did not overcome the peasants' prior instability of land tenure or interfere with Somoza's plans for the area.

The Somoza strategy for development of capitalism in the Atlantic was evident in three salient aspects of the settlement process: 1) the relocation of peasants, was limited in magnitude, and did not provide stable tenure, 2) land distribution to peasants appeared equitable but masked the overall process of land distribution, and 3) colonization did not constrain spontaneous settlement outside of the project. By 1972, government-directed

settlement had contributed 65% of the population of the municipality through PRICA. In the following period, this source of population increase was responsible for raising Nueva Guinea's proportion of the department of Zeleza's population from 8.5% to 21.2%. In all, 2,233 families were settled in 28 colonies.

But distribution was not limited to peasants. "In 1975-76...the National Agrarian Institute (IAN) authorized the partition of 25,000 manzanas in 51 properties of 500 manzanas each..." to military and administrative associates of the Somoza government (MIDA-OAS:1980:8). These large parcels, in the still-forested south and east borders of the project, formed a barrier to peasant appropriation of national lands and fit into the Somoza government's plans for future development of the region (MIDA-OAS:1980:8). This direct subsidy of capitalist ranchers did not inhibit deforestation, but directed it in the interests of the recipients of the 500 manazana tracts.

PRICA and the other Somoza colonization projects were like most government-initiated colonization projects in Latin America, (Taylor, 1968) in that they assisted and regulated the settlement of only a minority of frontier-bound settlers expelled from their lands of origin. Spontaneous settlement preceded and followed the transfers of land by IAN throughout Nicaragua's extensive agricultural

frontier. Road construction to El Rama and from La Gateada to the project lands of Nueva Guinea provided the opportunity for settlers to claim forested lands. Rights of possession were gained through settlement and "carrileo", (clearing boundary lines around arbitrarily sized areas of land). According to Midinra, land began to attain monetary value when the majority of adjacent lands had been occupied. "Improvements, clearing, pasture, fences and fruit trees determined value" (Midinra, 1984b:6). The increasing value of land contributed to the development of large ranches along the new roads and adjacent to lands distributed by IAN. Because of the absence of alternative employment or access to land in their place of origin, many peasants continued to settle spontaneously in the forested frontier, stretching from Nueva Guinea to the Honduran border and along the San Juan river/Costa Rican border to the south.

Taylor's survey indicates the land-use patterns and differentiation among settlers in the area to the north of Nueva Guinea. Table 16 data indicate the inverse correlation between farm size and intensity of land use. On the smaller parcels, annual plantings of beans and corn were the main form of land use while idle or fallow lands were minimal. On the larger parcels, most land was either in pasture or left idle and the area of land devoted to annual crops was minimal. Permanent crops played a substantially

greater role in the smaller farms and were relatively insignificant in the larger farms.

TABLE 16
LAND USE ACCORDING TO FARM SIZE 1965
(Percent)

Farm size (mz)	Number of Farms	Percent of Area*			
		Crops		Pasture	Idle
		Annual	Permanent		
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 - 1000	3	1.4	.9	18.5	79.2
1000 - 2500	2	1.0	1.8	56.6	40.7
All farms	272	10.5	2.0	21.3	66.2

Source: Taylor, 1968:77

* Horizontal sums equal 100%

** Includes permanent and semipermanent crops, including root, tuber, and tree crops (coffee, cocoa, plantain).

Spontaneous settlers included not only peasants who continued to arrive from the Interior and Atlantic regions but also peasant recipients of land through PRICA. Many peasants who had received 50 manzanas from IAN were pauperized and forced to sell, thus providing lands for the establishment of medium and large cattle ranches within the site of government-directed colonization. Peasant migrants from both sources contributed to the capitalist development strategy pursued by Somoza by providing the labor for

clearing forests and establishing pastures on the 500 manzana parcels and within the 'peasant' colonies established by PRICA.

All three forms of settlement expanded the cattle sector and concentrated land in the interests of large landholders and a minority of ascending peasants. First, where all lands were distributed to peasants, concentration occurred when families were forced to sell their lands (Table 17). Second, on the 500 mz tracts, peasants paid for access to land by clearing forest, seeding pasture, and giving a portion of their grain to the owners (see page 85). Third, on national lands beyond the official IAN transfers, many settlers were forced to abandon or sell their lands to cattle producers and move on to remaining forested lands (MIDA/OEA 1980). These forms of land concentration were each part of the social differentiation process.

In these three ways peasant poverty enriched large scale cattle producers. But colonization by PRICA best illustrates how capitalist reform promotes deforestation. The following section focuses on the process of social differentiation among recipients of the 50 manzana parcels. This discussion begins with examination of the model 50 mz family economic unit planned by IAN. It ends with an analysis of social differentiation, expulsion, and frontier expansion in the "reformed" sector.

The Model

The family economic unit as planned by IAN was based on a 50 manzana (30 hectare) parcel. The land use of the basic parcel was to be distributed as follows:

Cattle	20		
Annual crops	5		
Reserve woodlot	4	13%	
Family lot (solar)	1		

Total	30	100%	

Source: IAN-BID-OEA-ISRAEL: Rigoberto Cabezas Project -
First Stage: March 1972

The model had each family unit combining grain and cattle production while maintaining forested lands. This intention 1) reflected the increased external demand for beef (MIDA-OAS, 1980:9), 2) recognized peasant dependence on grain production, and 3) implied concern for maintenance of the forest. In spite of the relative equality with which peasants were supposed to be settled in project colonies, in Nueva Guinea, peasant social differentiation and deforestation were similar to that which predominated in the interior during the 1960s. Those planning the model family unit disregarded factors beyond parcel size that ultimately differentiated the resettled families.

The equality in land area per family which the 50 mz parcels established was undermined by unrestricted property rights. Pre-migration capital, family size and age, and

farm experience differentiated the settlers in spite of equality in land holdings. Government credit policy accentuated these differences. By determining their opportunities for accumulating wealth and household reproduction, these factors influenced the use of the 50 mz parcel. Because cattle provided greater income, those who had the capital needed to produce cattle were able to benefit more than those who could not raise cattle. And the latter were the majority. As a result, on the poor end of the spectrum were basic grain producers with few or no animals and at the other end, families with a large portion of their lands devoted to fully stocked pastures. The inability to invest in cattle was the least of it. Poverty and indebtedness led many poor peasants to sell their land to cattle producers. A reformulation of the project, and model in 1977 reflected superficial recognition of differentiation process. The new model reduced the importance of cattle, gave lip service to the need for fallow cycles, increased the area of forest reserve and contemplated the introduction of permanent crops to attempt to put the pauperized on a level with the more "successful" producers.

Basic Grains	3%
Permanent Crops	4%
Fallow	1%
Pasture	17%
Forest Reserve	7%

Total 30%

Source: IAN: Reformulation of "Rigoberto Cabezas Project
Stage I, June 1977:14

Nevertheless, promotion of permanent crops only aggravated the differentiation process. Only the more capitalized producers were able to implement the new crops (MIDA/OAS, 1980:22). As reflected earlier in Table 6, some families expanded, some barely maintained, and many lost their lands.

The end result was that the 50 mz family parcel did not slow expansion of the frontier, but, in fact, accelerated deforestation, promoting its conversion to pasture. Many peasants had no real alternative to rapid clearing to produce grain for subsistence and sale. Conversion not only occurred on the 50 manzana parcels distributed by IAN but also on the forested national lands beyond PRICA where many of these families were forced to settle after losing their PRICA parcels. The ultimate benefit of conversion did not accrue to peasant families but to ranchers who were able to acquire their parcels at distress prices. Thus the reform accelerated deforestation because peasants were unable to

maintain forest on their parcels and because many were unable to sustain ownership. In both peasant colonies and beyond the 500 mz. parcels, social differentiation resulted in land transfers from the poor and their concentration in the hands of ranchers.

In the reconcentration process, coercion played a role in removing resistant peasants from the lands they had received through the agrarian reform. Ranchers disregarded the maintenance of fences bordering the parcels of neighboring poor peasants who produced annual crops. "Accidental" escape of cattle into these fields resulted in significant losses for the peasant farmers. This caused indebtedness and intense pressure to sell, since peasants who suffered these losses were not compensated. Although sale was not always to the rancher who had exercised this form of coercion, the effect was to displace peasant beneficiaries and the owners moved on and cleared new lands. Indebtedness to private lenders and the National Development Bank also pressured sales.

By 1979, nearly 20 percent¹⁸ of the lands initially awarded to peasant families or approximately 570 parcels had been concentrated into cattle ranches of Somoza associates. These large landholdings did not reflect all

18. 1,868 mz already in CAS by 1983, 26,725.6 mz transferred April 1, 1984 of 151,197 mz.

of the reconcentration which had occurred by that time. In 1984, a census of 14 colonies demonstrated that about 330 additional parcels had been concentrated into holdings of greater than 70 manzanas held by relatively wealthy peasants. In all, 543 farms or eleven percent of the landowners were in this category holding 33 percent of the lands. Table 17 illustrates the inequalities of land tenure which remained following expropriation of the estates of Somoza allies and additional amount of land concentration which had developed in the period since IAN's initial distribution of land parcels.

TABLE 17
LAND TENURE IN NUEVA GUINEA*

Tenure Strata	# units	%	Area (mz)	%	$\bar{X}$
Landless	2326	45	7875	5	3.4
1 - 40 mz	220	4	3160	2	14.4
Subtotal Poor					
Peasants	2546	50	11,036	7	4.3
40 - 70 mz	2038	40	89,752	59	44
>70 mz	543	11	50,410	33	93
Total	5,127	100	151,197*	100	29.5

* Based on census of 14 colonies

Source: DGRA, 1984: Nueva Guinea, Zona de Desarrollo Cooperativo "Ahmed Campos Corea".

The 13% per parcel forest reserve planned by IAN was disregarded by the agency in its implementation of the reform. Disregard for this idea is reflected by land use reported in the census of 14 colonies. Some parcel owners remembered the provision while explaining why they were

forced to clear most if not all of the reserve area. The initial reason given was for the planting of basic grains. This was almost invariably followed by pasture expansion. Virtual elimination of forest parcels was confirmed by the census of producers and interviews with knowledgeable residents of each of 14 colonies. Within the colonies, forests had been reduced to only 5% of the total land area and most were substantially degraded (MIDINRA, 1984a:98 Table IV-10). The project failed to accomplish the objective of maintaining wooded lands on the reform parcels. Poor peasants could hardly be expected to refrain from using that portion of their land when neither cattle herds or sustainable crop lands were available to them. Given the value of pastures, forest, could only be expected to be preserved to the extent that they were excluded from settlement.

Land use potential indicated that the entire project area was viable for forest production and/or forest preserves, and that 14 percent was explicitly not suitable for any crop or pasture uses (Land Use Potential maps of the Rio Escondido watershed (1970) and Southeast Nicaragua (1976) in MIDINRA-OEA:1984a:50).

Based on project designers' claims, one might have expected tenure in PRICA to have changed little over the course of the 13 years that followed its initiation.

However, the project was not immune to the social processes which had already deforested the Central Interior region. Pauperization and reconcentration of the 50 mz parcels demonstrates the transient nature of colonization transfers and refutes the claim that planned colonization is an effective alternative to spontaneous settlement. The fact that peasants did not preserve woodlots on their parcels showed that deforestation is not easily controlled by administrative measures. To resolve peasant landlessness or stop deforestation, the project would have had to protect beneficiaries from the process of pauperization.

In conclusion, PRICA was a microcosm of the overall trend in deforestation which increased dramatically during the latter three decades of Somoza rule. The process of land concentration which occurred on the reform parcels was not essentially different from that which produced social differentiation and expulsion of peasants throughout the agricultural frontier. At the crux of the differentiation process was the fact that capitalist social relations made pasture expansion more profitable than more capital intensive development of beef production. Also important were Somoza's lending policies, which gave credit to larger producers to the virtual exclusion of the peasant majority. From the perspective of capitalist ranchers, the Somoza reform was successful in accelerating expansion of the

agricultural frontier and in winning general support from the recipients of land.

Summary

Throughout the period 1950 - 1979, Nicaraguan capitalist development and agrarian reform produced impressive economic growth through dynamic agro-export expansion but at substantial social and environmental costs. Government support for agro-export expansion indeed expanded production of domestic grains, export crops and export beef, however, most of this growth was nourished by the expansion of the agricultural frontier without benefiting rural Nicaragua's peasant majority. The cattle sector employed a significant portion of the rural labor force in absolute terms but absorbed only a small proportion of the families that it displaced. The expansion of pastures and the relatively large amount of labor employed both contrasted sharply with beef's relatively small contribution to export earnings (See page 65). Income distribution reflected the inequality of resource distribution while increasing numbers of frontier migrants reflected the human costs of capitalist agro-export expansion.

Somoza's policies of resource distribution and agrarian reform produced impressive economic growth together with shifts in regressive income distribution. Annual growth, of

the agricultural gross domestic product (GDP), averaged 4.7 percent between 1950 and 1977 while the productivity of labor increased 4.6% per annum, among the highest in Latin America (Baumeister, 1985a:59). Nearly two decades of government-directed agrarian reform did little to change this degree of social stratification. In fact, land tenure among peasants had become less secure and essentially temporary for the majority. While it may be true that the cattle sector's operations consumed more labor than any other export crop, its expansion displaced many more peasants than any other crop and their exceeding inefficiency of land use insured that this would continue. In essence, government support for pasture expansion constituted a national subsidy of the larger cattle producers.

The process of land concentration and peasant expulsion set into motion by agro-export expansion was not stopped by Somoza's colonization project and credit programs. Land became reconcentrated in his directed colonization program almost as rapidly as in spontaneous settlement. Contrary to the oft repeated claim that the Somoza government "left the Atlantic coast peoples alone," Somoza's policies pitted peasant migrants from the Pacific region against the indigenous population of the Atlantic region by treating the forested lands inhabited by Miskito, Sumo and Rama Indians

as national lands.

According to Marvin Ortega (1986a:1), the significance of unrelenting expansion during the Somoza period extended beyond the established interests of privileged cattlemen. Ortega asserts that "the continuation of cattle's extensive nature and control in the hands of large landholders and usurers, guaranteed the whole of the capitalist agro-export economy." Frontier expansion extended capitalist development with little investment by and high returns for capitalist ranchers, meat packers and exporters, thereby increasing the capital resources of the larger investors.

The most salient result of peripheral capitalist development was the displacement of peasant grain production and its incorporation into an export expansion strategy of considerable momentum. This strategy was responsible for continuing migration and settlement on the agricultural frontier, far beyond what would have resulted from population growth. Opening the frontier absorbed social tensions and forestalled threatening political opposition during the decades which witnessed greatest peasant expulsion. Thus, expansion produced and depended upon social differentiation and even made it politically viable.

Due, quite directly to capitalist development and agrarian reform, the seemingly inexorable process of deforestation consumed Nicaragua's tropical humid resources

at an alarming rate. Barring revolutionary change in the agrarian structure, nothing appeared likely to stop the trend before pastures would finally replace the last tropical forests and reach the Caribbean coast.

Chapter IV

Non-Capitalist Development:

Prospects For Saving Tropical Forests

Curtailling deforestation of the humid tropics requires disentangling the peasant strategy for survival from the ranchers' strategy for accumulation. As we have seen both generally and in Nueva Guinea during Nicaragua's Somoza period, peripheral capitalist development promotes a process of social differentiation which is a losing proposition for most peasants. Qualitative changes in the way resources are distributed are necessary if peasants are ever to stabilize their production, retain their land and stop clearing forests in order to survive. Changes in both production relations and social structures are necessary to stop anarchic expansion of the agricultural frontier in nations where terminal shifting cultivation is a major proximate cause of deforestation. Central to these changes is a form of agricultural development which allows peasants to subsist without abetting expansionist schemes of large ranches, and to sustain themselves and their families without continuing to encroach upon the forest. Theoretically, cooperative or collective development of peasant agriculture* offers a way to stabilize frontier farming by facilitating needed land-use change. In the cooperative, peasants gain independence from capitalist exploitation and achieve economic stability through cooperative actions to solve common problems. In short, revolutionary agrarian reform empowers the new state

to develop stable alternatives to frontier migration.

Revolutionary Agrarian Reform

Revolutionary agrarian reform is distinguished from capitalist reform (as discussed in Chapter II and illustrated in Chapter III) by a political and ideological change which commits the power of the state to furthering the interests of popular majorities rather than defending the interests of large landholders. Popular majorities include peasants and other household producers, workers, students, professionals and in general the social classes and fractions of classes whose primary and essential income is derived from labor, rather than from surplus value. The new state's commitment replaces state support for private accumulation with direct state and cooperative appropriation, investment and redistribution of the social surplus.

Change in the political control of the state is expressed by its intervention in the social structure. However, as Gutelman (1974:19) warns, it is a fallacy "that the capitalist mode of production and its contradictions will be suppressed with the simple nationalization of land." The state must also intervene in and alter social relations of production throughout society. Social relations are altered so that remaining capitalist producers no longer

exercise and are not capable of reproducing the hegemonic political power they once enjoyed.

Revolutionary reforms range from radical redistributive reforms (Cuba) to reforms in which national and multinational capitalist producers may continue to participate in the transitional economy for an indefinite period (Nicaragua). Common to both is the fact that resources of some portions of national and multinational capital become available for reform. The fundamental commitment of the revolutionary reform is to replace capitalist hegemony with popular or non-capitalist hegemony. This commitment is expressed in state action to assert and reassert the right of popular majorities to guide the process and participate in the benefits of economic growth¹.

Changing from a system based on inequality to one which directs a nation's resources to increasing equity among its citizens requires a multitude of actions, few of which can be specified in advance or out of context. Nevertheless, production, redistribution, and participation are all goals that are sought in the initial steps of a revolutionary reform. Popular participation is facilitated by producing

1. In Nicaragua the issue of who guides the revolutionary process remains a subject of debate. Recognition of top down tendencies in leadership and decision making are struggled with. Nevertheless the state has become, albeit imperfect, a forum for popular majorities.

increasing quantities of capital and consumer goods and services to meet the needs of those who have been traditionally excluded from all but the most basic consumption. The foundation for socialist redistribution involves eliminating the income derived from ownership of means of production or reducing it to that which can be made by family enterprises. Important aspects of this change are state control of the key points of capital accumulation such as foreign commerce, banking, and industry. Movement toward equality of income requires changes in the ownership of the means of production. The initial steps do not resolve centuries of inequality but begin progress in a new direction which requires many further steps to attain its objectives.

Because of the importance of agriculture in many peripheral capitalist nations, changing the social structure in agriculture is a high priority. Revolutionary agrarian reform redistributes agricultural income by redistributing land and capital and by establishing new forms of social organization. This process typically begins with "the expropriation of the private property of land and the state's appropriation of ground rent..." (Bartra, 1976:144). This dramatic state intervention includes a number of ways of acquiring land and capital: by purchase, by trade, and by expropriation. Acquisition of land and capital by the

state initiates the reform process and makes the establishment of new organizational forms possible.

Organizational Alternatives

One organizational alternative is the state farm. State farms are formed on national lands or by lands already in agriculture which are acquired and managed by state managers and/or workers' unions. Beyond wages paid, the economic surplus, or profit, deriving from state farm production is retained by the state and is redistributed through capital investment and social programs. To the extent that state farms replace, or prevent the expansion of capitalist farms they weaken the capitalist's capacity to extract the surplus produced by workers and peasants

Cooperative development, another alternative, includes a wide range of organizational forms. One level, involves organizing individual household producers to apply for credit or to market production without changing the individual nature of household production. Higher levels of cooperation involve joint ownership of the means of production, joint work and joint control of produced goods. Collective investment in transportation, marketing or access to new agricultural technologies may be developed to solve specific problems of producers who continue to own and work individual household parcels of land. Real or artificially

managed economic advantages may induce members of lower level cooperatives to gradually increase their commitment to collective ownership and labor. Initial forms of cooperation may be followed by others involving collective capital or labor such as mechanized tilling of individual parcels or working as a group to raise seedlings for the establishment of tree crop plantations for individual households. At one extreme of this continuum of cooperation are production cooperatives where significant portions of land and capital are owned collectively and where an important portion of work is done jointly.

