THE EFFECTS OF REGIONAL DEVELOPMENT ON A LOCAL ECONOMY IN MICHOACAN, MEXICO

by

RONALD JAMES HARDER

A thesis
presented to the University of Manitoba
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ABSTRACT

This study examines the impact of the developmental process on a local economy in rural Michoacán, Mexico. I focus on two aspects of the developmental process: how the "metropolis-satellite" relationship (Frank 1967) manifests itself in the Mexican situation; and how regional development articulates with an economy that is, in most cases, subsistence based (see Stavenhagen 1975).

Empirically, this thesis concentrates on those people who derive their income from a forest livelihood. The people in question obtain the majority of their income through resin collection, wood cutting and charcoal manufacture. Because of the developmental process in general, and regional development in particular, many of these traditional economic pursuits are now diminishing in importance. The developmental process is contributing to an intensification of certain phenomena that already have long-term antecedents in the area (Wiest 1970, 1973, 1979, 1980); there is now increasing pressure on small-scale producers and subsistence farmers to abandon these practices in favor of out-migration or full-time participation in the local wage labor force.

In addition to the aforementioned economic realities, the area in question is undergoing changes that will have long-term ecological implications. Since a respectable livelihood (one that would ensure subsistence needs for a household) can no longer be obtained from small-scale forestry enterprises, many ejidatarios (those with usufruct rights to land) and pequeños propietarios (small land owners) have begun to clear their forest land for maize cultivation while they look for or engage in wage employment.

The thesis documents the responses of these small-scale producers cum proletarians through eight months of field work in 1983; it involves case studies as well as the analysis of government and agency studies and reports.

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The field work phase of this study was completed under the direction of Dr. Raymond E. Wiest, principal investigator for a larger 1983 research project in the municipalities of Acuitzio and Madero, funded by the Social Sciences and Humanities Research Council of Canada. The field research was made easier because of a letter of introduction from Dr. Luis González González, president of the Colegio de Michoacán in Zamora, and I would like to take this opportunity to thank him for his time and efforts on my behalf. Alvaro Ochoa, a graduate student at the Colegio de Michoacán, also provided substantial assistance by providing an introduction to archival research.

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do not mention them here by name, but nevertheless, their assistance was greatly appreciated.

I would like to thank my advisor, Dr. Raymond E. Wiest, for the many years of tolerance, invaluable criticism and the encouragement to pursue unorthodox ideas. This thesis is to a large degree more a result of his persistence than of my enthusiasm to continue.

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I alone, of course, take full resonsibility for any errors contained within this thesis.

CONTENTS

Chapter I

INTRODUCTION

> Of all the environmental impacts of the study projections, deforestation probably poses the most serious problems for the world, particularly for the developing world (Global 2000).

This thesis examines the processes that are rapidly contributing to unprecedented deforestation in rural Michoacán, Mexico. The principal goal of the study is to demonstrate how the influx of capital, through the initiation of forest development projects, is radically affecting the way of life of forest occupationalists living in the area. First, these occupationalists are being coerced through various means to become more involved in what the Mexican government calls the "productive process" (Mexico City News 1983a). The emphasis of the Mexican government's developmental program is to establish an industrial infrastructure "to create permanent public work jobs in rural depressed zones...to train the under and unemployed to take part in the productive process" (Ibid.). This study will show that while opportunity for local employment has increased and the majority of the local occupationalists have been successfully integrated into state capitalist production, the immediate and long-term

effects of the government's developmental program are detrimental to the area. What the developmental programs have accomplished is to make the local occupationalists dependent on wage labor that only provides marginal benefits and forces them to intensify subsistence activity.

This thesis concentrates on those people who derive their income from a forest livelihood. These people, to whom I refer in a general sense as "occupationalists", obtain the majority of their income through resin collection, wood cutting and charcoal manufacture. Although these forest occupationalists have not lived in "isolation" and have always interacted on a regular and continuous basis with the neighboring towns and their market systems, the recent developmental programs have altered the character of their articulation with the larger economic sphere. Before the instigation of the developmental programs, the forest occupationalists engaged primarily in petty commodity production. Cook (1982:2) writes that petty commodity production:

> assumes a domestic production regime, operating with non-waged family labor power, in which the direct producers own or control the principal means of production and produce essentially for autoconsumption...On the other hand, simple commodity production implies some degree of production for exchange by domestic units and consequently, the necessary involvement of direct producers in exchange or marketing relationships.