Production cooperatives (or collective farms, terms which I use interchangeably here) are "operated by groups of producers who are not members of the same individual family and who are sharing between themselves property, work and the results of their work" (Galeski, 1980:1; 1977:70). These cooperatives are discussed in detail in the second part of this chapter. Yet, the collective aspect does not preclude individual household production or land ownership. Baumeister (1984:3) suggests we assume that the cooperative member is at the same time a direct worker, manager and owner and that he does not contract labor. This prohibition on contracting labor commits production cooperative members to work rather than to exploit the labor of others.

Production cooperatives are established as an

alternative to individual household production. According to Galeski (1977:71), production cooperatives are either 1) organized by governments to accomplish social, economic and political goals; or 2) organized by peasants to attain economic advantages which result from collective production. The economic advantages of cooperatives are derived from the economies of scale which are available with specific production technologies. To the extent they are attainable, economies of scale may have a significant impact on the success of the cooperative in meeting the goals of both peasants and governments. Purchasing inputs in greater volumes reduces packaging and transportation costs. Increasing the size of the production unit increases access to transportation, farm machinery for irrigation and equipment needed for on-farm processing of agricultural produce. These are all options that are either more expensive for or unavailable to small producers. Technology is more economical where an internal division of labor (in the larger units) facilitates specialized training in complex technologies. Transforming large farms into production cooperatives also avoids the cost of subdivision. Combined, these advantages reduce the length and the physical hardship of the peasant household's work day while increasing the efficiency of their labor.

State vs. Cooperative Farms

Theoretical debates are extensive regarding the agrarian sector in the transition to socialism. In peripheral nations peasant majorities have presented a major policy challenge. According to Deere (1984), early Marxian concepts of the construction of socialist agriculture relied upon capitalism to establish the preconditions of socialist agriculture. Marx expected that the agrarian capitalists' lands, capital and workers would form the basis for socialist agriculture, organized in state farms. However, the applicability of his assertion depended upon the extent to which capitalism transformed the peasant economy into a capitalist one. To the extent that agricultural producers were peasants, this analysis did not apply and offered little direction. Following the Russian revolution of 1917, when peasants vastly outnumbered agricultural workers, the future of peasant agriculture became the focus of a major debate. A very similar one has been underway in Nicaragua since 1979. Could socialism be constructed where large numbers of peasants remained, and had not been proletarianized? For those who felt it could, the question was "how?". Many argued that collectivization provided the answer because it would socialize the means of production and limit social differentiation.

Deere (1984:62) points out that "the socialization of

the agrarian capitalist enterprise is certainly an easier task than the socialization of individual peasant producers." Perhaps for this reason in both Cuba and Nicaragua, state farms played primary roles in the early periods of their respective agrarian reforms. The fact that both countries shifted emphasis to peasant cooperatives over time, however, suggests that cooperatives may have a larger role in future socialist reforms. Regardless of whether state farms or production cooperative alternatives are emphasized, revolutionary agrarian reform seeks to reverse capitalist expansion and coalesce new political forces interested in developing and defending the new forms of social organization.

REVOLUTIONARY AGRARIAN REFORM AND DEFORESTATION

Building alternative social organization takes time, particularly where peasant agriculture constitutes a significant part of the transitional economy. For this reason it requires a number of simultaneous actions by the revolutionary state. Undoing the social relations which promote social differentiation, and deforestation as one consequence, involves initiatives which affect both cattle ranchers and frontier peasants. By acquiring land and herds from large land holders with limited compensation, the transitional state marks a distinct course from that taken

by capitalist reforms. It reduces the cattlemen's power to exploit poor peasant labor and to appropriate lands belonging either to indigenous groups or the nation². While the power of some producers is quickly reduced by such actions, many large producers remain relatively powerful during a prolonged period of transition. One way of reducing their impact is to limit their credit and to offer more to poor peasants who have land. Another is to transfer portions of ranchers' lands to colonos who have traditionally established and maintained their pastures. When ranchers lose their privileged access to credit and peasants have their own land, remaining cattle ranchers' may no longer find the traditional pasture expansion scheme desirable. To the extent that lands are sufficient, peasants will be freed from working for ranchers. These initial measures are necessary but not sufficient to stop the process of differentiation and deforestation.

Separating the peasants' survival strategy from the ranchers' accumulation process requires additional state action. Their vulnerability is found not only in the lack of land and capital but in the exclusively individual nature

2. Indigenous lands were are considered national lands by the Somoza government. Since Somoza's ouster, Miskito Indians and the Sandinista government have made efforts to clarify indigenous land rights.

of their operations. Within the individual and private nature of property, as M. Ortega (1986b:39) has reminded, is found the germ of capitalist development and renewed impetus for social differentiation and frontier migration. Unless the state intervenes further, many of them remain on the losing end of social differentiation. The socialist strategy is to change relations of production in ways that enable peasants to stabilize their production and cease undesirable migrations. For this reason, the strategy emphasizes peasant cooperatives with collective ownership and work.

Change in social relations of the kind described implies rethinking the peripheral capitalist economy's prior orientation to raw materials and cheap labor exports in which environmental and social costs are high. Since the old agrarian structure is insufficient to meet the material needs of the poor, the reform must also facilitate more productive and sustainable uses of renewable natural resources. In tropical humid forest regions, overcoming the limitations of the old agrarian structure, calls for a shift from grain production to permanent crops and from extensive to more intensive cattle production.

The transitional state promotes this first shift by establishing collective forms of social organization. With tenure security, state financing, and a reliable market,

peasants can shift a portion of their labor from annual grain crops to the work of establishing permanent crop. The social division of labor and specialization on state farms and cooperatives facilitates the adoption of new crops such as cocoa, natural rubber, African oil palm and citrus and their current technologies. Once permanent crops are established, grain production in the tropical humid lowlands³ and the clearing of forest it has required can be further reduced. Thus, rather than clearing pastures for ranchers, peasants can clear degraded pastures and convert them to permanent crops.

The state promotes the second major shift by enabling many changes in cattle production. In Nicaragua, shifting from extensive to intensive cattle production can be accomplished by shifting cattle production from the areas of higher rainfall in the Atlantic region to portions of the interior where rainfall ranges from 1,500 to 3,000 millimeters. Making the investments necessary to provide dry season forage, decreased mortality through increased availability of veterinary medicine, and improved pasture management* resemble the common practices of First World

3. The portion of frontier grain production whose purpose is subsistence, or food security rather than sale on the market, can be reduced or eliminated only when markets and prices for alternative products are adequate and when food grains can be purchased reliably.

ranchers. Revolutionary agrarian reform with both state farm and cooperative sectors can provide the social and economic conditions that are necessary to slow deforestation.

The State Farm

Whether state farms alter land use or the relations between cattle ranches and peasants depends upon both state policy and the structural conditions of state enterprise. Deere describes some of the structural conditions.

In a state farm, wages are a cost of production and the state directly appropriates whatever surplus is produced. The risks of production fall directly on the state; but the state is also assured of whatever output is produced, whether to guarantee food supplies and/or the generation of foreign exchange. The state enterprises need not be financially viable to guarantee certain minimum levels of output (Deere, 1984:62).

Since the state farm does not necessarily have to produce a surplus or "profit," managers are not "obliged" by a profit motive to expand pastures and reduce demand for labor. On the other hand, state farms could, without violating the ideology of socialist agriculture, expand pastures in similar ways to those pursued by capitalist landowners. Ideological legitimacy could be retained by discontinuing in-kind rent charges and by socializing the surplus produced by the peasants' unpaid labor of clearing brush fallow or forest.

While it may be true that the state farm can meet the state's production needs without the profitability of capitalist farms, societal expectations for improved standards of living and specific investment programs exert pressure on the state to generate a surplus. Increasingly, the transitional state insists that its managers produce a surplus. Because the state replaces the individual capitalist as the interested party, the extensive strategies of the capitalist rancher are less viable than more capital and labor intensive approaches to increasing production and surplus. The fact that surpluses produced by state enterprises are socialized by the state through distribution and investment resolves a fundamental contradiction between workers, peasants and the former capitalist landowner. Since the state now finances development capital must be formed and available. Around the world, the view toward inefficient state enterprises is forcing them to become economically viable. This is also true in agriculture.

Structural changes produced by creating state farms may not intensify land use or control pasture expansion. Nonetheless, they shift decision-making from capitalist owners to state policy makers, opening the possibility for ecologically sound practices and equitable relations among workers and peasants. The revolutionary state facilitates greater societal influence over the conduct of state cattle

ranches because reducing the role and influence of capitalists increases the influence of other social sectors. In the case of environmental policy, the socialist state desiring to take progressive stands may be able to implement decisions far more readily in state-managed organizations. The private appropriation of surplus is structurally constrained by the new state, and managers have a relationship to peasants and workers and the state that is not pressured by a personal profit motive. Therefore, a policy to expand pastures could be chosen without necessarily violating ideological imperatives. However, the rationale for such a policy would have to show that pasture expansion was necessary to benefit society as a whole, rather than to enable a few individuals to increase their profits. Likewise, valid arguments for a policy decision to stop clearing forests for pasture expansion would find few structural constraints.

Finally, the shift from capitalist to state enterprises is important because it changes the former rationale for capital accumulation. Individual producers are not prevented by capitalist economic logic from wasting the commercial timber which occurs in the pasture expansion process. Neither are they concerned with future revenues from long-term sustainable forest production. The state, on the other hand, may well be concerned with both. As a

resource endowment of the state, both standing timber and long-term revenues become an economic concern. By recognizing these economic issues, the state may choose to maintain remaining forests, transfer lands from cattle production to permanent crops, implement practices of intensified pasture management on state farms, and refrain from engaging in the social relations of pasture expansion.

The positive feature and limitation of the state farm is that it intervenes on one side of the rancher - peasant relationship, notably the former. In the early stages of social transformation, state farms are not complemented by rapidly expanding industrial expansion which may absorb the excess rural labor force during a later phase of development. Transforming private ranches into state farms is insufficient when a large portion of the rural population are peasants whose labor was not and can not be fully proletarianized in the short term. While state farms may influence the differentiation process among rural families whose members work on them, they may not be able to control the process even among this group if such families depend to a substantial degree upon their own production outside the state farm. State farms may have little or no ability to influence the process of social differentiation among land owning peasants.

The Production Cooperative

Production cooperatives possess structural characteristics which reduce the peasant's subordinate relationship to cattle producers. Their collective component 1) equalizes income, 2) maximizes the use of available resources, 3) improves peasant input in policy making and 4) facilitates state intervention. Each of these components influences the peasant role in pasture expansion in particular ways.

Increasing income equity among cooperative members slows and may be capable of stopping the social differentiation process. Although the social division of labor within cooperatives may produce some different remunerations for labor, difficulty or experience, collective ownership minimizes the impact. In cases where labor is paid by a wage or advance against future earnings, profits are distributed according to hours worked and not according to position or skill. Income differences are limited to purchasing power. If the magnitude of these differences is sufficiently limited, then socio-economic differentiation does not result. One of the ways that this is accomplished is by distributing only a portion of the cooperative's surplus to the membership in the form of wages or annual profits. The remainder is distributed among the cooperative's funds for capital investment, education, day

care, and health services.

The maintenance of some degree of family logic characteristic of peasant household production stimulates labor expenditures, reversing the trend established by capitalist development. Baumeister (1984:10) maintains that family logic will continue to exist even in cooperatives where technology does not socialize labor. As long as some control over production remains in the hands of the cooperative membership, some degree of peasant or family labor logic can exist. Production cooperatives respond to both peaks and furrows in the demand for labor by maximizing the use of available labor, rather than by limiting its use according to capitalist logic. The need for income and food motivates cooperative members to work despite the diminishing return that prohibits such labor expenditures on capitalist farms and mitigates against them on state farms. Diminishing return to labor does not affect income and food security in peasant cooperatives in the same way that they affect profits on the capitalist farm and surpluses on the state farm.

Important increases in production and consumption were realized in the Peoples Republic of China as a result of this change in the production logic (Kanel, pers. com. 1983). Because this means to increasing production depends upon absolute increases in labor expenditures, it

constitutes an important temporary measure during the prolonged period when new institutions are developing and when costs of organizational and social change are born by the state to bring about the conditions for socialist accumulation. Until such accumulation begins to provide the capital needed to intensify agricultural production or develop industry, it may be advantageous to seek yield increases rather than attempting to maximize labor productivity. Cooperatives are better suited to this goal than are state farms.

The production cooperative improves peasant participation in policy making in two ways: 1) through mass organizations, such as a peasant cooperative union, and/or 2) through the state's commitment to the production cooperative model. The state's ideological support for the production cooperatives induces it respond to the cooperatives' problems. Peasant input may be direct and active through unions or quite indirect and passive through state institutions and government functionaries. These two forms of participation may not be sufficient in themselves.

State regulation may be necessary to keep production cooperatives from losing their egalitarian character. Regulation may take the form of taxation or extending the right of membership to new people so that the coop meets its labor needs with the labor of its members rather than by

employing wage labor. Regulating the distribution of surpluses, as discussed earlier, is another form. Such interventions complement the collective aspects of the cooperative enabling the new organization to prevent social differentiation among its members. Regulation to this end distinguishes socialist production cooperatives from those established in capitalist reforms. In capitalist reforms, where stopping social differentiation is not a priority, members often shift from being equal working members to shareholders or managers who profit from employing wage labor. Complementing the cooperative structure with regulation to control social differentiation is easier than attempting the same objective among individual peasants.

Voluntary vs. Compulsory Association

Where cooperatives have been organized as one measure in revolutionary agrarian reforms, the means used to promote and expand them have been the subject of intense and polemical debate. The debate is shaped by a number of theoretical considerations and by experience. Galeski (1980:2) maintains that the definition of cooperative includes voluntary association and emphasizes that this characteristic is not fully present in most cooperatives, particularly collective farms. Its absence has been due to peasant experience and attitudes and the conditions which

have led some states to compel peasants to join cooperatives.

Prior to revolutionary changes in the state, peasants' production experiences are largely limited to the individual family farm and to seasonal work on agro-export estates. In the face of dispossession, peasants have formed political organizations and have at times developed anti-capitalist ideology. These moves have resulted in their participation in the revolutionary struggles of Guatemala, El Salvador, and to a lesser extent Nicaragua. In some cases, peasants have organized collective agriculture as a response to the capitalist threat and cooperatives have become part of the popular struggle. However, Bernstein, (1986:14) cautions that these experiences "should not obscure the fact that the object of struggle is typically the preservation and reproduction of peasants' private property in/possession of land." Overzealous state efforts to promote cooperatives have promoted an anti-socialist ideology.

According to Deere (1984:19), Stalin's forced collectivization of the Russian peasantry did not reflect the thinking of Marx, Engles or Lenin. Lenin (1980:30) emphasized that "guided by personal advantage [peasants] will be hastened to try out participation. Only those associations are worthwhile which have been set up by the peasants themselves on their own initiative and the benefits

of which they have verified in practice. Undue haste in this manner is harmful, for it can only strengthen prejudices against innovations among the middle peasants. Representatives of Soviet power who permit themselves to employ not only direct, but even indirect compulsion to bring peasants into communes must be brought strictly to account and removed from work in the countryside" (Lenin, as quoted in Deere 1984:19). Lenin's point that "Cooperatives... coincide with socialism" (ibid.33) and concern for mass participation (ibid.30,34) would appear to have been used by Stalin to justify compulsory collectivization of the Russian peasantry while Lenin's emphatic concern for gradual and voluntary participation was lost or ignored.

Despite the experiences of compulsory collectivization, peasant willingness to join and participate in cooperatives has emerged as an important criterion for contemporary cooperative development. Understanding diversity in peasant production, experience and attitudes is key to making the cooperative a viable and acceptable alternative to individual holdings. The fact that "the advantages attained through cooperation are not homogeneous" is of consequence to many dimensions of cooperative development (Baumeister, 84:9). Recognizing this fact is of consequence to the attractiveness of cooperatives to peasant families. Just as

"combinations of large and small scale technology are necessary to optimize the cooperatives resources" (Baumeister 84:9), combinations of public and private property and work have become common to production cooperatives. Although the "voluntary form of association may not be necessary to change social relations", Baumeister (1984:2) comments that "in cases where the state authoritarian methods of collectivization were used, consequences were measured by lesser productivity and production." Meeting minimal levels of production may be feasible for the state (Deere, 1980), but is hardly feasible as a means to provide improvements in the standard of living of the rural poor. Consequently, productivity has become an important argument for cooperative development. Deere (1984:62) adds that "the basic issue has usually been defined in terms of whether state farms or production cooperatives better serve the purpose of social accumulation. But just as important an issue is which organizational form better fosters new social relations of production, particularly if one considers participatory democratic norms integral to socialist relations of production." In sum, the rationale for voluntary participation in cooperatives has economic, political and ideological components.

If cooperatives are to be voluntary, then

"participatory democratic norms" must have tangible ways of responding to the peasants prior predicament while overcoming the problems involved in a new organization. Radical peasant activism cannot be interpreted as a carte blanche for what ever replaces capitalist agriculture, nor can peasant support be expected to last if the alternative is also threatening. If the peasant's goal is private property, then how can the cooperative become an organizational alternative for the masses on a voluntary basis? Meeting the revolutionary government's political objective of changing social relations of production must be complemented by ways in which the peasant household can meet its economic objectives if cooperatives are to become attractive alternatives. Lenin stressed the need for "a series of economic, financial and bank privileges." Collado voiced the Sandinista position when he stated that "production cooperatives must be strengthened as economic models for the individual peasant and as a way to visible, tangible economic improvement. Interest and willingness to collectivize can be stimulated by giving concrete advantages to cooperatives, " (Carlos Collado, pers. com. Granada 7/18/1985). Economic privileges are important, but may do more to produce perceived advantages to peasants if the model itself is flexible.

Maintaining many of the attractive and deeply imbedded

aspects of peasant household production is just as important as extending economic privileges. Maintaining individual plots of land, household cottage industries, and commercial activities may all be important to making production cooperatives attractive. combinations of collective and individual household production might one of the most effective ways to respond to the need for "combinations of large and small scale technology". Voluntary membership and active participation may be the best way to maximize the desirable combinations.

Thus, for a variety of political, economic and ideological reasons, successful cooperative development requires voluntary participation and government support of collective alternatives. Because deterring social differentiation, may very well depend upon the success of cooperative development the question of how to promote voluntary collectivization becomes an important one. Government support may function as an economic stimulus for poor peasants to join cooperatives, however, active participation is required in order to insure that cooperatives develop in ways that continue to elicit peasant interest. Peasants, rather than government, should be the cooperatives' most vocal supporters.

In summary, revolutionary agrarian reform can use a combination of state farms and cooperatives to replace

hegemonic capitalist enterprises. Both forms of social organization shift the locus of decision making from individual producers to the state and the elected representatives of the cooperatives. Both help reduce capitalist hegemony in the countryside. State farms take advantage of the more socialized means of production acquired from capitalist enterprises and internalize the state's economic rational. For deforestation, this means maximizing the use of the nations land and forest resources. Production cooperatives are an organization alternative that increased social equality. The cooperative's capacity to limit income inequalities to differences in work rather than ownership, makes it attractive in the less developed third world. Production cooperatives permit peasants to pursue increased income without the displacement and frontier migration associated with capitalist development.

The success of the cooperative is based on a number of factors. Cooperatives provide sufficient land and capital to provide income to reproduce member households without their members' resorting to off-farm labor. Cooperatives must also provide attractive alternatives to individual household production.

Revolutionary agrarian reform redistributes land and credit and supports the development of collective forms of ownership and investment in permanent crops to retard the

process of peasant social differentiation. New relations of production replace capitalist forms with peasant participation in planning becomes a more important feature of development. Therefore, the alternative social organizations which form the cornerstones of socialist agriculture are theoretically capable of stopping differentiation and the clearing and conversion of forested national lands to pastures. Achieving this goal has proven to be difficult and to require a combination of democratic governance (Gianotten and de Wit, 1983:101) and state intervention to minimize the emergence of exploitive social relations within the production cooperative sector.

Stopping deforestation is not the primary goal of revolutionary agrarian reforms occurring on the capitalist periphery. However, because of the commitment of political forces engaged in popular struggles against exploitive social relations, such reforms are considered an important part of the potential solution to the deforestation problem.

Chapter V

Sandinista Reform: Confronting the Differentiation Process

Following the revolution of 1979 and under the leadership of the Sandinista National Liberation Front (FSLN), the new Nicaraguan government embarked on a project of social transformation. The "program of 1979" had as central objectives improving the condition of the rural poor and promoting economic development in the interests of the nation. These objectives required a confrontation with the process of social differentiation. A key component of the Sandinista strategy of social transformation was and is agrarian reform to democratize the distribution of land, "Nicaragua's principal natural resource" (Wheelock, 1985:52). Cooperative development has been an important component of this reform (Baumeister, 1984:1).

The Sandinistas argue that their reform is a response to the "complete anarchy in tenure, and in land use" which characterized the Somoza period (Wheelock, 1985:54). Transformation of the agrarian structure and national control of capital accumulation, together with severance of neo-colonial relationships with the United States are central objectives of the Sandinistas¹. Pursuit and open advocacy of these objectives make Nicaragua unique among

1. The Government program of National Reconstruction, 1979 and Constitution of the Republic of Nicaragua, 1987 both provide further information on the FSLN's overall program of social change.

Latin American nations. To the extent that Nicaragua achieves these objectives, it may also do away with the social contradictions which produce deforestation.

By any account, the social and land-use distortions of Nicaraguan agriculture inherited by the new revolutionary government were startling. By 1978, 14 years after Somoza's "agrarian reform" some 1600 large landowners, .6 percent of all landowners, and only .4 percent of the economically active population in agriculture still owned a third of all land under cultivation². Little had changed since the reforms were begun in 1963, when landowners with holdings of 500 mz or greater comprised only 1.5 percent of the landowners and held 41.2 percent of the nation's cultivated land. Table 27 shows the most conservative estimates published. Even these indicate 36% of the land was in farms and ranches of more than 500 manzanas. The highly skewed pattern of land ownership was coupled with extraordinarily inefficient patterns of land use. Of 8 million manzanas of land in production, 7 million were devoted to extensive cattle pastures (Wheelock, 1985:51). As discussed in Chapter III, the development of the Nicaraguan tropical humid Atlantic region served the interests of large and

2. Jonakin (1984:108) states that in 1978 92.2 percent of all lands in agriculture were held by Large-Scale Private owners while only 7.8 percent were in the hands of cooperatives and small farmers.

medium-sized cattle ranchers and meat packing/export interests.

Sandinista Agrarian Reform

Since social relations are a major cause of deforestation, the revolutionary process of social change advocated by the FSLN could be expected to diminish the rate of deforestation. However, as in all revolutionary programs, there have been compromises. Some of these made attainment of desired outcomes more difficult. The Nicaraguans leading the reform have sought to build a new economic and social order without excluding many of the beneficiaries of the previous regime's policies and without forcing collectivization on the rural poor. Theoretical constructs were modified to accommodate practical, political realities. The result was a flexible strategy for change.

The net effect of this flexibility has been that some lands that might have been expropriated have not been taken, and credit policies have not been modified as radically as might have been expected. The economic and political impact of the agrarian reform has consequently been less dramatic than was anticipated when the Sandinistas took power. The Sandinistas have been well aware of this shortfall in expectations, and have endeavored to make up for it by promulgating policies designed to intensify land use.

Making better use of cultivated lands requires changing the location of several traditional crops and emphasizing permanent crops on the agricultural frontier. These changes were described by the Minister of Agriculture: 1)

"intensive annual crops produced in inappropriate zones like Nueva Guinea in the Atlantic, or the mountains of the north central region, should be produced in the Pacific region," and 2) "the lands of the vast tropical humid zone of the Atlantic are appropriate for forest production or tropical crops such as coconut, African palm, cocoa, pejivai and natural rubber" (Wheelock, 1985:52-4). Wheelock's plan called for shifting grain production from the agricultural frontier to the Pacific region. Intensification would be accomplished in part by irrigation to increase the number of crops produced annually on lands already under cultivation (ibid.57). Under this plan, less land would be needed for stable intensive farming than had been required for shifting cultivation on the frontier. Revolutionary agrarian reform with widespread redistributive actions could thus coexist with a reduced sector of capitalist agriculture. And what of the forests? Theoretically, they would still fare better than they had under Somoza.

A 1974 study of actual and potential land use (DIPSA in CIERA, 1980) quantified some of the land-use contradictions which emerged during the last decade of Somoza rule.

Presented in Table 18, this study evaluated the viability of actual land use and presented one set of use options for the lands remaining in forested lands. Of 7.5 million manzanas of land already in agriculture or pasture, more than 3.6 million manzanas would have had to be changed from their then current agricultural and ranching uses. About 3.34 million manzanas or 93 percent of this area required change because of the inappropriate dedication of land to pasture. If this problem were to be rectified, more than half of the 6 million manzanas which were in pastures at the time would have had to be taken out of pasture and put into annual and permanent crops, forestry, recreation and wildlife uses.

The fate of Nicaraguan forests depends upon 1) the success of the agrarian reform and cooperative development in changing the conditions which have produced frontier migration and spontaneous settlement and, 2) the decisions of government policy makers affecting the development or preservation of remaining forested lands. Thus, as has been stated earlier, successful agrarian reform can yield an opportunity to plan the use or preservation of the remaining tropical forests, but it does not, by itself, guarantee that the subsequent decision makers will act to use remaining forests in sustainable ways.

If land use planning becomes possible, the resulting overall forested area could range between 3.8 and 6 million

manzanas. These are conservative estimates. Of the approximately 8 million manzanas that were forested in 1974, approximately 4 million remain. Unfortunately there is no adequate statistical survey to precisely document the rate of deforestation in quantitative terms in Nicaragua. However, the population of the remaining, large blocks of forest has declined substantially as a result of relocation (See Table 32). As a result there can be little doubt that the rate of deforestation has decreased.

Policies affecting the development of remaining forested areas could be expected to fall anywhere between two recognizable positions regarding the remaining forest. One would maximize the economic uses of currently forested lands, the other would emphasize preservation. The impact of policies maximizing use on remaining forests is evident in Table 18. Of the approximately 8 million manzanas that were still forested in 1974, 5.4 million manzanas would have been put into more intense uses which would have required deforestation (pasture, permanent crops* and annual crops). This would have involved a most prominent deforestation of 4 million manzanas of remaining forest for pasture expansion and lesser amounts to annual (.8 million), and permanent (.6 million) crops. The study estimated that 1.5 million manzanas of existing forests could only be used for recreation and wildlife. A lesser area, .7 million manzanas

would be reforested and .5 million would be transferred from pasture to recreation and wildlife. The total amount would thus be approximately 3.8 million manzanas of forest. This study identified potential uses without considering criteria such as the preservation of biological diversity and the long-term economic potential of these resources. The second policy position is founded on this concern.

Table 18
LAND USE CHANGE
From actual to potential use

To:	Annual Crops	Permanent Crops	Pasture	Forest	Recreation/ wildlife	Total change
From:						
Annual	-	43,313	99,809	32,662	13,918	118,722
Perm.	53,921	-	45,698	29,131	22,989	151,739
Past.	1,296,600	894,131	-	637,890	515,492	3,344,113
For.	797,255	594,280	3,991,189	-	1,509,620	6,892,344
Rec./ Wildlife	-	-	-	-	-	-
Total from other uses:	2,147,776	1,531,724	4,136,696	699,683	2,062,039	10,577,819

Source: Diagnostico Socio-Economico Del Sector
Agropecuario. 1980. CIERA, VOL:14
From DIPSA, 1974

This position supports the preservation of large blocks of tropical forests as biological reserves, and the sustained use of commercial forests. Consequently, the

position emphasizes retaining and managing remaining forests rather than converting them to non-forest uses on economic grounds. Promoters argue that silvicultural methods for rain forests have not developed to the point where a majority of tree species are used and that the economic potential of these forests has not yet been realized. Land use proposals reflecting this position would preserve large areas of forest in national parks and wildlife refuges. Additional forests would be managed on a sustained yield basis and protected from conversion. Reforestation would be undertaken to meet part of the nation's demand for firewood and construction materials. Rather than opposing agricultural uses entirely, this position emphasizes crop, pasture and forest combinations which protect soil nutrients, yield forest products, and preserve varying degrees of biological diversity while producing crops and meat.

Estimates of the impact of these two approaches are speculative, but indicate the possible range of forested areas that could be anticipated if unplanned conversion were stopped. However, if the natural forests have in fact been reduced to 4 million manzanas, then this constitutes a maximum area of natural forest which could possibly be preserved in its wild state by either approach³. I will

differentiate between overall forested area and reserves of original forest. The 1974 study provides a basis for estimating the amount of forest that could be expected to remain if traditional criteria of maximum potential, economic use were to be pursued. The 3.8 million manzanas of forest estimated above, could be increased to 4.5 million manzanas with reforestation, if the study's estimates of land-use potential are accepted. It stated that 2.5 million manzanas were apt for forestry and at least 2 million should be restricted to recreation and wildlife (DIPSA, 1974 in CIERA, 1980:Table A-3). One might conclude that from 3.8 to 4.5 million manzanas of overall forested area would be maintained if the maximum potential use logic prevailed. This would be accomplished by preserving portions of existing forests and by reestablishing other areas. The maximum amount of original forest protected by this scheme, would be less⁴.

If those favoring maximum preservation prevail, both the overall forested area and reserves of original forest would be greater. Eighteen percent of the nations land

3. Ariel Lugo, (Institute of Tropical Forestry, Puerto Rico) argues that many tropical forests which are considered climax or virgin are in fact old growth secondary forests (lecture, UW-Madison 2/10/88)

4. At least 1.2 million manzanas of this area were already deforested in 1974, and reverting to second growth forest or planted.

area, or more than 3 million manzanas have been proposed as national parks and biological reserves. Depending on the management practices on the remaining one million manzanas of original forests, it may or may not also retain a large portion of its biological diversity. Estimating the overall forested area is more difficult. Determination of forest reserves and reforestation plantations have not been made, but initial efforts indicate that this could become an important activity, pushing the overall forested area to 5 or 6 million manzanas.

Nonetheless, the differences between these two positions will become irrelevant unless sufficient change in the agrarian social structure and the overall course of development occur. Progress toward changing the agrarian structure can be measured by the extent to which the Sandinista reforms have redistributed agricultural lands to the dispossessed. The impact of redistribution on deforestation is at best indirect, but its "probability" can be imputed from the successes and failures of attempts to accommodate more of Nicaragua's rural population on existing agricultural lands without expanding the agricultural frontier into forested areas, and indeed reducing the population of forested areas through relocation and settlement.

Resource Acquisition

Land

Sandinista actions to change the agrarian social structure began with the expropriation of the land and capital of the Somoza family and allied bourgeoisie but did not end there. The lands thus acquired comprised 20% of those in cultivation (Kaimowitz and Stanfield, 1985:53) making this first phase of the agrarian reform a substantial beginning (Kaimowitz and Thome, 1980:23). Baumeister (1985) confirms that the national mean area expropriated per landowner was 1,364 manzanas (or 955 hectares) and that 91% of the area confiscated was in farms and ranches of more than 500 manzanas. He also states that prior ownership of extensive cattle haciendas by the Somoza family and its associates "accounts for a large portion of the area in fincas that is now under the control of the revolutionary state, that is, within the Area of People's Property (APP) (Baumeister, 85:16). This expropriation was important for the reform process, but was insufficient for the transformation pursued by the new government. An additional means of acquiring land was provided with the passage of the agrarian reform law of 1981 which initiated the second phase of the agrarian reform. This law established criteria for expropriation of decapitalized or abandoned lands while protecting the property rights of "patriotic producers" who

maintained satisfactory levels of production. These criteria avoided placing ceilings on size of farm and permitted expropriation if: 1) lands were uncultivated for two consecutive years; 2) less than 75% of the usable area were cultivated, or 3) pastures were stocked at sub-standard rates. Expropriating lands under any of the three categories reduced the economic power of large landowners and open the door for subsequent redistribution to peasants. The first criterion targeted previously deforested lands for state acquisition and redistribution. The second facilitated recovery of forested or abandoned land holdings. The third, potentially the most relevant to the problem of deforestation, directly targeted the underutilized lands of large cattle growers. The regulations made lands with fewer than .5 head per manzana in the Pacific or .3 head per manzana in the interior vulnerable to expropriation⁵. Of the three departments which had experienced major pasture expansion and peasant expulsion, only Matagalpa stocking rate was below the limit (.27 head per manzanas). Boaco at .48 and Chontales at .43 were well above. Zelaya, which was excluded from the law, had a stocking rate of only .09 head/mz while Rio San Juan trailed with .15 as the second

 5. This regulation appears fairly lenient considering that the average national stocking rate had been .7 head per manzana in 1971 (Baumeister, 1985:67).

lowest stocking rate in the country (Quintanilla, 1977:116). Because of their reliance on the appropriation of various forms of ground rent, the most land-extensive cattle producers found themselves legally vulnerable to legal expropriation. Altogether, the lands abandoned and expropriated from the Somoza and allies and lands affected by the agrarian reform law contributed 60 percent of the lands made available for redistribution by the end of 1986. Much of this land had been converted to pasture by their prior owners.

Another means of land acquisition by the government was negotiated purchase. This enabled the government to redistribute the lands of large holders without alienating them politically or interfering with their production. Such acquisitions typically involved the purchase of only a portion of the owners' lands. Compensation was partially fulfilled with consumer goods i.e., a new vehicle, rather than liquid capital. Purchased lands provided about 14 percent of the land for reform by the end of 1986.

Several additional sources of land emerged: state farms, voluntarily collectivized farms and national lands. As will be discussed in greater detail, when the Sandinistas first came to power, their emphasis on state farms made the state sector a major recipient of lands expropriated from the Somoza and allies. A subsequent decision to

redistribute some of these lands made state farms a secondary source of land for reform. Twenty percent of the land fund had passed through the state farm sector. Voluntary collectivization became a locally important alternative in Region V. Their landed peasants contributed their own parcels to production cooperatives, enabling landless peasants to become members and gain access to land in this unusual way. National lands, which had been the principal source of land for reform under Somoza, constituted only 8% of redistributed lands by the end of 1986. Most of the lands acquired for reform (67%) had been acquired from 762 large landowners. Table 19 presents the sources of land for reform and Table 20 illustrates the rate of land acquisition from large landowners between 1981 and 1986.

TABLE 19
ORIGIN OF THE LAND FUND
(through Dec. 1986)

SOURCE	AREA*	%
Expropriations	438,588	39.7
Purchases	150,475	13.6
Donations	29,829	2.7
State farms (Ag. Ref. Enterprises)	224,124	20.3
Reassignments	9,510	.8
National Lands	88,576	8.
Others	161,967	14.7
TOTAL	1,103,069	99.8

* (Manzanas)

(Source: MIDINRA, DGRA, Land Tenure Department)

TABLE: 20
LAND ACQUISITION

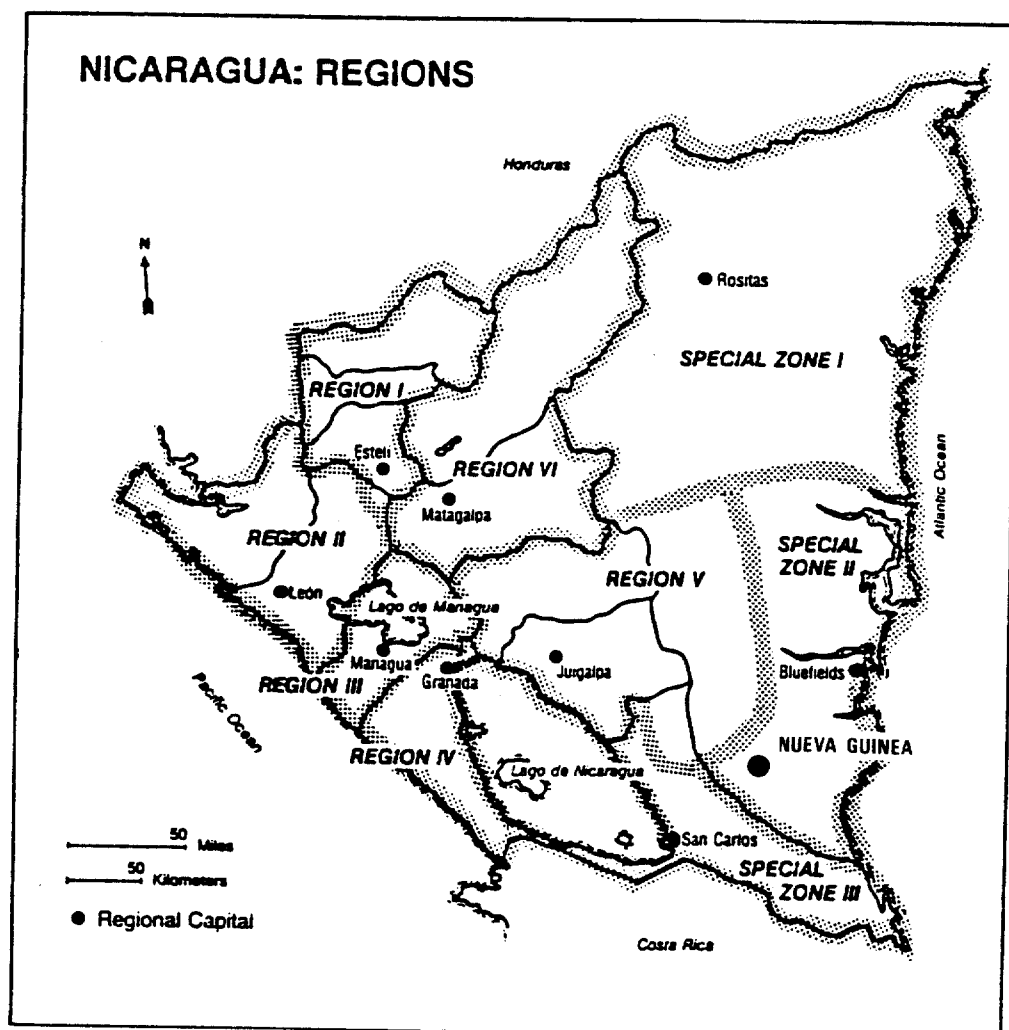
PERIOD	LAND AREA	PROPERTIES	OWNERS
1981-1982	264,448	279	200
1983	157,792	156	134
1984	44,988	48	60
1985	56,175	97	54
1986	216,405	375	314
TOTAL	739,808	955	762

SOURCE: DGRA-MIDINRA 1986, Ortega 1987, DGRA-MIDINRA 1987

Acquisition of land for agrarian reform has progressed more rapidly in the Pacific than the Interior. This was most pronounced in phase one. The land acquisitions which followed the promulgation of the agrarian reform law increased in frontier (interior) areas most affected by the

war (Kaimowitz and Stanfield, 1985:62), but by 1985 had not yet caught up to the pace in the Pacific region. "In regions I and IV, the latifundio has nearly disappeared, less than two percent of the land in these regions belongs to property owners of more than 500 mz. However, in Region V, the most important cattle producing region, seventy percent of the nation's remaining latifundio survives, totaling more than 50,000mz" (MIDINRA, 1986).

MAP 1



Source: Charles Downs, "Local and Regional Government," in *Nicaragua: The First Five Years*, ed. Thomas Walker (New York: Praeger Publishers, 1985), p. 49.

As Table 21 shows although 72 percent of agricultural lands are located in the interior only 51 percent of lands affected in phase I and 64 percent of lands affected in phase II were from the interior. This is an important consideration where deforestation is concerned, because the interior region's large cattle ranchers have traditionally placed great pressure on Nicaraguan forests. However, given the diverse means for acquiring land, and the demonstrated willingness to redistribute the lands of large producers it would appear to be only a matter of time before the interior region's cattle estates are affected by reform. In spite of delay in Region V, state acquisitions have provided a substantial amount of lands for reform. These acquisitions were particularly significant because a large portion of them had been cattle estates. Due to the Sandinista bias in favor of the agricultural workers and peasants, these actions have weakened the impetus for capitalist expansion without producing new frontier migrants.

TABLE 21
LAND ACQUISITION IN THE PACIFIC AND INTERIOR REGIONS

	Agricultural	Agrarian Reform	
	Area %	Phase I* %	Phase II** %
Pacific	28	49	36
Interior	72	51	64
	100	100	100

* Lands confiscated from Somoza and allies.