Likewise, the Michoacán forest occupationalist's interaction with the nearby communities consisted of selling wood and

charcoal for local energy consumption, and selling resin to national industries for turpentine and paint manufacture. The labor for this activity was provided by family members, and the income received was used to purchase commodities such as sugar, cooking oil and tools that the forest occupationalists could not produce themselves. Thus, the pre-development forest occupationalist maintained a small subsistence plot for maize and vegetable cultivation, poultry and cattle for dairy produce and meat, and a horse and donkey for transportation and the movement of goods to market.

With the developmental programs came immediate change. In order to exploit the vast timber reserves in the area, roads had to be built. Parsons (1976:123), citing Mexican economist Edmundo Flores, states that "roads create space (resources); they give value to previously worthless land by making it accessible and incorporating it within the market area". In the two municipalities the study focused on, over five hundred kilometers of roads were built within four years. The developmental programs also altered the relationship between large landowners and the forest occupationalists. The majority of the forest occupationalists owned only small parcels of land, and depended on sharecropping arrangements with the larger landowners (see Wiest 1979, 1983). As the state-subsidized developmental organizations began to purchase trees for the

saw and pulp and paper mills, there were fewer trees for the occupationalists to tap for resin. Simultaneously, the saw mills started to offer scrap wood for sale locally. Since scrap wood at the saw mills was in abundance, and one of the easiest ways to get rid of it cheaply was to almost give it away, this removed another source of income the forest occupationalists relied upon.

When I arrived in Michoacán charcoal manufacture and wood collecting for sale had become a thing of the past. In fact, I was even told on one occasion that I should not concern myself with charcoal manufacturing and wood collecting because they no longer existed. But in order to provide a diachronic perspective, I have intentionally used the general term "forest occupationalist" so I could deal with the decline of certain forest-based activities and better express the systemic loss of a way of life. While I have no illusions about the inequitable relationship that existed, and still does, between landowner and forest occupationalist, I feel that the transition from occupationalist to peon (laborer) has not produced any positive results. While there are still forest occupationalists who now simply refer to themselves as resineros, they have undergone a marked change in status (Cárdenas 1976). The resineros are now all registered employees of the state capitalist company that is in charge of local development in the state of Michoacán.

Theoretically, this thesis will focus on how the "world capitalist system" (Wallerstein 1979) through "debt and investment dependency" (Chase-Dunn 1975) manipulates the socio-economic lives of the resineros described above. This theoretical perspective essentially employs the basic precepts of dependency theory of Andre Gunder Frank (1966, 1969), but places these precepts (i.e., center-periphery exploitation) in a more contemporary context. The political climate in Latin America is changing rapidly. Where only a decade ago Latin American states (at least 90% of them) were an actively overt vehicle in promoting multi-national interests, there is an increasing trend in Latin America (e.g., Venezuela, Nicaragua and Argentina) towards nationalization and restricting foreign investment in certain strategic areas of their economies. Mexico is in a paradoxical situation vis-à-vis other Latin American countries. Having nationalized most key sectors of its economy over the last fifty years, Mexico's agrarian reform policies are seen by many Latin American politicians as a prototype for progressive social change in their own countries. Ironically, Mexico is also a cataclysmic example of another phenomenon that is overwhelming Latin American economies--large foreign controlled debts and high interest payments. When oil was discovered in the Gulf of Mexico in the early 1970's, there was a great deal of jubilant speculation on the part of the Mexican government and the

world community of financial entrepreneurs, that Mexico would enjoy a prosperous future. Huge amounts of money were loaned to the Mexican government by foreign capitalists--the repayment schedule being based on Mexico's future oil earnings and bridged against the rising price of oil on the world market.

Due to certain occurrences beyond the scope of this thesis, the price of oil on the world market stabilized and then dropped. This rapid decline in oil earnings prevented Mexico from meeting its rising interest payments. For Mexico to retain its solvency in international monetary circles, the Mexican government was forced to accept International Monetary Fund (IMF) assistance and agree to an austerity program that would cut social spending and allow Mexico to meet its interest payments.

This thesis will outline the relationship between foreign capital, state enterprise and forest occupationalists (resineros) in two municipalities in Michoacán, Mexico. The ideas presented in this thesis are more a response to what Palma (1978:414) calls the necessity "for the study of concrete situations of dependency, from which concrete concepts and theories can be developed", than it is an attempt to participate in or resolve any aspect of the polemical debate involving dependency theory (Chilcote 1982).

In order to understand how the present phase of Mexican development is deepening Mexico's dependence on the world capitalist system the basic relationships must first be delineated. First, this thesis will examine how investment capital has stimulated regional development and contributed to large-scale proletarianization in the Mexican country side. Much of the capital designated for regional development was usurped by Mexico's national classes who control the forces of state capitalism. This appropriation of capital seriously jeopardized any chance that regional development would succeed in offering greater opportunity for employment for Mexico's chronically unemployed. What regional development did succeed in doing was to divorce a group of occupational specialists from practicing their livelihood. This disenfranchisement left these occupationalists in a position where they were totally susceptible to the whims of capitalist developers. The present "crisis" in Mexico has further intensified the problems these occupationalists are facing. The austerity program imposed by the IMF has reduced subsidies that these occupationalists depended upon to meet their subsistence needs. Consequently, the occupationalists who can no longer meet their subsistence needs through petty commodity production have no alternative but to turn their land over to subsistence cultivation.

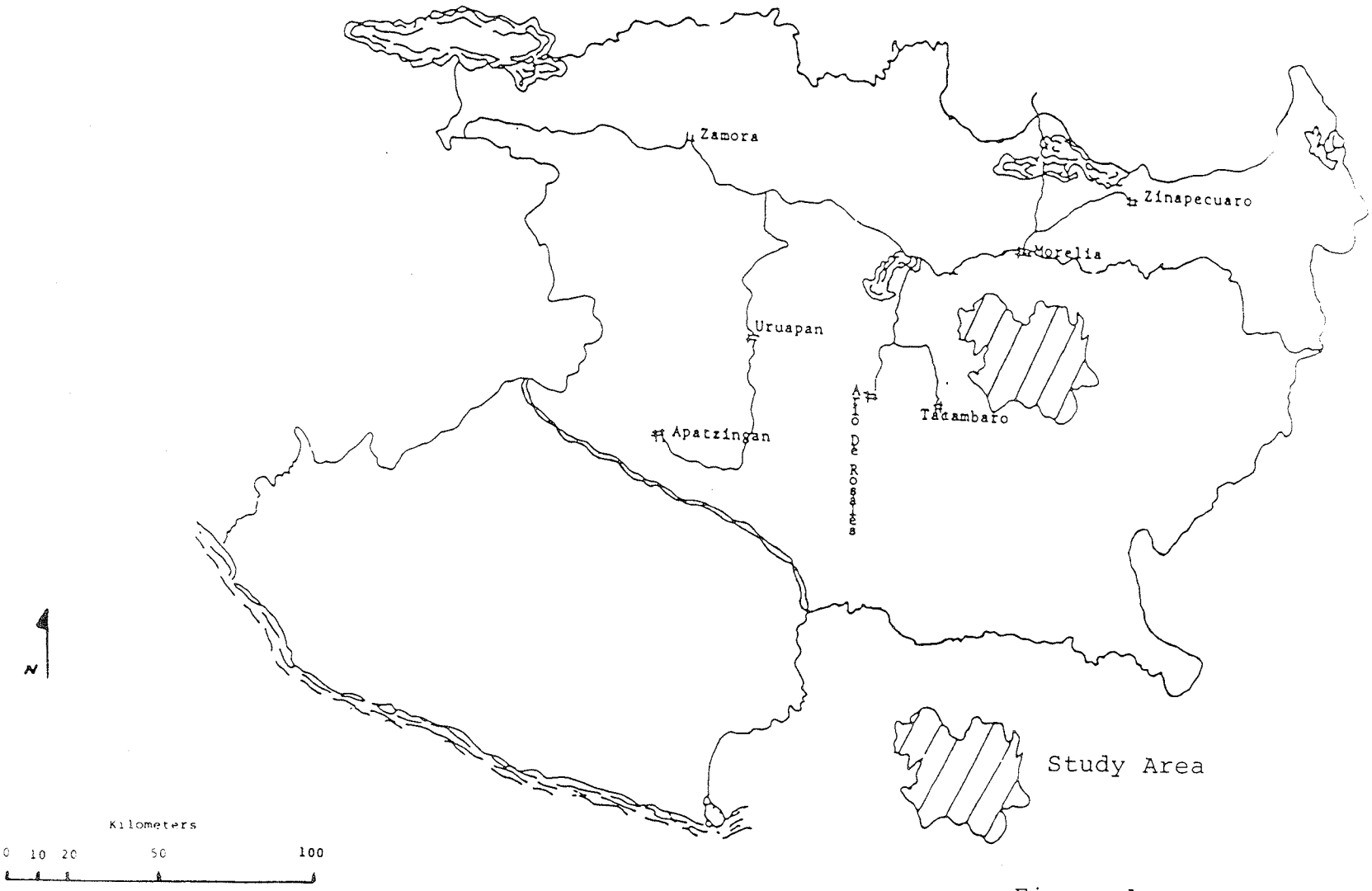

Figure 1: Map of Michoacan

1.1 REGIONAL OVERVIEW

In the last fifteen years certain developments have radically altered the socio-economic lives of forest occupationalists within two municipalities of the Mexican state of Michoacán. In this portion of the thesis I examine the genesis of these developments and lay the historical and geographic foundation for an understanding of processes to be discussed in subsequent chapters.

The municipalities of Acuitzio and Madero are located to the southwest of Morelia, the capital of the Mexican state of Michoacán. The municipality of Acuitzio, which has a surface area of 147 square kilometers, lies at an average of 2040 meters and is totally ensconced in the altitudinal zone known as the tierra fría (cold land) (Correa 1974). There are two distinct forms of agricultural land found in Acuitzio: the most productive riego land (land that is irrigated and not dependent on seasonal rainfall), is for the most part farmed by the residents of Acuitzio del Canje, the principal town of the municipality (Wiest 1973); the other type of agricultural land found in the municipality is temporal. Temporal is rainfed land that is considered by most area residents to be marginal and a bad investment for two reasons: the soil is thought to be deficient in nutrients, and it is dry farmed and totally dependent on seasonal rainfall. Other land found in the municipality is

either heavily eroded (sometimes used by area residents for cattle grazing), or montaña[1 forested mountain land that supports a number of species of ash and oak (see Chapter III), but is more regionally associated with the many species of ubiquitous pine that are common to higher altitudes.