** Lands affected under provisions of the agrarian reform law of 1981.

Source: Baumeister, 1985:68

Credit

Gaining control of the banking system was substantially easier than gaining control of the capital it had once moved. The banking system was nationalized immediately following the Somoza's ouster. However, "The banks had been largely bankrupt during the war due to heavy borrowing by the Somoza government, massive capital flight, and widespread non-payment of debts. Nationalization, therefore, was essentially the assumption of bank debts by the new government" (Enriquez and Spalding, 1985:10). Access to international loans grew during initial years, but within two years of the the U.S. embargo, Nicaragua's ability to secure international loans decreased dramatically. As external financing became less available, the Nicaraguan banking system was forced to depend upon internal sources for financing. Due to a number of the banks own policies,

savings and repayment of principal and interest from previous loans did not provide sufficient resources to sustain credit policy (ibid:28). "Interest rates that were far below the inflation rate, low recuperation rates in some sectors, and the clearing of peasant and APP [state sector] debts all limited the return flow of bank resources." As a result of the low interest rates offered to depositors "were consistently lower than the rate of inflation ...[and] idle investment resources were not attracted to the bank.

"Consequently, credit disbursements from the Nicaraguan banks relied increasingly on emissions from the Central Bank. This continual expansion of the money supply without a proportionate growth of production contributed to the inflationary spiral that became a defining feature of the Nicaraguan economy in 1985" (ibid:29). Due to concerns that "conventional adjustment mechanisms ... would undermine the revolutionary project, policy makers were unwilling to ... raise interest rates or reduce loans" (ibid:30). Enriquez and Spalding concluded that "such developments reflect the complexity of designing and implementing a program of revolutionary change...[and that] poverty, the dislocations of profound institutional change and war set into motion a series of tensions that confound the process of transition." Despite the difficulties which decreasing international financing and inflationary banking policies implied,

redistribution of credit to favor peasants and particularly cooperatives was important in slowing the differentiation process in the case of individual peasants and consolidating and strengthening the cooperative alternative model of development.

Resource Redistribution and Changing Social Organization of Agriculture

Redistributive actions of the Sandinista agrarian reform attempted to alter the historical inequity which had accompanied capitalist development under Somoza. Land and credit were both redistributed to favor poor peasants and the growth of agricultural cooperatives. The lands acquired through the Sandinista agrarian reform were assigned primarily to the landless in state farms and production cooperatives and secondarily to small land-owning peasants. There was a fleeting experiment with "Agrarian Communes" in the closing days of the war against Somoza and during the first months of the new government, as workers and peasants organized by the Sandinista rebels took over Somoza's farms and factories. This short-lived experience was soon aborted by a major policy shift which established state farms called Agrarian Reform Enterprises (ERA)⁶ as part of the Area of

6. Although this sector was greater in 1985 than other processes of socialist transition i.e. Vietnam, eastern

People's Property (APP). The state also acted to prevent spontaneous takeovers of land by peasants. State farms received 70 percent of expropriated land from 1981-82 and 65 percent in 1983. This first major period in agrarian reform policy shifted in 1982 to a second which emphasized the establishment of peasant cooperatives⁷ (Kaimowitz and Stanfield, 1985:52).

A debate continued between those who favored state farms and those who favored peasant agriculture. However, pressure from the contra war and concern about a possible invasion by the United States influenced government policy to shift once again in 1985. This involved redistributing or "sacrificing" a portion of the lands making up the state farm sector and expropriating large landowners who would not negotiate the sale of their lands for reform. These actions began in Masaya and spread to other areas of the country to

6. cont. Europe and the Peoples' Republic of China, it was considerably less than that of Cuba (Baumeister, 85).

7. Except for the state farm sector, reformed lands remain private. "No payment for the land is required. The titled land cannot be rented out or sold, although it can be inherited. Subdividing the land through inheritance is not permitted. The titled land can be used as a credit guarantee, although the land cannot be taken by the bank and sold in the case of nonpayment". Rather the land assures the bank that there is sufficient productive base to repay the loan (Kaimowitz and Stanfield, 1985:57). These features tend to make the reform more stable, limiting reconcentration in the hands of rich peasants and the agrarian bourgeoisie as occurred in the Somoza period.

provide more land for poor peasants who had not yet benefited from the reform. In 1985 97,200 manzanas of APP land were transferred to peasants (Carrion Cruz, 1986 Barricada 4/26/86). Transferring land from the state farms to individual peasants and cooperatives was considered a sacrifice by those with the new government who favored a strong state farm system as a major component of agricultural development. By 1987 the state farm sector had been reduced from 20% to 13% of agricultural lands while the production cooperative sector (CAS) grew to 11% of the lands in agriculture and individual peasants, organized in credit and service cooperatives (CCS) had become important beneficiaries of reform. Table 27 illustrates these shifts in land tenure.

The production cooperatives continued to receive ample land transfers and generous financial support through the National Development Bank. The state's transfers of land to production cooperatives amounted to 81% of the lands in production cooperatives in 1982 (Baumeister, 1984:13). By 1987, production cooperatives had received 32% of the lands affected by the agrarian reform, while 29% were in Credit and Service Cooperatives (CCS) and 39% still remained in the state farm sector.

Cooperative Development

Cooperative development strategy was not limited to support for production cooperatives. Membership in Credit and Service Cooperatives provided a loose form of association for more than 40,000 families. The ten-fold increase of the cooperative sector from 9,270 in 1978 to more than 95,000 in 1986 may be, in part, attributable to "the flexibility of the state's policy for incorporating the peasantry into cooperatives" what Baumeister (1985:28) calls "the central aspect of the cooperative movement in Nicaragua". The growth and diversity of the cooperative sector is presented Table 22. By 1985 there were 975 CAS and 1,350 CCS. Work Collectives or (CT), a type of mini CAS, had decreased as members joined either CAS or CCS.

TABLE 22
GROWTH OF AGRICULTURAL COOPERATIVES 1978 - 1985

Year	CAS	CCS	CSM	CT	Trad. Coop. R.L.	Total
1978	-	-	-	-	42	42
1980	548	1,397	-	n.d.	n.d.	2023
1982	499	1,587	-	633	57	2776
1985	975	1,350	3	140	n.d.	2535

Source: Molidier and Merlet, 1986:29

This growth in Nicaragua's diverse cooperative sector was strongly supported by the redistribution of agricultural

credit. Table 23 illustrates the overall shift in credit distribution from only 4% available to peasants through rural credit in 1978 to around 20% by the end of the new government's first five years. According to Enriquez and Spalding (1985:15), "the cooperative sector received clear priority over individual producers. Within the cooperative sector, increases in credits were greater among the CAS than among the CCS. Short term credits for CAS cooperatives rose from 5.9 percent of Rural Credit allocations in 1981 to 28.6 percent in 1983. The CAS share of long-term National Development Bank (BND) credit rose from 2 percent in 1981 to 29 percent in 1983". Thus, the dramatic shift in credit resources included significant support for production cooperatives.

TABLE 23
CREDIT
(in millions of Cordobas)

Type of Credit	Bank	%	Rural	%	Total	%
1978	2,432	96	90	4	2,552	100
1979	1,215	87	178	13	1,393	100
1980	2,237	73	831	27	3,068	100
1981	3,336	77	972	23	4,308	100
1982	2,878	82	613	18	3,491	100
1983	3,784	82	852	18	4,636	100
1984	4,206	74	1,444	26	5,650	100

Sources: 1978 - 1981 CIERA, Balance de Reforma Agraria 1979/1983a Rural credit corresponding to the financing of peasants and small capitalist producers. Bank credit was distributed to capitalist producers and state farms. 1982 - 1984 Enriquez and Spalding 1986:Table 5).

Priority support for production cooperatives continued from 1983 through 1986 despite important changes which surfaced in 1985. Support in the form of credit was matched by transfers of land. From 1982 to 1986, the number of production cooperatives nearly doubled. Peasant membership in the CAS more than tripled in the same period reaching 27 percent of all households in cooperatives (Table 24). Total cooperative membership reached 95,037 members by the end of 1986. Growth in the CCS membership slowed in 1986 while the CAS continued to grow with strong government support. In 1986, 43.7% of lands redistributed went to production cooperatives (CAS).

TABLE 24
GROWTH IN THE COOPERATIVES MEMBERSHIP 1978 - 1986

Year	CAS	CCS	CSM	CT	Trad. Coop. R.L.	Total
1978	-	-	-	-	9,270	9,270
1980	9,275	48,712	-	n.d.	n.d.	67,257
1982	7,081	52,052	-	4,285	14,196	77,614
1985	20,000	44,000	204	896	n.d.	79,296
1986	25,715	46,256	1,643	1,340	n.d.	95,037

(Sources: 1978 - 1985 Molidier and Merlet, 1986:29
"Movimiento Cooperativo, eje de la Sobrevivencia de la
Revolution" and DGRA, 1987.

- 1978 BND
- 1980 ATC The number of CAS is underestimated because it doesn't include those CAS formed by PROCAMPO.
- 1982 Agricultural Census, the categories are those defined by the members, DGRA for the Traditional Cooperatives R.L.
- 1985 Provisional Registration of cooperatives n.d. No data. The total presumes maintenance of the prior number when data for following years was not available.
- 1986 MIDINRA, DGRA, personal communication, 7/1987. Their is a discrepancy between the Total listed and the actual total of 89,210 of 1986 membership.

Concern that further growth of the production cooperative sector would be unmanageable and growing dissatisfaction among peasants who had not yet benefited from the agrarian reform resulted in a third major change in the governments policy of land distribution. In early 1985, agrarian reform officials concluded that land transfers to individual peasant households (approximately 30,000 mzs.) had been insufficient. Peasants had pressed this view in a number of public demonstrations, and the November 4, 1984,

election results may well have given impetus to this change. Although the FSLN won with over 60% of the vote, political problems and the growing economic crises were reflected in reduced support from some rural areas. In response, the Sandinista government changed both the rate and structure of agrarian reform in 1985 by increasing the distribution of land to peasants and relaxing distribution policies which had excluded individual peasants to a large degree. The land policy based upon peasant willingness to work in production cooperatives was abandoned. Now peasants would have the opportunity to receive lands as individuals. Significant holdings of the state farm sector were made available for transfer to individual peasants and the policy of limiting settlement of landless peasants to peasant zones was eliminated.

As a result of these policy changes, the impact of agrarian reform was broadened from a nearly exclusive emphasis on redistributing land to the landless to include individual small holders. Beginning in Masaya and Los Pueblos, the past policies of containing peasant agriculture within peasant zones and of preventing peasant land takeovers were abandoned. A dynamic period of peasant participation followed, dramatically increasing the number of peasant families benefiting from the agrarian reform in Masaya-Los Pueblos. By July 1985, these and other new

actions of reform brought the total of reform transfers to 2,211,893 manzanas which had been transferred to 69,429 families. Peasants received 95 percent of the lands affected by the agrarian reform law in that year (FAO 1986:11).

In spite of the government's willingness to transfer land to individual households, not all peasants choose to receive lands in this way. In our survey of 400 Masaya-Los Pueblos households (CIERA-DGRA 1985), which preceded the new actions, initially only 13% of peasant households indicated their interest in joining production cooperatives. However, when distribution occurred a few weeks later, 14% formed production cooperatives immediately, and this grew to 33.6 percent in the following months. Other peasants (38%) formed Credit and Service Cooperatives (CCS) in a way that retained a potential for gradual or partial collectivization (Marchetti, 1985:17). These new CCS were different from prior CCS and were more amenable to future voluntary collectivization because the parcels of all member households were contiguous, with no fences or other obstacles to consolidation. Individual parcels were distinguished by an untilled "dead furrow" rather than fences, and dwellings were not to be built on these new lands. The contiguous and fenceless parcels thus lent themselves to future cooperative investments, i.e., mechanized tilling/harvesting or

irrigation. Hence, the Sandinistas significantly modified their strategy, creating units that were apt for future collectivization, rather than insisting upon immediate change.

The Sandinista agrarian reform experienced a number of changes which affected both the source and destination of land. Examination of the reform actions in 1986 reveal a continuing willingness to expropriate large landholders and to "sacrifice" the state farm sector to favor peasants (Table 25). In 1986, individual peasants received almost as much land as production cooperatives which continued to receive more land than any other sector (Table 26). Assignments of land averaged 31.86 manzanas per family on a national basis. In the Pacific regions (I,II,III,IV) the average was 16.8 manzanas per family, in the interior (V,VI) 37.1 mz/family and in the special regions of the Atlantic 52.3 mz/family (MIDINRA, 9/1985).

TABLE 25
LAND ACQUISITION IN 1986

From: APP	Expropriation	Purchase	Reassignment	Others	Total
137,923	156,619	14,927	9,510	18,576	337,555
40.9	46.4	4.4	2.8	5.5	100

TABLE 26
LAND REDISTRIBUTED IN 1986

To:	CAS	CCS	CSM	CT	Individual	Total
	147,466	25,021	21,632	5,138	138,298	337,555
	43.7	7.4	6.4	1.5	41.0	100

Source: DGRA, 1987

Almost eight years of Sandinista agrarian reform have brought important change to Nicaragua's social and agrarian structures. Table 27 illustrates the shift in the structure of land ownership from one benefiting a few large holders to one benefitting the peasant majority in which diverse forms of cooperatives play a growing role. By 1987, land tenure had been radically altered from the exclusively private and individual form under Somoza to include individual, state and collective ownership. The state and production cooperative sectors grew to comprise between 24% and 34% of the country's land in agriculture.⁸ Land held by large

8. Lands in state farms 13% and CAS 11% have involved changes in ownership and management from private individual tenure to state, in the case of the state farms and private collective ownership in the case of the production

landholders with greater than 500 manzanas had been reduced from 36% to 10% while in the 200 - 500 mz category, holdings were reduced from 16% to 12%. Altogether these actions not only decreased the power of the largest landowners, but reduced pressure on remaining individual peasants and provided an alternative, collective ownership, which would slow or prevent social differentiation among a growing portion of Nicaraguan peasants.

8. cont: cooperatives. A portion of the lands held by individual peasants organized in Credit and Service cooperatives have involved changes in land tenure, while the majority have not.

TABLE 27
EVOLUTION OF LAND TENURE
(in thousands of manzanas)

PROPERTY SECTOR	1978		1981		1985		1986	
	AREA	%	AREA	%	AREA	%	AREA	%
INDIVIDUAL OWNERS	8,073	100	5,550	69	4,983	62	4,917	
61								
> 500	2,920	36	1,665	20	884	11	796	10
200 to 500	1,311	16	n.d.	-	1,021	13	999	12
50 to 200	2,431	30	n.d.	-	2,391	30	2,412	30
10 to 50	1,241	16	n.d.	-	560	7	581	7
< 10	170	2	n.d.	-	127	1	129	2
REFORMED SECTOR			2,515	31	3,089	38	2,783	34
Credit and Service Coops			804*	10	804	10	804	10
Production Coops			111	1	736	9	899	11
State Farms (ERA)			1,600	20	1,549	19	1,080	13
Abandoned lands							425**	5
TOTAL	8,073	100	8,073	100	8,073	100	8,073	100

* The 1986 figure was used for 1985 and 1981 since little change had occurred and the figures for these years were unavailable.

** The abandoned lands figure was updated to July, 1987 to include 10,000 additional manzanas which were abandoned in the first half of the year. This change is not reflected in the other figures.

Sources: 1978 and 1985: MIDINRA, Plan de Trabajo 1986:54
1981: Ortega, 1987:10
Plan de Trabajo, MIDINRA 1983:15
1986: DGRA, Oct. 86, Agrarian Reform Policy for 1987

Individual Peasant Holdings

Despite important advances toward cooperative development, individual land tenure still predominates in Nicaragua. Roughly the same amount of land was held by individual private landowners with less than 200 manzanas in 1986 (3.9 million mz) as in 1978 (3.8 million manzanas). In Table 27, an important portion of individual producers are included in the reformed sector under the Credit and Service Cooperative (CCS) category. Most of the CCS members work and own individual parcels of land and participate in the acquisition of credit as a group. The government's initial expectation that CCS would gradually become production cooperatives failed to materialize. Most CCS members continue their individual form of production. Peasant participation in CCS has not prevented pre-existing exploitive relations of production from being reproduced. Cortez Hodgson (1984:3) found that "it is not unusual to find within a CCS, rich peasants as members who contract labor from poor peasant-members, or rich peasant members that engage the poor members in share cropping."

Nevertheless, some collective actions by these new organizations have begun to change the way individual peasants resolve common problems in Nicaragua. With organizational support by the National Union of Farmers and

Ranchers (UNAG) and the local offices of the Ministry of Agriculture and Agrarian Reform (MIDINRA), exceptions to the individual character of the CCS have begun to appear. Efforts by creative local directors of agrarian reform have resulted in some unusual experiences with collective ownership and work by CCS members. In other cases, individual members of CCS have contributed parcels on a temporary basis for collective farming by land poor members without charging rent (interviews N.G/85). Cortez Hodgson (1984:68,69) examined the experience of the poorest CCS members in San Francisco Libre who organized work collectives within their cooperatives to conserve their lands. He found that this action "rapidly diminishes the polarization of the peasant sector" and "accelerates the transformation of the social relations of production." These measures have permitted CCS members to experiment with collective ownership and work while retaining their individual parcels.

Gradual progress toward collectivization has included state financing of collective investments in produce storage facilities, (i.e., cabbage growers) and transportation, which have permitted individual producers to take advantage of an economy of scale and market their produce without a middle man. Beyond these aspects of the CCS, titling and credit policies have influenced the tenure security of

individual peasants regardless of whether or not they participate in the CCS.

Titling

For the majority of farm families, acquiring legal title to land had been a long-term aspiration. From 1981 to 1985, the land tenure office of Midinra granted title to the lands of cooperatives and individual peasant families, indigenous communities and frontier landowners. During this period, 83,322 families or between⁹ 52 and 64% of peasant families received title for 2,523,388 manzanas, or 33%¹⁰ of the land in agriculture. Virtually all of the lands titled were already in agriculture and a majority were in areas of prior frontier expansion where tenure was least secure. Table 28 shows the results of titling efforts during this period.

9. The number of peasant families in Nicaragua has been estimated at between 130,000 and 160,000 (pers. com Marvin Ortega 1987).

10. This is based upon the 8,073,000 mz of land in agriculture less the 425,000 mz abandoned, leaving 7,648,000mz the current total.

Table 28
AGRARIAN REFORM TITLES FROM 1981 TO 1985

Type	AREA (mz)	Families benefited	%	mean area/ 13 family (mz)
Cooperatives	805,090	39,364	47.2	20.45
Individuals	194,939	7,213	8.7	27.03
Indigenous communities	101,408	3,348	4.0	30.29
Special titling	1,421,951	33,397	40.1	42.58
TOTAL	2,523,388	83,322	100	30.28

Source: DGRA, 1986

In addition to direct state actions to redistribute land and to increase tenure security for small holders, Midinra took initial steps to control the private market of agricultural land sales. "Agrarian reform" titles prohibited sales on the private market, while guaranteeing the right of inheritance and limiting subdivision among heirs. The land market was further restricted by requiring approval of the Ministry of Agriculture and Agrarian Reform for all other sales by private land owners. Local offices of this ministry were to be advised of the intention to buy or sell land and were charged with approving or denying approval of such transactions.

Changes in the Banking System

Enriquez and Spalding (1985:25) claim that the shift in distribution of credit from 1979 to 1985 "reflected a conscious policy of favoring sectors previously excluded from the system." They conclude that "the traditional alliance between the banking system and larger private producers was broken. Beyond a redistribution of credit, National Development Bank (BND) policy prohibited foreclosure actions against peasants due to an inability to repay BND loans. Although many more peasants had access to credit in 1985 than prior to the revolution, expansion of participation was limited to roughly half of the eligible population. Enriquez and Spalding (1985:27) attributed this to continuing rural poverty, low productivity, inadequate prices and the disruptions of war.

The early credit disbursements known as the "pinata", are believed by some to have been intended to foster increased grain production through expansion of area planted in the agricultural frontier (Kaimowitz and Thome, 1980:18). Except for this initial disbursement, which was later revised, credit policies for peasant grain production do not seem to reflect a position on the frontier per se. Apart from continued but more limited and carefully controlled

financing, and the provision of improved seeds, the most visible attempt to resolve the considerable deficit in corn production focused on increasing yields and on shifting a part of the corn crop to Pacific cotton lands.