Madero, in contrast to Acuitzio, is geographically quite diverse. Madero is much larger than Acuitzio, having a surface area of 946 square kilometers. The average altitude of Madero is 2180 meters, but the municipality itself is best understood in terms of its altitudinal variation. In contrast with Acuitzio, Madero has very little irrigation (riego) land in the altitudinal zone of the tierra fría. The majority of Madero's tierra fría land is suitable only for dry farming or is covered by the timber trees that occupy a great portion of the municipality's land space. In the southern-most part of Madero, as well as some of the land in its more eastern valleys, lies the altitudinal zone known as the tierra caliente (hot land). By definition, the tierra caliente is "a land of tropical agriculture" (West and Augelli 1966:36), but much of the low altitude land found in the municipality of Madero is more characteristic of an oasis environment. Much of Madero's tierra caliente is dry with agricultural activity being concentrated around the few pockets of spring fed water in the zone. In the western-most part of the municipality closest to the

boundary of the neighboring municipality of Tacambaro, one finds the fertile land that West and Augelli say is indicative of the tierra caliente.

1.2 POPULATION

Although official government census data on the area has not proved reliable (Wiest, personal communication), the demographic data on Acuitzio and Madero are useful to establish general trends (see Tables 1 and 2). First, the decline in population in the municipality between 1960 and 1970 corresponds to a trend that Wiest (1970:10) decribed during his early research in the town of Acuizio del Canje. But Wiest also noted at this time that while there was a population decline in the municipality of Acuitzio as a whole, the town of Acuitzio del Canje had experienced a population increase from 2,965 in 1950 to 3,436 in 1960. This pattern was reversed between the years 1960 and 1970 when Acuitzio del Canje experienced a population loss of 313. This trend suggests a high rate of out-migration between the years 1960 and 1970 when there was very little local employment outside of agricultural work available. Regional development in the two municipalities altered this demographic trend. Tables 1 and 2 show that the population of both municipalities increased between 1970 and 1980. The population data is most striking for Madero where the growth in population corresponds almost exactly to the number of

employees PROFORMICH employs in the municipality (see Chapter IV).

TABLE 1

ACUITZIO

YEAR	MUNICIPALITY	ACUITZIO DEL CANJE
1960	8,717	3,436
1970	7,515	3,123
1980	8,115	3,372

TABLE 2

MADERO

YEAR	MUNICIPALITY	VILLA MADERO
1960	16,141	1,177
1970	14,538	1,406
1980	15,339	1,679

Source: Gobierno del Estado, Michoacan (Apuntes Socio-economicos Tesorena General, Morelia, 1981. Salvador Resuedez Arreola y Mario Fabela Gonzalez.