Direct interventions by the Nicaraguan government to change resource distribution in favor of peasants and to promote cooperatives as an alternative model of social organization were complemented by other actions which further reformed land tenure and promised to alter the deforestation trend.

Government Action to Intensify Land Use

Permanent Crops

Government efforts to increase the intensity of land use has emphasized changes in the role of permanent crops. Coffee, traditionally Nicaragua's most important permanent crop, has been the subject of redistribution to peasants, and efforts to increase yields. As a result of the agrarian reform, land tenure in this crop shifted to favor peasant families whose role increased substantially¹¹ in the

11. Baumeister writes that "according to an analysis of the agricultural frontier in the departments of Matagalpa and Jinotega, the production of coffee by small producers doubled between 1979 and 1983 (Baumeister, 1985b, 24-25).

northern interior. Elsewhere changes intended to increase the production of coffee per unit of land area had a negative impact on the traditional coffee growers' practice of maintaining most of the natural forest canopy species. Following a practice toward high volume shadeless coffee which had been observed in Brazil, a coffee renovation program was begun. The plan called for removal of shade trees which had provided a continuous canopy of natural forest species and the replacement of coffee varieties which required heavy shade with others tolerant of light shade or full sun. Against the warning of environmentalists such as Budowski the program was implemented, deforesting most of the traditional coffee lands on the southern part of the Carazo plateau. Soil erosion and area temperatures increased while yields decreased abruptly during years when coffee prices were high. The maturing "renovated" coffee did not reach the expected yields and criticism of this project became widespread. The value of this experience may be found in the skepticism toward radical technical changes which followed.

Beyond coffee, promotion of permanent crops was directed toward the tropical humid lowlands of the Atlantic region. The work included an effort to locate foreign markets, plan for industrial processing and transfer technology for avocado, cocoa, rubber, Pejivai, coconut,

African palm oil, plantain and citrus. The efforts to expand these crops would be undertaken exclusively by peasants and native peoples. Permanent crops received growing portions of investment capital. Palm and coconut oils received 7.3% and cocoa 3.4 % in the 1982 - 7 period (Harris, 1985:75). Table 29 illustrates the initial progress in a number of permanent crops and the projections in land areas which are to be used by them.

The area of permanent crops established by 1987 was not yet sufficient to substantially alter the slash and burn practices of most poor frontier families. However, the experiences of local efforts in many parts of the Atlantic region prepared the way for future expansion and demonstrated the potential to reduce the peasant demand for land in tropical humid areas. In the tropical Atlantic region, attempts to expand permanent crops proceeded with caution and technical innovations were attempted without abandoning traditional practices.

TABLE 29
ESTABLISHMENT OF PERMANENT CROPS
(manzanas)

Crop	1979	1987	2000
Cocoa*		<1,000	6,000
Rubber**			25,000
<u>Pejivai</u>			
Coconut			
African Oil Palm*	50	600-700	6,000
Plantain			
Citrus			
Avocado			
Coffee*		130,000	

TOTAL			

* estimates from from DGRA, Midinra interview 1987.

** DGRA, 1984:64

National Lands

In addition to redistributive measures the Nicaraguan government acted to stop the depletion of national lands. The government expropriated lands which were held by private land speculators and had not been worked. Furthermore, the new government nationalized forests and initiated a number of measures which would provide the legal and practical basis for preventing further spontaneous settlement and unplanned pasture expansion.

A number of projects such as the Oscar Benavidez Forestry Projects S.A. (PROFOBSA) in the Southeast involved the commitments of state and foreign capital investments and

specific areas of forested lands to sustained yield forestry. PROFOBSA officials explained that if regrowth were to follow initial logging of old forests, settlement on the project's forested lands would have to be stopped. According to the same officials, peasants already living within project lands could either form agro-forestry cooperatives in which their migratory agriculture could be integrated into logging and reforestation plans, stabilize their agriculture with permanent crops or join the project work force.

The Institute of Natural Resources and Environment (IRENA) attempted to control the harvest of trees regulating cutting, charging a fee for timber cut, and by marking trees and establishing boundaries for commercial harvests, but interviews revealed that unless sufficient alternative access to land or employment were made available, these attempts at enabling regeneration would be doomed to fail. Legislation which would require delineation of national forest lands throughout the country has been proposed by IRENA but has not been acted upon by the national assembly.

Protection has been contemplated for a number of areas of the tropical humid forests of the Atlantic region. Outstanding are the two biosphere reserves. "Bosawas" was established in 1980, "the government allotted 9,000 square kilometers of virgin forest land to the Nicaraguan Institute

of Ecology and Natural Resources (IRENA), designated for the establishment of a forestry reserve in the Bosawas region of northern Zelaya, with the intention of protecting the environment and benefiting the indigenous communities"

(Brown, 1985:181). On world environment day 1986, Nicaraguan president Daniel Ortega proposed broadening the scope of biosphere preserves through international cooperation. Included in his proposal were the establishment of "international biosphere reserves with neighbouring Costa Rica, El Salvador and Honduras" (IUCN 1986:1). Conflict over the future the of a second biosphere reserve area has brought attention the countries largest remaining tropical humid forest. An initiative by the Nicaraguan forestry corporation to sell off the timber on 3,200 Km² the southeast forest was disputed (El Nuevo Diario, 1/17/87) and defeated in 1987 (El Nuevo Diario 6/27/1987). A commission including opponents of the concession was established to investigate the multiple issues involved in development and preservation of the remaining tropical humid forests of the southeast. In all 18% of the national territory has been proposed for National Park or other reserve status.

Industrialization

Part of the shift away from dependency on agro-export production, the accompanying imports, and the extensive forms of land use is to be found in a new course of industrial development. Harris (1985a:73) maintains that "Nicaragua can achieve the integrated industrialization of its economy" and claims that "the new revolutionary government of Nicaragua has launched the country on a course of development which seeks to achieve most, if not all of the conditions required". Despite the "structural conditions that were responsible for Nicaragua's economic underdevelopment and neo-colonial dependence...(Harris 1985a:83), he explains that Nicaragua is currently undergoing capital investments which will prepare the country for "much more extensive industrial development in the future. Nevertheless "Agro-exports continue to be considered the dynamic access of accumulation. The economic strategy of the last six years has consisted in taking advantage of and strengthening the installed capacity of this sector of the economy and the comparative advantages that derive from Nicaragua's ecological conditions.... And it is through the agro-export sector that the Nicaraguan economy will hope to obtain the income to finance the general development and transformation of the economy as a whole" (Harris, 1985b:223)

Organization of Rural Workers and Peasants

Substantial growth in the organization and participation of rural workers has occurred. By 1987, The National Union of Farmers and Ranchers (UNAG), had grown to 132,579 members. The Rural Workers Union (ATC) had 48,133 members in 70 unions.

The Impact of War

The political shocks and economic consequences of war have substantially altered the agrarian reform and, in the short run, may have increased its potential for slowing the rate of deforestation. Conditions which once promoted rapid frontier expansion began to change with the revolutionary war against the Somoza government.

Increasingly, the pace with which agrarian reform and land-use change have taken place in Nicaragua has been attributed to the war which seeks to overthrow the Sandinista government, the economic crises it has spawned and the Sandinista's pragmatic approach to implementing revolutionary policies. Since 1983, the armed conflict has centered in the forested and mountainous regions of the agricultural frontier. Because the focus of social change is in agriculture, agrarian reform has been targeted as a

primary military objective of the counter revolution. Contra attacks on rural communities and cooperatives and a focus of military clashes on the agricultural frontier have made these areas unattractive for new settlers and have caused many old settlers to abandon the frontier (IRENA, 1985:4). Absorption of peasants and rural workers into armed forces (on both sides) has resulted in an unprecedented "proletarianization" process among peasants. While employment may be temporary for most, the experience may well be sufficient to separate surviving peasant youth from farming well beyond the war.

The economic costs of the war have affected all sectors of Nicaraguan society but the agricultural, forestry and construction activities of rural areas have been hit most directly. "Capital and material damages amount to U.S.\$ 120 million from 1980 to 1985. The most affected sectors include agriculture (U.S.\$ 39 million) wood and forestry (U.S. \$30 million), construction (U.S.\$ 17 million) and fishing. Production losses in the same period are greater, totaling U.S.\$ 398 million (Nicaragua: The economic costs of aggression of the government of the United States of North America, 1986:3).

Reduction of the Cattle Herd

During the war of liberation, illegal export over borders reduced the cattle herd by an estimated 350,000 head, or 12 percent (Ballard, 1982:21). Although the new government made efforts to regulate the slaughtering of cattle, the illegal export and slaughter combined with a misdirected credit policy to continue to deplete the herd. "Credit policies largely (75 percent) favored the fattening and development phases in the cattle production cycle, to the detriment of reproduction", considered the most difficult (Midinra, 1987a:10). From 1979 to 1984, it was estimated that the herd had been reduced by an additional 1,157 head or 45 percent (Cajina Loaisiga, 1985). Midinra maintains the loss has been 30 percent in 9 years (1987a:10). Table 30 illustrates the growth and decline of the cattle herd.

TABLE 30
GROWTH AND DECLINE OF THE NICARAGUAN HERD
(x 1,000mz)

YEAR	POPULATION		
1952	1,182		
1957	1,300		
1960	1,287	2,770*	
1961	1,155		
1962	1,191		
1963	1,234	1,252	
1964	1,713		
1965	1,799		
1966	1,879		
1967	2,020		
1968	2,135		
1969	2,293		
1970	2,431	2,183	1,730
1971	2,550	1,828	
1972	2,103		
1973	2,197		
1974	2,322		
1975	2,105		
1976	2,231		
1977	2,700		
1978	2,850*		
1979	2,600*		
1980	2,072		
1983	1,960		
1984	1,443	1,458	1,666

Sources: 1952- 1976 Quintanilla, 1977:112
 1960*, 1978*, 1979* Ballard, 1983
 1977, 1980, 1983 Midinra, 1987a, Informaciones Agropequarias, Vol III, No. 22:7
 1984: Loaisiga, 1985:33

Regardless of whether we accept the 1.4 or 1.6 million head herd levels, the reduction has been substantially greater than that which could be explained by abandonment of

pastures in war zones. The herd declined by at least 30 percent while the total of abandoned lands constituted about 6 percent of the lands in pastures. The slaughter, which grew from 383,000 in 1977 to 453,000 heads in 1978, continued to decimate the herd in 1979 when 434,000 head were killed. The impact of this massive slaughter was evident in the decline to 325,000 head in 1980 (Table 31).

TABLE 31
SELECTED CATTLE SECTOR INDICATORS

Indicator	1977	1978	1979	1980
Total Production				
in metric tons	71,278	85,064	80,530	65,190
Export	34,262	45,493	55,059	35,640
Domestic				
consumption	35,958	35,339	31,193	29,550
Total Slaughter	383,000	453,000	434,000	325,000
(heads)				

Source: Ballard, citing USDA Attache Report, 1980

Intensification of Cattle Production/Land Use

Development of cattle production within the Ministry of Agriculture and Agrarian Reform (MIDINRA) involves a short term effort to halt the decline of the cattle herd. In analyzing its approach to the productivity problem, the Federation of Nicaraguan Cattlemen (FAGANIC), composed primarily of larger ranchers, believes their inability to expand herds to be the result of the Agrarian reform and the threat its existence implies for their tenure security. Efforts by the government¹² and peasant (UNAG) organizations

to improve the efficiency of cattle production may result in a capacity to produce more beef and milk with a smaller amount of land than that used in 1977 or 78, when the Nicaraguan herd peaked at between 2.7 and 2.85 million head. The strategy involves increasing the production of forage for the dry season, intensification of pasture management, genetic improvement, veterinary care, and supplemental feeding.

Relocation from the Agricultural Frontier

In response to growing attacks by the "contra," government ministries and non-governmental organizations have worked together to relocate increasing numbers of peasant families away from the agriculture/forest frontier. Relocation began in 1982 and increased as the war escalated in 1984, continuing through 1985 and 1986 (MIDINRA, 1985:6; MIDINRA, 1986:6,7). Quezada and Gomez (1985) sustain that relocation has been "inevitably coercive" as a result of the war, and emphasize that these "regressive tendencies" should be neutralized by offering massive services (credit), careful persuasion and above all democratic participation in decisions determining the form of organization, (individual vs. collective) that they [peasants] desire".

12. The diverse technical and political approaches to development of the cattle sector were compiled by the cattle and agrarian reform directorates of the Ministry of Agriculture (DGG, DGRA).

Relocation has involved transferring land, building houses, health centers, schools, day care centers and providing electricity for the first time, suggesting that such resettlement could result in an improvement in the standard of living for frontier families and become permanent. However, such stability has not resulted for the Miskito Indians who returned en mass to the Coco River. Nevertheless, settlements composed of mestizo peasants remain stable. The massive movement of mestizo peasants from war zones (regions 1, 5, and 6 and Special zone I, II, and III) has reduced peasant occupation of the forest fringes and moved peasants onto better lands, in areas of lesser rainfall, and on lands which had been under cultivation previous to resettlement. Reduced peasant occupation of the agricultural frontier is strongly reflected in the reduction of grain production in the Atlantic from 1980 to 1984. The production of rice, beans and corn fell 62 percent in special regions I and II and 41 percent in Rio San Juan (Ortega, 1986:8). By 1986, 415 thousand manzanas of frontier lands had been abandoned and 13,000 families, more than 10 percent of the peasant households, had been relocated. A little more than half of these joined cooperatives, and of these, more in CAS than CCS (Quezada and Gomez, 1985:15). New settlements were located closer to the existing transportation and commercial

infrastructure, facilitating economic development, and taking better advantage of existing investments. Table 32 shows the number and geographic distribution of resettled peasant families. Most of the relocation has occurred in the Interior and Atlantic regions which had contributed most to expansion of the agricultural frontier.

TABLE 32
RELOCATION AWAY FROM AGRICULTURE/FOREST FRONTIER

REGION	# SETTLEMENTS	# FAMILIES	CAS	CCS	MZ**	MEMBERS
PACIFIC						
II	12	1,122	20	8	15,300	861
III	3	550	3		12,347	84
IV	3	471	20		9,157	321
Subtotal						
(Pacific)	18	2,143	43	8	36,804	1,366
INTERIOR						
I	42	2,800	37		53,568	1,424
V	4	530	nd	nd	24,616	nd
VI	49	2,893	59	3	49,539	2,021
Subtotal						
(interior)	95	6,223	96	3	127,723	3,445
ATLANTIC						
ZE I	15	2,179***	30		22,800	928
ZE II	15	1,147	3		20,028	nd
ZE III	15	1,330	42	3	55,694	1,118
Subtotal						
(Atlantic)	45	4,656	75	3	98,522	2,046
Total						
(National)	158	13,022	214	14	263,049	6,857

*Production cooperatives (CAS) and Defense cooperatives (CAD) have been combined because of their common characteristic of collective production.

** Land area transferred to cooperatives formed in resettlements are based on June 1987 data for Region V and September 1986 data for the remaining regions.

*** Miskito Indians which had been resettled in Tasba Pri, began to return to their communities in 1985. By July of 1987 only 200 families remained in the Tasba Pri settlement.

Source: Quezada and Gomez, 1985:11; data from: MIDINRA, Balance y Perspectivas 1985

Colonization

In 1985, IRENA estimated that, in the period from 1984 to 2000, 60 percent of colonization would be directed or organized and would replace spontaneous colonization in importance. According to IRENA, MIDINRA plans include colonization of 600,000 hectares in three areas: the Carlos Fonseca project, Rio Blanco-Siuna, and Nueva Guinea. However, unlike spontaneous colonization which has occurred entirely on forested lands, 80 percent of this colonization would occur on already deforested lands. About 20 % or 120,000 hectares would involve forest clearing (IRENA, 1985b:4).

Limited spontaneous colonization has also occurred. Road construction projects connecting Matagalpa with Puerto Cabezas, Rio Blanco with Siuna and Nueva Guinea with San Miguelito facilitated spontaneous migration into previously unsettled areas. Rather than a policy of expansion, however, this illustrates the tension between development programs and the policy of "retaining the population in their place of origin" (Ortega, 1986:7). In Rio Blanco in 1984 it was estimated that 15.2 percent of the population had migrated to the area in the previous 5 years (ibid, 1986).

Forestry and Permanent Crops

Implementing forestry projects has been slowed or halted by contra attacks which involved the kidnapping of park and reforestation personnel and destruction of equipment. Damages to forestry enterprises, forest fires of merchantable timber and reforested lands totaled U.S.\$ 118.7 million by 1986 (Nicaragua: The economic costs of aggression of the government of the United States of North America, 1986:3). The heavy losses and high risks in frontier areas forced a delay of several projects and an intensification of logging in the more accessible forests.

Contra attacks also targeted cocoa and other permanent crops, imposing substantial losses of human and economic resources. As a result, a number of these projects limited expansion and delayed construction of processing facilities.

Recolonization

Recolonization has become part of the agrarian reform program for practical and political reasons. In late 1986, as the other sources of land for reform were reduced, and political obstacles remained in the way of further redistribution in Region V and elsewhere, the Sandinista government turned to the abandoned frontier lands as a primary source¹³ of land for peasants. Recovery of

abandoned lands also signified regaining control of national territory within an overall strategy of defense of the revolution. For those who believed it important to redistribute land to peasants it was clear that even if conditions had permitted redistribution of the the remaining latifundio, their 796,000 manzanas (10 percent of lands in cultivation) would not be sufficient.

Although the 425 thousand manzanas of lands in the relocation effort are considered by Midinra as "apt for cattle" production (Midinra, 1987a:11), resettlement implied something other than a return to the status quo. Of the six types of territorial recovery outlined, four involved permanent recovery with peasants who had not been owners of the abandoned lands. In three of these, families committed to the revolutionary process would organize and develop the new settlements. A fifth type involved recovery by landowners and the last involved temporary recovery to harvest coffee.

Relocation began in Yali, Jinotega of Region VI during the last trimester of 1986. Since then, 22 territories have been resettled in that region and resettlement has also begun in Regions I and V. Planned for recolonization in

13. The second source of land would be existing production cooperatives, permitting new families to join. The third source is the small quantity of land within the state farm sector which could still be "sacrificed".

1987 were 28 percent of the abandoned lands. Table 33 presents the areas that were planned for recolonization at the start of 1987. It is too early to predict whether resettlement will involve changes in the unequal and strictly individual land tenure which preceded the abandonment of frontier zones. However, a number of factors would indicate such changes in at least an important portion of the resettled territories. In the early experiences, a compact style of housing was built instead of the disperse housing which had been typical of the rural areas. As a result of peasant participation in the planning process, these plots did not follow a strictly urban design and included sufficient land to enable each family to have kitchen gardens, fruit trees and animals. A document orienting local authorities on the resettlement process indicated that agriculture in the new communities would be collective only if the new settlers wanted it to be. "Experience has demonstrated that any imposition, regardless of how well intended it might be, is highly prejudicial from any perspective, for the future development of the population center, or settlement" (Midinra, 1987b:7).

TABLE 33
RECOLONIZATION OF ABANDONED FRONTIER LANDS
(TERRITORY RECOVERY PROGRAM)
1987

REGION	# manzanas recolonized

Region	
PACIFIC	
II	13,000
III	-
IV	7,000
Subtotal (Pacific)	20,000

INTERIOR	
I	5,000
V	66,700
VI	5,250
Subtotal (interior)	76,950

ATLANTIC	
ZE I	-
ZE II	-
ZE III	-
Subtotal (Atlantic)	-

TOTAL	96,950 117,896*

* This is the amount projected for the year. At the time this table was assembled, it could not be determined which region's figures were under represented.

Source: DGRA, Midinra, 1987

In 1987 it was estimated that there were between 140,000 and 160,000 peasant families in Nicaragua and that of these, 60,000 were poor peasants (DGRA A. Fonseca pers.

com. 7/1987). By July of that year it was estimated that more than 60 percent of the country's peasant families had received lands under the Sandinista reform (pers. com. M. Ortega, 7/1987). In sum the agrarian reform and continuing conflict appear to be working in concert, at least in the short run, to significantly relieve pressure on the tropical humid forest.