1.3 A BRIEF LOCAL HISTORY

Historically, the municipalities of Acuitzio and Madero served as hubs uniting the tierra caliente with the markets north of Acuitzio (Wiest 1973, 1980, 1983). One of the consequences of being situated on the path of an established and heavily travelled trade route was that a certain aspect of productive activity was geared towards the maintenance of the merchants who moved through the area. Commmerce thus became important to the economic life of both municipalities. One can surmise that the rural population was also involved with supplying the resting stops of merchants, the towns of Villa Madero and Acuitzio del Canje, with food, firewood and other essentials.

Before the Mexican Revolution belatedly broke up large land-holdings in the area, haciendas flourished in the two municipalities (Dotación Acuitzio Exp. 108). Although the hacendados (landowners) engaged primarily in grain production, they indulged in a practice that became characteristic of the hacienda as an institution--they acquired land for the singular purpose of acquisition and the prestige derived from being large landowners. Wolf (1959:204) writes that:

> the hacienda geared to sell products in a market, it yet aimed at having little to sell. Voracious for land, it deliberately made inefficient use of it.

In the municipalities of Acuitzio and Madero much of the land that was inefficiently used by the hacendados had very little economic significance, as it was not suitable for cash cropping or cattle grazing (see Table 5). The land's worthlessness was formally expressed, when after the Mexican Revolution certain areas of land were not even considered for redistribution through the land reform program:

> The fincas affected by the document of Acuitzio are San Andres, La Florida, Coapa and San Antonio Coapa. Not affected are San Pedro and Tzintzun for they are located a great distance and do not serve for agriculture (Dotación Acuitzio Exp. 108).

Although the exact nature of the land tenure system that persisted in the "inefficient" or agriculturally "unproductive" areas will be discussed in detail in Chapter IV, it is important to mention here that recent developments in the municipalities of Madero and Acuitzio have strong historical antecedents and must be looked at as part of an ongoing process. For example, although large landholdings were at least in principle subdivided into ejido plots throughout most of Mexico (see Wolf 1959:248), large landholdings in peripheral areas (both geographic and economic) were in many cases not disturbed. In Agrarian Revolt in a Mexican Village, Paul Friedrich (1970:2) writes that "the Tarascan area of southwestern Mexico remained outside the mainstream of Mexican history because of mountainous terrain, extremes of cold, limited arable lands and geographical remoteness". Because of the lack of

economic interest in the timber regions of Villa Madero and Acuitzio at the outset of the land reform programs, expropriation and redistribution of montaña land was delayed (many of the disputes have yet to be resolved), and large landowners can still own up to 800 hectares of montaña land (see Table 3). As a result, the patron-client relationship that characterized the hacienda period--when "theoretically the peon was free to come and go; in practice, he was detained for his debts, which he could never satisfy" (Chevalier 1970:311)--still exists to a certain degree in some of the cases encountered during the course of the study.

TABLE 3

SIZE OF LANDHOLDINGS ALLOWED AFTER AGRARIAN REFORM

CLASSIFICATION OF LAND	MAXIMUM SIZE ALLOWED IN HECTARES
irrigated	100
rainfed cultivated land (temporal)	200
grassland	400
mountain	800

Source: Efren Capiz, Encuentro 1983a, The Mexico City News Political Supplement.

1.4 REGIONAL DEVELOPMENT

The Mexican government, as part of a new development program in the 1970's, began an active search for natural resources that had not been exploited to their full extent. One of the resources identified as being "underexploited" and essential to Mexico's long-term economic development was the largely virgin forests found throughout the country (La Voz de Michoacán 1983).

Michoacán, with 4,320,800 hectares or 72.2% of its land space covered by forest, was just waiting to be developed and in the government's mind ripe for exploitation (Aspectos Económicos 1983). The local catalyst for this development was initiated in 1972 when the federal government of Mexico issued a decree that effectively put much of the forested land of the state under governmwent control. From 1972 onward, all the forest-related activity in the municipalities of Acuitzio and Madero would be monitored and supervised by a state run company called PROFORMICH (Productos Forestales de Michoacán). The essence of this decree stated that all trees cleared for public sale must receive government approval; that the government would be the sole purchasing body in these transactions; and that all people working in forest-related activity would be henceforth considered state employees whose product's value would be set by the government in accordance with national or world market prices (Ejido Forestal 1983).