The long term perspective is less clear. Some people who migrated away from the frontier without government assistance do not yet have lands. When the war ends combatants (on both sides) will return to a more normal life and many will need land. The challenge to the Sandinista government will be to meet these new demands without sacrificing the remainder of Nicaragua's tropical humid forests.

Nueva Guinea:

Sandinista Reform of Somoza Colonization

Despite the local impact of the contra war¹⁴, and the self-imposed limitations on expropriation, the Sandinista

14. For a more thorough description of damages and other Nicaraguan losses resulting from U.S. policy and intervention see: Nicaragua: The economic costs of aggression of the government of the United States of North America, 1986:3).

agrarian reform has made some important advances in Nueva Guinea. As elsewhere in Nicaragua, the lands of local Somoza allies were confiscated following Somoza's ouster, putting an end to expansion of many of the large ranches. The Sandinistas organized state farms and expanded the permanent labor force within them, but this did not solve the generalized process of social differentiation they inherited, or the landless condition of many households who were not employed. Increased employment levels on the state farms were unsustainable because they were not accompanied by changes in land use or sufficient increments in production. Many peasants were still without land and continued to face a subordinated relationship to well to do peasants and remaining larger landholders. Local expropriations of the most notorious land grabbers and a national moratorium on bank foreclosures diminished pressure on small holders. However, many of the peasants who still retained the 50 manzanas they had received via PRICA were still threatened by the economic instability of frontier grain production and the pauperization process that had already weakened or displaced many families. Out of these conditions emerged an unusual phenomenon: voluntary collectivization of the lands held by beneficiaries of the

Somoza reform. No, peasants were not expropriated but voluntarily collectivized their parcels. Beyond the provision of land for the dispossessed, the new cooperatives' investments in permanent crops provided a partial solution to pauperization for both landless and land-owning peasants. As a result of the initial experiences, landed peasants became an important source of lands for the landless and for the consolidation of production cooperatives in the zone. Relying on this unusual source of land implied a radical alternative to insecure frontier farming. The National Development Bank also contributed to making peasant stability and land-use change possible by financing capital investments in permanent crops, transportation, grain drying and storage facilities.

The author's field research in this zone revealed that the conditions of socio-economic differentiation inherited by the new government not only favored collectivization of landed peasants but could also undermine this unusual process when government policies of resource distribution among individual producers were not carefully designed to avoid stimulating social differentiation. Voluntary collectivization of the parcels of middle peasants has not been attempted as a main road to collectivization in the country. However, the experience of Nueva Guinea

illustrates the delicate and difficult process of encouraging this collective form of social organization and the importance of social differentiation in producing economic conditions which can either favor or block participation.

Voluntary Collectivization

Part of the Sandinista transformation of the Somoza reform was a policy of collectivization in which parcel holders consolidated their lands to form production cooperatives. In effect, each member sold his parcel and its improvements to the cooperative of which he was then automatically a member. Down payments ranged from 5 - 20 percent of the appraised value with the remainder to be paid at some future date. Given the small down payments, the uncertainty of final payment, the lack of interest and the high rate of inflation these land transfers can in practical terms be characterized as gifts.

This unusual policy grew out of the fact that the large farms in the municipality could not provide sufficient land for all the landless peasants in the zones. The reason why large farms provided an insufficient amount of land had to do with the multi-class political alliances of the FSLN and the intensity of the of the counter-revolutionary war in region V¹⁵. While legally vulnerable to expropriation



because of low stocking rates on their larger ranches, the cattle bourgeoisie of Boaco, and Chontales were protected by their earlier anti-Somoza alliance with the Sandinistas. As a result 60 percent of the nation's latifundio survives in the Region V. Nevertheless, this did not prevent the development of the revolutions social alternative. By 1986, 260 coops had been organized in the region; of those, 95 were production cooperatives (Midinra, DGRA, Settlements pers. com. 1987). In Nueva Guinea there were 12 CAS with 260 members, 23 CCS with 558 members and 2 "dead furrow" cooperatives.

Cooperative development strategy internalized this obstacle by requiring solutions for landless peasants within the area of peasant agriculture defined as a cooperative development zone. In Nueva Guinea, as in other prioritized peasant zones, only a portion of the initial study area was made official as the Ahmed Campos Corea cooperative development zone (Midinra 1982b:6); (Midinra, DGRA, 1984a:6-8). So while the larger ranches would have been the logical source of lands for landless peasants, most were excluded from the area designated for reform actions. As a result, substantial further transfers appeared unlikely in the short or mid term.

15. Region V is among the four regions where capital and production damages have been greatest (Nicaragua, 1986:3).

The existence of a significant strata of rich and middle peasants further complicated the problem. Although some of this group had formed part of the political alliance described, many were part of a conservative peasantry which the government chose not to alienate. These producers were virtually untouchable in terms of expropriation according to the criteria established, too successful to involve in the production cooperatives, too numerous to alienate and too small to make negotiated transfers feasible. The better off among them needed little from the government, except to be left alone to enjoy their immunity to expropriation. The rest demanded government services, but would not accept the imposition of conditions which cramped their individual style of production. Beyond the problems which these political concerns presented, remained the problem of the unstable frontier agriculture of the majority of middle and poor peasants.

Even if sufficient lands had been available, the trends of pauperization of the landed frontier peasants could not have been resolved without changing production relations and changing the production structure. Differentiation of middle and landed poor peasants could be expected to continue to produce a small portion of rich peasants and a majority of frontier migrants unless the one-way transfers of resources which resulted from growing inequalities were

prevented. The one way transfers, would continue to be the result of social relations between unequal households unless, of course, the government could become an ally in confronting the common problems of this diverse peasantry's disadvantaged relationship to the larger producers and in overcoming the smaller differences between them. Common among peasants was a disadvantaged relationship to export markets and limited access to capital. In more concrete terms, the disadvantage meant low prices for grains or beef and, as a result, insecurity of land tenure and little hope for an alternative to periodic migration. During the period 1983-1985, the production cooperative was held out as a solution. With government support in the form of cheap credit, cooperatives would invest and accumulate through the establishment of permanent crops. As a result, access to land for the landless was directly tied to transformation of the social and physical production structures and would depend upon the unequivocally voluntary collectivization of landed peasants.

In spite of the fact that individual parcels averaging 50 manzanas were either insufficient for basic grains or instable in cattle production, collectivization was considered a feasible way to extend land to landless peasants and arrest the differentiation process. The fact that this would result in a net decrease in land per family

of collectivizing landowners was to be more than compensated by changing the production orientation of the new cooperative farms. Sustainable land use and increased household income would be achieved by investing in the establishment of permanent plantations of tree crops. Cocoa and natural rubber were two tree crops planned for the Nueva Guinea area. These crops would absorb more labor and produce more income per unit area of land than grain or beef production.

In addition to the problem of land availability which forced heavy reliance on the permanent crop solution, part of the specific land requirements of permanent crops coincided with a number of the parcels still retained by beneficiaries of Somoza colonization. Cocoa was the first permanent crop to be planted in the production cooperatives of the zone. Because of restrictive soil and rainfall requirements, suitable lands were limited to a handful of sites within the Atlantic region, one of which coincided with the parcels of Somoza reform recipients in the "colonies," or "production centers" as they were later called, in the municipality of Nueva Guinea.

Because of a favorable export market and ecological conditions, large scale expansion of natural rubber was anticipated. Lands ecologically suited to rubber plantations also fell within the settled areas of the ex-

Somoza colonization project, on unsettled national lands, and on the cattle lands adjacent to the road corridors from La Gateada to Nueva Guinea and El Rama. Massive expansion of rubber plantations was planned to follow a protracted period of field tests of rubber clones.

The government's desire to develop the production cooperative model to establish permanent crops with up-to-date production technology required building solid cooperative organizations. Time, perseverance and support would all be required to implement permanent crops and adopt new technologies within the new organizations. Developing technical skills within a new division of labor and working out the important kinks in the competing individual vs collective interests of the members were just two of the many tasks required for success. For both cocoa, whose implementation was to begin immediately, and rubber, which would come later, cooperatives would have to be developed and consolidated by beginning right away unless individualized production was to be continued in permanent crops.

Whether permanent crops would be cooperative or individual would depend more upon the success of existing cooperatives than on the government's will. Specifically, it would depend upon the ability of the government to create and sustain economic incentives for collectivization and

establish successful models of this new organizational form of production. It would also require limiting the growth or further consolidation of the the capitalist and individual peasant models. Considering the fact that experience with such an endeavor was essentially nil, implementation of a task would not be easy. However, cooperative development in Nueva Guinea revealed support for theoretical constructs and presented important challenges to policy makers to turn theory into praxis.

Of the 15 cooperatives studied, voluntary collectivization took place in 10, contributing 51 percent of the land in the 15 cooperatives (Table 34). Of the 359 members, 42 or 12 percent, contributed parcels averaging 47 mz each to cooperatives which had an average land area per member of only 11 manzanas, a considerable reduction in the land area for households which contributed. Incorporation of 317 landless households, made possible by the contributions of land by both the state and peasant landowners, provided land for 11.5 percent of the landless families in the study area.

TABLE 34
NUEVA GUINEA: SOURCE OF LAND IN CAS
1984

	Mz.	%
Land contributed by state:	1,868	49
Contributed by individual peasants:	1,982	51
Total in 15 CAS	3,850	100

The impact of collectivization on the landless population was most notable in the area where the "Cacao Project" had been implemented (Subzone I) and within the Cooperative Carlos Roberto Huembes where voluntary collectivization had begun. Thirty-two percent of the landless families in the area of "the cacao project" attained access to land by joining production cooperatives specializing in cocoa (Table 35).

TABLE 35
NUEVA GUINEA: INCORPORATION OF LANDLESS HOUSEHOLDS TO CAS

Subzone	1979	%	1984				
			in CAS	remaining	%		
							reduction
I	408	11	129	41	279	11	32
II	1,718	66	112	35	1,606	66	7
III	625	23	76	24	549	23	12
Total	2,434	100	317	100	2,434	100	11.5

Source: DGRA, 1984a:89

Additional contributions of land from the state farm sector, 26,725 mz., to cooperatives and individual producers in 1984 increased the state's share of lands in production cooperatives and eliminated the local presence of state farms. Redistribution of lands acquired by the agrarian reform had resulted in an average area of land per beneficiary (52.3 mz/family) that was slightly larger than in Somoza's PRICA. Nevertheless it was still anticipated that in the mid and long term, voluntary collectivization would be required to resolve the landless question for most of the remaining households (DGRA, 1984a:89). The smaller average area of land held by cooperative members in Nueva Guinea, was sustained in part because of the investments in permanent crops. Farms this small would not otherwise have sustained the recipient families.

A survey of the production cooperative members who had collectivized their parcels revealed that the pauperization of middle peasant farms had combined with the attractive aspects of the production cooperatives to encourage collectivization by land-owning peasants. Many peasants in Nueva Guinea had become indebted to the National Development Bank or to private lenders during the Somoza years. Some had already lost their parcels and others were on the verge of losing their lands when the new government came to power. The problems of these producers presented themselves in a

familiar dilemma. Peasants explained that because their entire parcel was cleared of forest they were forced to look for new lands to continue producing beans and corn. Rains had "washed" the soils. Corn and beans, they explained, could not be planted on pasture lands or short term fallows with the results obtained from old growth forest. Pastures, on the other hand, were of little use without cattle. The National Development Bank did not extend credit for the purchase of cattle to peasants who either had not already developed ranching as a significant activity or whose pastures were not of a minimal quality (BND interviews of bank managers and technicians, 1984). Money made from renting pastures was insufficient for a family's survival. Subsistence and commercial income from grain production remained the only source of income within their reach. Thus forested land, still containing the nutrients capable of producing acceptable crops of grains, would have to be sought elsewhere.

The Sandinista reform was accompanied by generous credit distribution and cancelation of the peasant debt accumulated during Somoza years. Nevertheless, some peasants indicated their lack of access to credit formed part of their decision to collectivize. These are conditions that some believed no longer continued in Nicaragua. Insufficient household labor and the policy of

reimbursement for the value of capital and improvements to land collectivized were other factors.

The households who contributed their parcels to form or expand production cooperatives were similar to many other households in the municipality of Nueva Guinea. The 42 families who collectivized their land were a tiny fraction (2 percent) of the peasants who still retained all or part of the 50 manzanas they had received through PRICA. However, these households were part of the majority of middle peasants who eventually experienced economic disadvantage in the market and in access to credit. The problems of these 42 families were not unlike many of the other individual households who stood to lose their lands if the process of pauperization were not arrested. In the study area, 2,038 families, 59 percent of all households, held lands between 40 and 70 manzanas, which averaged 44 manzanas per household. Because 50 manzanas had been given to each family by the Somoza reform, this average is indicative of subdivision and sale of lands.

The phenomenon of voluntary collectivization was more significant for the development of the production cooperative alternative than the small number of families would indicate. Table 36 presents the impact of voluntary collectivization by 42 land-owning families. They provided more than half of all lands in production cooperatives in

the Municipality of Nueva Guinea through the end of 1984 and 69 percent of the lands in the cooperatives they joined. As a result, their cooperatives were able to incorporate significant numbers of landless households and were considered among the most stable and financially secure in the area. The fact that this experience emerged in the heart of Somoza's colonization project area, where the dictatorship had enjoyed considerable support, makes it a significant one in terms of the political viability of cooperative forms of production.

TABLE 36
NUEVA GUINEA: PARTICIPATION OF LAND-OWNING
FAMILIES IN PRODUCTION COOPERATIVES

	# CAS	# members	% mem. contributors	% area contributed
ZDC	15	359	12	51
CAS with land contributions	10	258	16	69

Source: DGRA:1984:96

The economic conditions of these households contrasted with the greater resources of several production cooperatives. The CAS enjoyed ample access to credit, demonstrated advances in establishing permanent crops, and possessed sufficient labor to meet peak harvest labor demands better than either state or capitalist farms. Collectivization was described as a positive solution to the economic problems described and an alternative to leaving

agriculture.

Land use - Permanent Crops

Among the attractive aspects of the production cooperatives were successes with permanent crops and technological improvements in the management of traditional crops. The cocoa cooperatives were successful in integrating family members into the permanent labor force of the cooperatives as a result of cocoa's demand for labor. By 1986¹⁶, 350 manzanas of cocoa were established within the cocoa project coops. The "Carlos Roberto Huembes" cooperative achieved substantially increased yields of rice and was more successful than either state or private coffee growers in mobilizing labor and completing the harvest.

Production cooperatives held only 13 percent of the cattle in the zone on 11 percent of the pastures, or a stocking rate of .64 head per manzana. Their stocking rate was above that of middle peasants (.53 head per manzana) and Credit and Service cooperatives (.33 head per manzana). This high stocking rate was in part the result of improved pasture management, itself accomplished with the expenditure of additional labor for pasture cutting rather than the more

16. Expansion has been discontinued due to the contra's targeting of these coops in particular, and the resulting loss of lives and material damages to infrastructure and crops.

common annual burning. This change promised to increase nitrogen availability in the soil and the productivity of pastures.

TABLE 37
NUEVA GUINEA: LAND USE IN
PRODUCTION COOPERATIVES VS INDIVIDUAL HOUSEHOLDS
(in percent)

	Annual Crops*	Permanent Crops	Pastures	Fallow	Forest	Total
CAS	7	18	43	26	6	100
Individual households	31	2	43	19	5	100

Source: DGRA 1984:98

CAS - Cooperative census April/1984

Individual households - Census of households by
colony and comarca, via knowledgeable residents and
CDS March/April/1984

* Annual crops were composed of beans, corn and rice
6% by CAS and 29% by individual households. The
remainder was planted in root and tuber crops
(quequisque, ginger, yuca).

TABLE 38
NUEVA GUINEA: COMPARISON OF AREAS PLANTED IN ANNUAL CROPS
BY CAS MEMBERS AND "LANDLESS"

Subzones	Area planted per household "landless" (1)	CAS members (2)	% (2)/(1) (3)	% collective (4)	% 4/2 (5)
I	3.7	1.8	49	.6	33
II	3.5	2.2	63	.7	32
III	4.2	5.0	119	1.1	22
ZDC	3.9	2.7	69	.7	26

Source: DGRA, 1984:99

Cycle II and Apante: 83/84 Season beans, corn,
quequisque, ginger, yuca (from the season of
greatest area)

In the cocoa project, an area of .9 manzanas of
basic grains per family was projected to continue
through the fourth year of the projects development,
or 1988 (Midinra and Tecnoplan/84).

Policy Obstacles to Cooperative Development

Along with the significant financial and institutional support which was afforded the production cooperatives the implementation of several policies did not support cooperative development sufficiently. Rather than encouraging individual peasants to join production cooperatives they worked together to promote continuing socio-economic differentiation. Three causes of continued economic differentiation emerged. They included: the unequal distribution of credit, the continuation of a private land market, and the continuation of social relations which transferred value to private producers from production cooperatives. Together they threatened to arrest the successful experience with voluntary collectivization and weaken the potential for future development of permanent crops in production cooperatives.

Credit distribution to individual households undermined the collective model of social organization and discouraged land-owning peasants from choosing to join production cooperatives. During the course of interviews and case studies it became evident that peasants who had taken the initial steps toward collectivizing their lands had later been offered individual loans for the purchase of steers. Loan offers thus led to a reversal of these peasants'

earlier intention to join production cooperatives. This contradictory lending policy is one local expression of what later became known as "an insufficient coordination between the Ministry of Agriculture and the National Development Bank" (Midinra, 1984c:14). Although cooperatives continued to receive important support from the National Development Bank the individual model was getting excessive support.

Credit distribution in CCS did less to encourage gradual experience and acceptance of collective action than to further differentiate their heterogeneous members. These problems became evident in the author's 1984 survey of CCS members. Most of the CCS members households (70 percent) still held parcels they had received during the Somoza reform. Eight percent of their members had been on the winning end of social differentiation, acquiring an additional parcel and thus displacing one family in the process. Including these rich peasant households was less of a problem, than the fact that credit distribution favored them excessively. Each rich peasant household receiving credit from the BND, received more than three and a half times as much as middle peasant households on average. Rich peasants, in part as a result of credit distribution, had an average of 38 head compared with an average 12 head per middle peasant household. The problem of unequal distribution of credit was compounded by the fact that this

credit was highly subsidized.

TABLE 39
NUEVA GUINEA: LAND TENURE IN CREDIT AND SERVICE COOPERATIVES
(Sample of 14 CCS N=263)

Tenure	Members		land area		$\bar{X}$
	#	%			
landless	7	2	(33)	--	(4.7)
>0 to 10	6	1	52	--	8.7
>10 to 40	84	19	2,472	11	29.4
>40 to 70	310	70	15,631	68	50.4
>70 to 200	37	8	4,025	18	109
>200	2	--	664	3	332
TOTAL	446	100	22,877	100	51.3

Source: DGRA, 1984:102

TABLE 40
NUEVA GUINEA: DISTRIBUTION OF CATTLE IN CCS 1983/4
(In Percents)
(N=227)

Tenure	Members		% owning cattle	# head per member	mz per member
	%	%			
landless	3	--	--	--	4.7
>0 to 10	2	1	40	10.5	8.4
>10 to 40	19	10	63	9.5	28
>40 to 70	64	53	79	12.1	50
>70 to 200	11	32	88	38	112
>200	.4	5	100	121	214
	100	100	74	15.7	51.2

Source: DGRA, 1984:76

TABLE 41
 NUEVA GUINEA: CREDIT FOR PURCHASE OF CATTLE IN CCS 1983/4
 (In Percents)
 (N=227)

Tenure	% Members with credit	Dist. credit for cattle purchase/ tenure strata	amount* credit/ member
landless	29	2	29
>0 to 10	40	.5	8
>10 to 40	55	17	21
>40 to 70	48	47	20
>70 to 200	52	32	72
>200	100	.5	14
		99	X 25.8

Source: DGRA, 1984:76

* in thousands of 1983 Cordobas.
 Data based on a random sample of 7 CCS.

At the end of 1983 the National Development bank cleared 31 million Cordobas of debts from basic grain loans. Eighty-one percent of this total (C25 million) was conceded to peasants from Nueva Guinea (DGRA, 1984a:112), indicating the importance of this area as a producer of grains, the economic hardships experienced by frontier grain producers and the priority this zone received. Interviews revealed that although the overall bias of the policy was to benefit poor and middle peasant grain producers, households who had borrowed more, were benefitted to a greater degree than poorer households which had either received no credit or borrowed less.

Land Market

Theoretically, land market policy favored cooperatives and poor peasants. The policy required the local offices of the ministry of agriculture to approve or reject land sales. This policy gave the ministry an opportunity to intervene in the process of social differentiation at one of the most explicit points in the process. However, a number of examples indicated that approved sales did not reflect the spirit of the cooperative development strategy. The Nueva Guinea tenancy offices of Midinra implemented the procedure of recording requests for approval of a sale or purchase of land and considered each on a case-by-case basis. However, it did not direct the land market to favor the production cooperative as an appropriate solution to the problems of poor landholders. This resulted in an active land market in the private sector. Records showed that some households (27 percent) bought land to expand pastures while most (60 percent) attempted to continue producing grains. More than a quarter of the landowners who sold their parcels did so for reasons that were similar to families who had collectivized their parcels. Pauperization continued and forced them to sell. As a result, fewer landed peasants than expected joined production cooperatives and the early trend toward collectivization of individual parcels was slowed.

TABLE 42
NUEVA GUINEA: PRIVATE LAND MARKET

REASONS FOR SALE	X
Land in pasture, insufficient forest/fallow for grain production, indebted, or not able to acquire cattle	26
Inheritance, sickness or age	33
Sale to relative or landless friend	13
no reason	7
TOTAL	99
REASONS FOR PURCHASE	
Expand pastures	27
Pastures or grains	13
Landless, or owning less than 20 mz, to plant grains	60
TOTAL	100

Data from land registry Jan 15 - Feb 25, 1984, small sample N=15

Another problem experienced by production cooperatives (CAS) involved the condition of farms transferred to them by

the state after a period under state management. These farms were known to have been stripped of even minimal infrastructure before cooperatives took possession. The fact that the state did not require payment for these lands hid the enormous financial and labor investments a cooperative had to make before such a parcel could become productive. This practice counteracted the generous allotments of credit to production cooperatives. According to the representatives of some CAS, the costs of such investments were greater than if improved land had been acquired on the relatively open, private land market. This decapitalization of lands prior to their transfer reduced the distributable surplus. As described further on, most parcels which were offered for sale on the land market, even those contiguous to existing CAS lands were purchased by the private sector (M. Molina interview on land market, 1984).

In the land market, the production cooperatives were disadvantaged in relation to individual producers. Production cooperative were required to seek permission to purchase land from the local office of the Ministry of Agriculture and Agrarian Reform (Midinra). This unusual requirement followed the controversial practice of forced sales of land through the National Development Bank for the cocoa project (Midinra and Tecnoplan, 1984). At the time of this study, production cooperative members explained that

when adjacent lands were put on the market cooperative were unable to purchase them. The cooperative's attempts to purchase lands were hindered by the time lag which getting permission entailed. Case-by-case decision making, made it impossible for cooperatives to compete with other interested buyers. The eventual decision of Midinra to permit the purchase, when it did come, was far less relevant than the bureaucratic impediment. Finally, members of production cooperatives described how neighboring individual peasants consolidated their farms by purchasing additional lands from poor peasants. They described this process as a conspiracy to prevent growth of the production cooperative.

The records on land sales approved by the local office of agrarian reform revealed a considerable land market which competed with transfers initiated by the agrarian reform in terms of amounts of lands transferred per month in the municipality. Based on recorded sales, an estimated 4,430 mz of land was changing hands on an annual basis. If those who sold due to a lack of land for grain production, indebtedness, and inability to acquire cattle, it would mean an additional 1,151 mz per annum, to cooperatives. Between 27% and 40% of these lands were openly targeted for pasture expansion.

These private Land transactions were complemented by subdivision of the lands of larger landholders who sought to

avoid possible future confiscation. Private land market sales thus threatened to reduce the potential source of lands which could eventually be transferred by the reform. Cosmetic subdivision protected large landholders from state expropriation, while real subdivision by private owners competed with state-sponsored agrarian reform in redistributing land and ground rent. Further, the diverse forms of the private land market functioned to reproduce the individual rather than the collective form of social organization by permitting the overt consequences of social differentiation to continue.

While the process of social differentiation was a gradual one, other problems exacerbated its effect. Cooperative members continued to sell their labor to private producers. This was a symptom of a continuing problem of land shortage within the production cooperatives in Nueva Guinea. While progressing in the establishment of permanent crops and more intensive cattle management of small herds, the cooperatives did not possess enough land to satisfy their member households' remaining need for land to plant beans and corn. Thus, cooperative members were required to rent land from private sources in much the same way they had previously done, namely through payment of in-kind and labor rent.

The process of social differentiation accompanying the

Sandinista agrarian reform appears to have promoted voluntary collectivization. However, many peasants reported that upon confirming the National Development Bank's offer of individual credit for steers, they decided against joining production cooperatives (Interviews 1984/Jerusalem colony). This suggests that state support for production cooperatives can be undermined by competing support for capitalization of individual households. State support for an individual household through subsidized credit for beef production follows the customary model of accumulation of the minority of successful middle peasants and inadvertently undermines state and production cooperative efforts to promote the collective solution. While the probability of successful accumulation is limited to a few, the dream of accumulation has been adopted by many and is one which frontier peasants are reluctant to replace with the collective model. The collective solution involving state subsidized credit and the possibility of capitalizing through permanent crops is an attractive but recent alternative. The individual capitalization model, provided by a minority of successful cattle producers continues to compete for the hearts and minds of frontier peasants.

Continuation of a relatively free land market and the limited and localized promotion of the production cooperative resulted in continued land sales by (indebted

land-owning) poor peasants who were not not all offered the alternative of collective solutions. Urban migration, part of the land market phenomenon, became a major problem throughout the years of intense contra attacks. While the poor sold out and migrated, rich peasants become strengthened through land purchases and significant credit subsidies. Production cooperatives also received credit subsidies but did not compete effectively for land.

Overt redistribution of resources appears to be occurring with mixed results. An important portion of poor peasants are incorporated into production cooperatives where transformation of social relations and the production structure appear to build a relatively stable economic alternative to individual frontier agriculture and its consequent migrations. Less obvious is the concurrent process of ascent of middle to rich and consolidation of pre-existing individual rich and small bourgeois cattle producers. Rather than creating positive conditions for future expansion of the production cooperative, this process blocks the potential for future collectivization. That this was occurring during the period when collectivization was given priority is notable.

It is understandable that economic and human resource limitations, also the products of the war, restrict expansion of the cooperative model. Yet, given the negative

effects of social differentiation, namely migration and consolidation of rich peasants, it may be desirable to take advantage of the opportunities which social differentiation presents for expanding the memberships and lands of production cooperatives.

Analysis and Interpretation of the Sandinista Agrarian Reform

In General the actions of the Sandinista government accelerated by the effects of war, reversed peasant migration and resettled peasants on better lands already in agriculture. More importantly, agrarian reform contributed to preventing future spontaneous settlement of remaining forested lands. In particular cooperative development began to slow the differentiation process and to provide a more stable form of social organization for remaining frontier agriculture.

In part, the current reduction of peasant settlement has been the result of reduced pressure on land. The area planted in cotton was reduced to half of what was planted prior to the revolution and a similar phenomenon occurred in the cattle sector (Baumeister, 1985b:18). By 1984, the Nicaraguan cattle herd had declined to about half of its 1978 peak level of 2.85 million head. Together these

reductions implied the existence of increasing amounts of fallow land. Baumeister concluded that these changes would increase land available to peasants and semi-proletarians (ibid.,18). Although it is clear that more lands were not allocated to prior uses, and may have gone unused by their owners, it could not be simply presumed that owners would make them available to peasants. Our (MIDINRA, CIERA, DGRA, 1985) survey in Masaya showed that many land owners who had traditionally rented land to peasants had ceased to do so fearing they would eventually lose their lands to renters. Furthermore, the reductions in land devoted to cotton and cattle in the 1980s could not be understood as permanent. Efforts by MIDINRA to arrest the decline in the cattle herd, were aimed at recovery (MIDINRA, 1985d:9;MIDINRA 1987a). Even though the technical measures employed, i.e. development of dry season forage, pasture management, and supplemental feedings would be expected to increase the stocking rates, some of the fallow lands would likely be returned to pasture and not all would be transferred to peasants.

Nevertheless, explicit reduction in peasant pressure on land has resulted from actual redistribution of land through the agrarian reform. The Sandinista government clearly has not followed the Somoza practice of transferring forested national lands to peasants and has redistributed lands which

were already under cultivation. Targeting already cultivated but underutilized lands of large capitalist holders¹⁷ for redistribution weakened the economic power of the bourgeoisie and in spite of problems strengthened the political support of the revolutionary process by enabling the government to respond to peasants' demand for land.

Of primary concern in our evaluation of peasant land transfers in general is the degree to which they offer an alternative to frontier migration and the permanence of such transfers. This depends on two factors: First, the sufficiency of lands transferred and, secondly, the stability of tenure.

Within eight years, over 60,000, or about half of all peasant families received land through the Sandinista agrarian reform program. By providing land to so many of the landless and land poor, the Sandinista agrarian reform has responded to the primary economic problem of most peasant families and has removed the impetus for their migration to the agricultural frontier. Although the degree to which landlessness persists is uncertain, both the

17. The Sandinista redistribution process was founded upon acquisition of land from less than 600 landowners while benefitting 60,000 or, 100 times as many. The initial lands acquired from Somoza and allies, which constituted 20 percent of the lands in agriculture not only provided land for peasants but facilitated subsequent purchases of land from other large holders by providing land for trades.

experience of the past and the predominant position among the leadership of the FSLN indicate that redistribution of land will continue.

Redistributing land to peasant families reduced their need to pay rent, whether in kind, labor or cash for access to land. Increasing peasants' access to land, in turn, increased their food and general economic security. As the 1980s progressed and inflation worsened, beneficiaries of the Sandinista agrarian reform enjoyed a relative insulation from the effects of inflation which undermined the consumption of salaried workers.

Although there were a few flagrant and widely criticized exceptions, the trend in land redistribution was to give peasants better lands. "Better" meant a shift from hill sides to deep volcanic soils in the Pacific region and from the distant roadless frontier to areas closer to the economic infrastructure (roads, markets) in the interior and Atlantic regions. Along with better lands, many peasants gained access to agro-export production enabling many previously landless or land poor families to consolidate their family farms or join others to form cooperatives. For example, "small cotton producers (cooperatives and individual producers) in 1980-1 had only 8,000 manzanas, but by 1983-4 they had 40,000 manzanas under cultivation largely as a result of the government's agrarian reform programme"

(Baumeister, 1985b:24). Because of the quantity of lands transferred and additional direct interventions, "the most backward forms of rural production and the various forms of rent in labour and kind have been eliminated" (Vilas and Harris, 1985:222; Baumeister, 1985b:18,26). Agrarian reform transfers have increased peasant access to lands capable of producing sustained yields without migration.

The Nicaraguan revolution has had an even more direct impact on the agricultural frontier. As a result of war, frontier zones have seen a drastic reduction of their populations. While some peasants have joined military forces, others have migrated from their frontier farms to urban and rural areas within Nicaragua and to neighboring Costa Rica and Honduras to escape the violence. Still others have participated in government-sponsored relocation projects which have moved peasants away from frontier fringes. Families who left the frontier within the government's relocation program have been given title to better lands and provided housing and social services they had not previously enjoyed. Experience has shown that at least a portion of these people will not want to return to their abandoned frontier lands and that those who do may do so under circumstances which differ considerably from the anarchic process that has prevailed in the past.

Resettlement and migration of peasants from fringe

areas are important components of frontier stabilization. Approximately 11,000 mestizo settler families were relocated from the frontier by 1986. Of all the Nicaraguan peasants and landowners, those that posed the most immediate threat to continuing deforestation resided within the large blocks of remaining tropical humid forest. Virtually all have moved or been relocated to other areas. Although they were not the majority of peasants inhabiting humid tropical regions, they were the ones who were clearing forest within the largest remaining blocks of tropical humid forest. Since these large blocks of forest are the most capable of maintaining their genetic diversity and ecological integrity when they are protected, removing settlers is a most promising accomplishment.

Whether the new settlements become permanent alternatives to frontier slash and burn agriculture is a question that can not be answered definitively at this time. Nevertheless, substantial amounts of land have been transferred with a relatively high degree of tenure security. In cooperatives alone, approximately 240,000 manzanas had been transferred, averaging 35,000 manzanas per member. Although emphasis toward increasing equality among reform beneficiaries is evident, a pragmatic approach has resulted in an attempt to at least match the lands lost by abandoning the frontier (A. Fonseca, pers. com. 7/1987).

A number of other factors determine the ability of the new state to shift the class bias of its policies toward the popular majority. Weakening the capitalist position reduced the pressure on both peasant holdings and reformed lands. Defeating Somoza's national guard and establishing armed forces, police and militias who would defend the goals of the revolutionary process enabled Nicaragua to maintain its revolutionary policies and a mixed economy at the same time. Large landholders could no longer use force to expand lands or fulfill their labor needs. The magnitude of redistributive actions has contributed to a temporary decrease in pressure on the rural poor to migrate to the agricultural frontier. Land titling and credit distribution combined with a reduced presence of the agrarian bourgeoisie to reinforce tenure security among new recipients of land and other peasant landholders.

Surveying, registering and titling the lands of 83,000 households has resolved disputes over ownership and provided a basis for control or intervention into the private land market. Titling lands of frontier occupants was considered by some to be a mistake and to further legitimize and perpetuate farming of the T.H.F. lands. This may be the case - and it may be harder for the government to move title-bearing land holders away from the frontier or to discourage their post-war return. Titling frontier

holdings, nevertheless, has distinguished them from remaining national lands, making a prohibition against the future of frontier settlement theoretically enforceable. Improved stability of land tenure may reduce the source of new migrants and some of the measures may control the results of differentiation i.e., land sales.

Despite Nicaragua's reduced access to traditional international lending and its own inflationary monetary measures, redistribution of credit has definitely shifted from its prior bias. Both the new state sector, and peasants have benefited by short-term lending, and long-term investments have been made by the state. Baumeister cites the increased availability of credit to peasants and state control of external and internal commerce as ways in which the state breaks the "typical domination of small producers by commercial capital." Change in the redistribution of capital has gone beyond the changes in credit policy. Under the Sandinista reform, peasants began to have access to transportation, mechanization, and processing facilities. Also, many of the lands that were transferred were capitalized with coffee or improved pastures. A problem of decapitalization of agrarian reform lands in the period between confiscation and transfer to peasants showed up in Nueva Guinea. A solution emerged in 1985 when peasants initiated the transfer process by occupying lands before the

government initiated acquisition procedures. Decisions regarding distribution are now made in concert with land acquisition.

Redistributing capital to favor peasants has been accompanied by changes in the balance of power between capital and labor on both state and remaining capitalist farms. This change has been largely the result of the growth of trade unions. The organization of rural workers gives them new potential for negotiation with their employers, whether, private or state. This progress does not guarantee but makes possible workers' ability to resist unpopular measures against them and to push for economic stability and security of employment on the farms they work. Expulsion from large farms and unplanned frontier migration from this source may be, as a result, less likely to occur in the future.

Although all of these measures contribute either to giving peasants alternative access to land or improving security of land tenure, these measures are by themselves, however, insufficient to offer a permanent solution to social differentiation among peasant households even on reform lands. However, cooperative development has begun to make it possible for the redistributive actions to have a long-term impact on social differentiation.

In order for production cooperatives to stop

differentiation, it was clear that they would have to become available to at least the poorest and most migration-prone peasants. Cooperative development was an important part of the government's program of social change, thus, interest in developing this new sector of the peasant economy was strong. In 1985, Baumeister claimed that "consolidation of the Sandinista model will depend mainly upon the state's capacity to organize a vast co-operative movement (Baumeister, 1985b:24). While according to Marvin Ortega (1987), Somoza's development project had hinged on the growth of the cattle sector, the Sandinistas' project for change depended upon organizing and stabilizing peasant agriculture.

Despite strong support, important obstacles to cooperative development existed and the government recognized limits to short-term expansion of the cooperative sector. In 1985, Minister of Agriculture, Jaime Wheelock wrote "MIDINRA, for example, has serious limitation in [its ability] to attend to the 3,000 cooperatives formed since the triumph of the revolution." In Nueva Guinea this limitation was evident in the obstacles to collectivization policy. Nevertheless, the potential for resolution of these obstacles and substantial growth of the production cooperative sector through voluntary collectivization were also apparent. The policy obstacles which conflicted with

voluntary collectivization by land-owning peasants occurred at a time when anti-government propaganda and military pressures made more complete and systematic shifts in the distribution of credit and implementation of restrictions or sale of land politically unfeasible. However, this does not explain all of the problems or missed opportunities in particular cases. Inexperience with attempts to deal with the differentiation process and to control the land market and, more importantly, a lack of awareness of these problems were also factors limiting growth of production cooperatives. The progress of the gradual and voluntary process of cooperative development has given a stability to the cooperatives which have been formed by both landless and landed peasants, and encourages rectification of competing policies and greater peasant participation in its development. The government's flexible approach was clear in its policy changes of 1985 which increased peasant participation in decision making, and a more flexible approach to the collectivization process throughout the country.

In spite of the many obstacles to cooperative development, a substantial number of peasant families have joined. By the beginning of 1987, 90,000 families or two thirds of all peasants were in one form of cooperative or another. For 28 percent of these families, or 18 percent

overall who were organized in production cooperatives by 1987, the new form of ownership appeared capable of diminishing some of the factors which contributed most to socio-economic differentiation. Employment of wage labor was discouraged, sale of coop land prohibited, and income differences were dampened by the more equitable distribution of income among members. Distribution of economic surpluses among education, reinvestment, debt payment and redistribution funds slowed the differentiation process within cooperatives. However, experiences¹⁸ with persistent differentiation were common enough to indicate that controlling the differentiation process would be difficult and ongoing. Differences between cooperatives, in the amount, quality of resources, and value of different crops, made it clear that additional measures would have to be taken to attain the long-range objective of social equality. Despite the challenges which developing an entirely new form of social organization entailed, important advances toward changing the social structure of peasant agriculture were achieved in production cooperatives. These changes implied substantially reduced social differentiation

 18. On some cotton coops (Tisma) profits were so high many members left to invest them in individual land or small business. On others (in Region II) members had gained a role of worker/managers hiring labor to replace themselves in the least desirable tasks.

and the potential for responding to remnant problems as they emerged.

In 1981, Minister of Agriculture Jaime Wheelock described his vision of what the distribution of Nicaraguan agricultural land would look like: "20 to 25 percent of the land [would be] under state control, 40 to 50 per cent under the control of co-operatives and the rest under the ownership of individual peasant or capitalist producers" (Baumeister, 1985b:23). In eight years, the Sandinistas made considerable progress toward this vision. The state sector held 13 percent or slightly more than half of the goal. Cooperatives held 21% or about half. Given the steady progress of the first eight years it does not seem unreasonable that the government would be able to reach this goal. However, this goal does not match the traditionally held view of socialist agriculture. Indeed, the mixed economy pursued by the Sandinistas contrasts substantially with the more thoroughly collectivized agriculture in existing socialist states. The key to their unusual approach is found in the structure of the Nicaraguan economy and the particular locus of accumulation the Sandinistas inherited. State control of direct production could, as a result, play a less important role in the changing economy than agro-industries related to the traditionally important export crops (Cotton, coffee and beef) (Baumeister,

1985a:59). The degree of state ownership reflects this view. In the cattle sector, the state holds 100 percent of the meat packing industry. While the state held 13 percent of the land, it controlled "about 40 per cent of the processing industry, and has a monopoly over banking and foreign trade (Table 27; Baumeister, 1985b:15). Both the redistribution of land and the state's growing role and emphasis on agro-industry were thus readily apparent.

The lack of industrial development was earlier cited as one of the reasons why peasants were forced to migrate to the frontier. Although the urban areas have proven capable of sustaining growing numbers of peasants who have fled the agricultural frontier in their "informal sectors", industrial development will nevertheless have to absorb a portion of the increased population from future generations. Given the climate of war and severe restrictions this implied for investment, "the extensive industrialization of the economy does not figure in the agenda of the revolution in the short run, except in so far as agro-industry is concerned and the local processing of domestically produced inputs which will contribute to the inter-sectorial integration of the economy. However, important investments in the industrial sector are laying the basis for much more extensive industrial development in the future" (Vilas and Harris, 1985:223 emphasis added). Other than the

possibilities enabled by preliminary actions, it is too early to predict the degree to which industrial development will in fact absorb portions of the rural population. Nevertheless, Baumeister believes that the government's policies of, on the one hand, maintaining the participation of many traditional producers and transforming both the means of production and form of social organization "emphasize agro-industrialization as the basic axis of the country's development, a shift to intensive methods of agriculture and the abandonment of the traditional extensive form of agriculture..." (Baumeister, 1985b:30).

Many factors influence the viability of state intervention to rectify the social and environmental costs of unplanned settlement during the pre-revolutionary period and to prevent them from continuing. In sum, the revolution and its agrarian reform have acted to substantially change the balance of power between capitalists and peasants. The Sandinista agrarian reform has substantially reduced both the contributing factors and actual relations of production which had been central to spontaneous migration and settlement. Other non-reform measures have contributed to changing the process of resource distribution on the agricultural frontier. Support¹⁹ for establishment of

19. More than 10% of agricultural investment capital went to permanent crops in the 1982-7 period.

permanent crops in the Atlantic region has begun to help an important minority of frontier farmers overcome the land-use constraints and instability of annual crops.

Chapter VI

Conclusions, Interpretations and Policy Options

The social process of deforestation and the accompanying privatization of indigenous and national lands are closely tied to the development of peripheral capitalism in Central America. Nicaragua, by virtue of the ouster of the Somoza government and the new class commitments of the FSLN, has offered an opportunity to examine some of the different intentions, and policies of two governments' relative to spontaneous settlement of the agricultural frontier. While the focus of this thesis has been on peasant social differentiation, this process has been presented within the larger political and economic orientation of government policies. Although the differences in the two governments are certainly apparent, the recency of the Sandinista agrarian reform and overall process of social change in Nicaragua requires further analysis. Given the nature and velocity of deforestation in Central America and the important potential of social change to arrest the process of social differentiation and to offer more stable alternatives for the rural poor, it is important to define what has been accomplished. Comparing the two reforms, examining the evidence of current deforestation rates, and analysing the current reform process and its results are all necessary if our approach to the future is

to be other than that of curious observers. Despite numerous obstacles, the efforts of the Sandinista government continue to change the social structure. Perhaps the ultimate impact of this change may not be known for several decades.

The Somoza and Sandinista government policies of agrarian reform represent social, political and economic alternatives for development in Central America. They also represent alternative futures for the region's remaining tropical humid Forests. The purpose of this section is to briefly compare the results of the two Nicaraguan agrarian reforms which were explored in detail in chapters II, IV, and V. Comparing the quantitative and qualitative differences between the two Nicaraguan governments' approaches to development of agriculture and agrarian reform illustrate some of the policy alternative's that are available to the Central American nations and their potential influence on rural social differentiation. The sharp differences in the trends in resource distribution and social organization indicate the feasibility of changing the condition of the rural poor and with it preserving the region's tropical forests.

The basic differences between the two agrarian reforms reflect the two governments' radically opposing political and economic objectives. Resource distribution is at the heart of the class conflict and is a center piece for

comparing the two reforms' impacts on social differentiation, migration and deforestation. Nevertheless, as Chapters II and III have indicated, mere changes in resource distribution may contribute, but are not by themselves sufficient to arrest social differentiation or stop unplanned deforestation.

Comparison: Somoza and Sandinista Development and Reform

Both Nicaraguan governments pursued economic development in the interests of specific social sectors. The Somoza family's strategic commitment to large-scale capitalist development and its own economic opportunities within the peripheral economy led it to pursue export agriculture in ways that subordinated the nation's land and human resources to the First-World economies. The Sandinista government's strategic commitment to political and economic independence led it to intervene in the inherited capitalist agro-economy to change the systemic bias of economic institutions, agrarian policies and redistribution of resources from large capitalist landholders to poor peasants. Put more simply, we are looking at one government whose policies were not designed to change relations of production and another that at least hoped to. On the one hand is found minimal redistribution and great care to preserve the underlying structure. On the

other, radical redistribution is complimented by attempts to change the underlying relationships.

The differences in the two governments' approaches to land distribution are striking. As discussed earlier, Somoza protected the private property rights of the wealthiest landowners while the Sandinistas acquired and redistributed some of the lands of the wealthiest landowners among the rural poor. This latter action was a contrasting expression of their different class commitments and had obvious consequence for the nation's tropical forests. Virtually all of the lands distributed to peasants under the Somoza reform were taken from national or indigenous tropical forest lands. In vivid contrast, the Sandinista government altered this upper class bias of economic development and with it the source of land for reform. The private sector of the Nicaraguan economy continued to predominate, but was reduced to 60 percent (Fagen, 1987:64). There was a significant increase in the state's ability to accumulate capital and a corresponding decline in bourgeoisie control of the accumulation process. National lands contributed only 8 percent of the lands redistributed under the Sandinista reform.

The difference in the source of land for reform was compounded by the extreme difference in the magnitude of redistribution accomplished by two governments. During the

16-year period of agrarian reforms under Somoza, less than three thousand peasant families benefited. In the 8 years that followed Somoza's ouster, more than 60 thousand farm families received land. As a consequence, the distribution of land between peasants and the largest landowners shifted dramatically as a result of the new governments' reform policies without promoting deforestation. The large landowners' share of agricultural lands, in parcels greater than 500 manzanas, which had been untouched by Somoza, was reduced from 36% in 1978 to only 10% in 1986. This was accompanied by the emergence of a state sector and by growth in the peasants' share of land. The state farm sector, nonexistent under Somoza, grew to 20 percent in 1981 and then declined to 13 percent as it gave way to direct redistribution to peasants. While the rich peasants share of lands (30 percent) remained unchanged, the poor and middle peasants' share increased from 18 percent in 1978 to 30 percent in 1986.

Land titling was an important component of both the Somoza and Sandinista reforms. IAN's entire land titling program benefited only 16,500 families (Enriquez, 1985:109) while the Sandinista reform extended property titles to more than twice as many families on the frontier alone (Carrion Cruz, in Barricada 4/26/86; Table 28 in Chapter IV). In all, the Sandinistas issued titles to the lands of 83,322

families by the end of 1985.

Similar contrast is found in banking and credit distribution. By the end of Somoza's reform program, peasants had received only 4% of the government's credit resources. Change in the distribution of credit and in the role of the banks was substantial under the Sandinistas; however, dwindling bank resources diminished the impact of this institutional change to some degree. Nevertheless, nationalization of the National Development Bank (BND) was followed by a moratorium on bank foreclosures. This action removed what had been an important mechanism for land concentration under Somoza. In spite of growing difficulties in credit resources, the peasants' share of Bank Credit increased from 4% in 1978 to between 18 and 26 percent in each subsequent year under the new government.

These quantitative differences in the distribution of land title and credit are substantial indeed. In half as many years, the Sandinista reform redistributed land to 20 times as many peasant families. Five times as many titles were given and 5 times as much government credit went to peasants.

Quantitative differences in resource distribution were accompanied by important differences in social organization. The distributive elements of the Somoza reform were all geared to maintain the private and individual form of

property, which was so crucial to maintaining the process of social differentiation. Somoza maintained the individual and atomized peasantry by distributing lands to individual households on an exclusively individual basis. Economic support in the form of "Limited Resource cooperatives" promoted the entrepreneurial ambitions of rich peasants by facilitating access to agricultural inputs. By 1978 these cooperatives served only 9,270 families but played an important role in consolidating a rich peasant stratum within the reform colonies. As evidenced by the flow of national lands to the bourgeoisie in Nueva Guinea, Somoza's reform was locally successful in maintaining social differentiation on reformed lands.

The Sandinistas' policies of resource redistribution were designed to support change in the social relations of production; in fact, considerable progress was made. The aforementioned reduction of the large bourgeoisie was fundamental not only in weakening this class of landowners, but in providing resources for social change. In spite of the heavily funded contra attacks on cooperatives, the Sandinistas developed state and cooperative alternatives to capitalist agriculture's large farms and ranches. A considerable amount of land was collectivized in the state farm and production cooperative sectors. Together, state farms with 13 percent and production cooperatives with 11

percent represented a change in the social relations on 24 percent of the lands in agriculture. Somoza's cooperatives continued to exist and grew by over 50 percent in just three years, but began to serve a broader sector of peasants, including some production cooperatives. The Sandinistas' Credit and Service cooperatives, which for the most part, grouped individual rich and middle peasants, began to undertake some collective activities, and others were formed from redistributed lands in ways that held potential for eventual collectivization. Their emphasis on a collective solution contrasted substantially with the kind of social organization supported by the Somoza reformers.

In Nueva Guinea, where Somoza's land redistribution was concentrated, the basic resource problems of poor peasants were not resolved by his agrarian reform. Somoza took no action which could have prevented or restrained social differentiation on the new lands. Tenure security for most of the initial settlers was linked to the time it took to clear the forest. Forests of the Atlantic region thus served as a buffer to political unrest in other parts of the country and locally by delaying expulsion. However, forests did not prevent expulsion. Clearing forest at 2 hectares per year enabled peasants to reach their full clearing prescribed by IAN planners in about 11 years and to clear the "forest reserve" in 4 more, or 15 years altogether. At

least 30 percent of the recipients had lost their lands 16 years after the project began.

The Sandinista efforts in Nueva Guinea are aimed at changing relations of production through cooperative development while struggling to provide solutions to frontier grain production. By 1984, landlessness had been reduced by between 7 and 32 percent in the three subzones studied. Voluntary collectivization of land-owning peasants provided land for well over half the landless families in the cooperatives. Progress toward establishing permanent crops in the cooperatives and encouraging experiments with collective farming in CCS progressed substantially. Together with other measures, this progress supports the premise that the social change process is in fact advancing in even the more difficult war zones.

Although the ecological consequences of deforestation were not of primary importance to either government, the policies of each had very different impacts upon the country's tropical forests. Altogether, the accelerated differentiation stimulated by Somoza's support for capitalist agro-export expansion and his colonization program resulted in the deforestation of approximately 4 million manzanas between 1950 and 1978. This dramatic expansion contrasted with the stability of the agricultural frontier in the 1980s.

This comparison of the two reforms provides the basis for a more in-depth analysis of the import and potential results of the current Sandinista agrarian reform in terms of the rural poor and deforestation.

The Frontier Now

In 1985, Julio Castillo, the director of Nicaragua's Natural Resources and Environment Institute (IRENA) estimated that Nicaragua had 4 million hectares of forest, 34 percent of its continental territory, excluding the lakes. The potential for losing the country's remaining forests and wasting standing timber was clear. "Were the historical rate of deforestation to be maintained, by the year 2,000 the remaining forest resources would be diminished by 1.5 million hectares, or a loss of 30 million cubic meters of log wood of currently usable species." Had the struggle against the Somoza government not succeeded, it is doubtless that anything but the historic trend of deforestation would have continued, claiming the remaining 4 million manzanas of tropical forest in three additional decades or less.

In the period 1979 to 1988, the historical trend of spontaneous settlement of the agriculture/forest frontier has been substantially reversed. Three major changes have occurred. First, the agriculture/forest frontier has ceased

to be a viable settlement alternative. Second, the frontier population has been reduced. Third, the remaining frontier population has begun to intensify its land use.

These have important implications for deforestation¹ both during the current period and in the future. By halting the flow of new migrants, reducing the frontier population and intensifying the land use of those who remain, less forested land is being cleared by the fewer remaining occupants². By halting the steady growth of the frontier migrant population, the opportunity to stop future frontier expansion by unplanned settlement is attained.

The Future of Nicaragua's Tropical Forests:

A number of writers' comments in relation to agricultural development, refer to actions of the Sandinista government which could open or extend the agricultural

1. A study by a Swedish government forestry team working with IRENA claimed in 1985 (IRENA, 1985) that "annual deforestation has been notably reduced in recent years" primarily due to "1) resettlement and titling organized by MIDINRA) and 2) the influence of war activities which has forced many peasants to concentrate themselves in urban centers or development poles."

2. Limited forest clearing occurs on parcels of land which are already isolated from remaining large blocks of forest by other farms. On cooperatives even this practice was discouraged, indicating a growing awareness of the problem of deforestation by agricultural technicians (pers. com. 1984, Nueva Guinea).

frontier. Baumeister commented that "the construction of highways linking the Pacific with the Atlantic coasts for the first time in the country's history has also made it possible to extend the agricultural frontier into the underdeveloped areas of the Atlantic Coast" (Baumeister, 1985b:18). Similarly, IRENA reported that "spontaneous colonization is expected to continue to be an important source of deforestation, "although this effect would be "dampened by the war and by directed colonization" (1985:5). Together these comments bring attention to significant possibilities for the continuing expansion of the frontier through traditional means i.e., spontaneous colonization. However, these writers did not consider the factors which produce spontaneous migration. On the other hand, a number of actions indicate that in the future: 1) spontaneous colonization will be reduced, 2) expansion will be planned and, 3) alternatives to deforestation will be considered.

IRENA estimates that deforestation of primary forest beyond institutional plans will decrease from 40,000 ha/year to less than 10,000 ha/year in the year 2005. Analysis of the combined tables and regional information presented yields the conclusion that regional deforestation will be greater in Special Zone I where a larger area of forest lies on lands of agricultural potential than Special zone III where the corresponding are low (IRENA,

SWEEDFOREST/INTERFOREST, 1985:4). This is important; the southeast's forests' limited agricultural potential is recognized.

In 1983, IRENA estimated (IRENA, 1983b) that for the period 1984-2000 directed and organized colonization would account for 60% of the land area incorporated to agriculture" Peters, (FAO 1985b) concluded that this increase in the importance of directed colonization represented a radical change in the historical trend of spontaneous colonization and that except for exceptional cases "the government's policy leads toward the intensification and rationalization of land use on lands already incorporated to the productive process more than the colonization of new lands..." By directing colonization of lands already in agriculture, pressure for further deforestation by peasants already living from slash and burn agriculture on the frontier and by estimated population increases will be reduced. Further, estimation of deforestation planned by MIDINRA indicates a gradual reduction of deforestation of primary forests in the ministry's projects from 4,000 hectares/year in 1985 to 2,000 hectares/year in 2005³ (IRENA, 1985).

3. The total planned does not make specific references to projects or sources which would permit an evaluation of the figures.

Other actions have prepared conditions for more active state possession of national lands (FAO 1985b). Legalization of native lands and private ownership permit the government to define remaining National lands and subsequent actions regarding their use. The government has recognized indigenous claims to resources, while retaining a state role⁴ (Brown, 1985:183). Development of state forest enterprises, with projects covering vast areas of THF lands, has the potential for managing forest resources for the long-term interests of popular sectors, and acting to prevent spontaneous settlement. A sustained yield management plan has been developed for a large portion of the Southeast, (PROFOBSA, pers. com. 1984) and reforestation has begun in the northeast⁵ and Pacific Regions (pers. com. H. Heiner, February, 1987).

 4. "The natural resources of our territory are the property of the Nicaraguan people, represented by the revolutionary state which is the only entity capable of establishing their rational and efficient exploitation, recognizing the right of the indigenous communities to receive a quota of the benefits that derive from the exploitation of the forestry resources for the purpose of financing projects of communal and municipal development in conformity with national plans" (Declaration of Principles of the Popular Sandinista Revolution with respect to the Indigenous Communities of the Atlantic Coast. Frente Sandinista de Liberacion Nacional and Government of National Reconstruction August 12, 1981 as quoted by G. Brown, 1985:183).

5. An area of 21,000 hectares were being reforested in the Bosawas area but "43 percent of the wood-processing capacity of the region was destroyed by a Contra attack on Sukatpin." (Brown, G. 1985:195).

A National Parks branch of IRENA has begun initial work for the management of some areas of the tropical humid forest as National Parks or Biosphere Reserves, and a substantial portion of the national territory was proposed for protected status. The National Assembly passed bills creating numerous national parks, wildlife refuges and establishing a number of wild area study zones. If comparable progress were made in the Interior and particularly Atlantic regions, Nicaragua could retain an important network of biological preserves.

In Nicaragua now, there exists a growing environmental movement and increasing government recognition of the relationship between deforestation and other economic problems, as well as of the value of biological diversity contained in the nation's forests. The experience of the forestry concession of the southeast illustrates that the old bias which quite exclusively saw forests as a resource to be exploited for short-term gains is strongly contested by a broad spectrum of professionals, environmentalists and a more informed citizenry (Barricada, 1987). Government response to public objection to the concession was favorable, and in 1987 the project was stopped. A commission including a number of professional associations was established to develop a management plan for the area including a biological reserve⁶. These and other actions

provide evidence that the traditional, maximum-use view toward forest resources is questioned and the opportunity to stop deforestation, real.

Conclusion

There are many obstacles to the economic democratization pursued by the FSLN. The land holding elite, far from a defeated and acquiescent class of the past, struggles to regain its prior privilege. The orientation of contra attacks, U.S. threats and accusations, and voluntary manipulation of land tenure by the landed elite, all point out the tenacity of the remaining Nicaraguan agrarian elite. Actions by the United States and its "Contras" place pressure on the Nicaraguan government to abandon its revolutionary course and revert to conventional capitalist reformism. The many actions of the new government and in particular those of the Ministry of Agriculture and Agrarian Reform (MIDINRA) reflect the government's flexible approach to social change. Because of the inclusion of capitalist producers and maintenance of a mixed economy, the scope of the reforms has encountered

6. The organizations involved included the Association of Biologists and Ecologists (ABEN), The Institute for Natural Resources and Environment (IRENA), legal, agro-technical, and other associations grouped in CONAPRO Heroes y Martires.

difficult limits. Nevertheless, the new government has found creative and effective ways to overcome these limits. Baumeister claims that "because of the flexible approach of the Nicaraguan leadership toward social change it is hard to predict the definitive course of the Nicaraguan revolution" (Baumeister, 1985b:54). Similarly, the definitive course of peasant agriculture and the continuing reduction of social differentiation and the long-term status of Nicaragua's remaining forests hinge on the course and survival of the Nicaraguan revolution.

In post-Somoza Nicaragua, capitalist agriculture has no longer been accompanied by its historical political hegemony, and to a considerable degree, it has been subordinated to a developing alternative of national economic development. A mixed economy that involved a difficult, seemingly contradictory, coexistence of different economic sectors now attempts to engage all sectors in the new, national course of development. In spite of the war macro-economic trends of agro-export agriculture have witnessed gradual changes in the distribution of income, and have questioned the prior bias of resource allocations. That this was accompanied by rapid inflation and decreases in real incomes by almost all sectors illustrates the costs of socio-economic change but does not wrest importance from the structural achievements attained.

Nonetheless, the new government of Nicaragua has established the political conditions and taken the practical measures which are most capable of halting the primary cause of deforestation. Where the Somoza government sacrificed tropical humid forests through agricultural policies that promoted spontaneous settlement and unstable directed colonization, the Sandinista Reform transferred lands already in agriculture, redistributed bank credit, promoted tenure security for smallholders, and began to develop an alternative to the destructive process of social differentiation.

Together the influence of war and the impact of agrarian reform have made possible the preservation of tropical humid forests and the planned development of the agricultural frontier. Although the Sandinista government has made substantial progress in changing the social structure of Nicaraguan agriculture, many peasants are still vulnerable to the consequences of differentiation. Consequently the remaining forests of Nicaragua are still vulnerable to the chain saws and axes of the pauperized. Redistribution of land will have to continue for a time, as will the greater and more difficult task of encouraging the growth of successful cooperatives. For production cooperatives to realize their potential, the government will need to further coordinate credit and land redistribution to

encourage participation by both landless and landed peasants. Nevertheless, while the reform has not overcome all the obstacles that have emerged, its substantial progress has proven the new government's commitment to a new course of development and a strong potential to stop spontaneous settlement of the agricultural frontier. Indeed, the future of the nation's forests lies in the ability of the government to pursue its reform program and in environmentalists' participation in the process of rural social change.

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