The significance of the decree manifested itself in Acuitzio and Madero in a number of ways; through the forestry development projects local employment opportunities increased immensely. Wiest (1983:79-80) describes wage-labor possibilities in the municipalities before this development took place:

> Regional labor opportunities are also severely limited, and there is intense competition for jobs everywhere in Michoacán and the surrounding states. The level of industrial development is low, with projects designed to alleviate the problem only recently emerging.

The availability of local employment was thought to be a starting point in curbing a disturbing demographic trend: large numbers of young men from the two municipalities were regularly migrating to engage in employment in Mexico's larger cities and the United States (see Wiest 1973, 1979, 1980, 1983). By building a saw mill in Villa Madero, a combination saw mill and furniture factory in Acuitzio del Canje, and through the provision of public works jobs (roads needed to be built for the transport of timber), non-agricultural employment was now available in the two municipalities.

The second consequence of municipal development was that all forest-related labor activity was now under the auspices of PROFORMICH. Where previously the resineros' contact with government agencies was through the office of Reforma Agraria and lending institutions like the Banco Rural, the

resineros now had another bureaucratic body to contend with. The resineros were promised a great many benefits through the developmental programs. In fact, ejidatarios and pequeños propietarios in other areas of Michoacán, as well as those in Madero and Acuitzio, were actively in support of increased government interaction on their behalf. "Banco Rural is our patron (boss). We're the workers and we don't even get a wage or have a labor union. We feel more exploited by the bank than if we were officially its employees" (Cockcroft 1983:193). So when popular speakers like Cuauhtemoc Cárdenas, whose father Lázaro Cárdenas was responsible for major land redistribution in the 1930's, came to describe the virtues of collectivization, many of the ejidatarios were responsive to this impending change.

> The creation of forest collectivizations is an immediate priority and we should join with the state to create ordinances and regulations for forest exploitation (Cárdenas 1976).

Cárdenas (1976:52) continues:

> We know that the forests can provide many benefits, there are many resources, and we are convinced that there is going to be the creation of a forest industry that incorporates wood and resin in an integral way. The forest industries are going to make use of that which is now wasted (the subproducts of wood and resin exploitation), and will create a strong and integral industry to create jobs in the rural areas of Michoacán. We know there are strong and opposing interests to this development and these interests can only be conquered through the unification of the campesino groups.

The type of organizational interrelatedness, through which different peasant groups would interact and "revolutionary thinking" (Cárdenas 1976:52) would lead to the recognition of common class interests, was not realistically applicable to Madero's and Acuitzio's forested land tenure systems. Although there was strong state and local support by the ejidatarios for collectivization of ejidos, the state's efforts were to a large degree frustrated because of private landownership in the area. As stated previously in the section on "Local History," large forested landholdings had not been severely affected by agrarian reform, and their owners did not perceive state intervention as being in their best interests. The large landowners were receptive to development since they would profit from forest exploitation generally, but collectivization was an ominous term that in concept and practice was diametrically opposed to their personal class interests. The pequeños propietarios, who themselves were quite significant both in number and the amount of land they owned, also would have to be dealt with on an individual basis.

As a consequence, there were opposing class interests competing for the capital that forest development would bring. The large landowners, utilizing their political and economic influence, benefited the most from forest development. It was the large landowners who were in the

position to hold a "reunión" (a business meeting), where food, alcohol and, according to some informants, graft were provided to the young engineers responsible for carrying out PROFORMICH's business. The reunión was usually less business than a celebration of the roads that were to be built and the trees to be sold. Second in this hierarchical chain of self-promotion were the pequeños propietarios, whose influence sometimes simply revolved around the geographical reality that their land had to be crossed to reach the larger tracts. The ejidatarios were in the most precarious and deferential position; since negotiations between PROFORMICH and the ejido collectives had been all but finalized, the collective ejidos were given low priority for development. In many cases, collective ejidos were cleared as an afterthought--when negotiations between the private landowners and the state were at a standstill, and there was little else to do.

The developmental process, in the municipalities of Acuitzio and Madero, has not produced the consolidation of group interests and the emergence of common class objectives that Cárdenas envisioned it would. Rather, class differences, following capitalist expansion, have been acutely intensified. Wood (1983:269) describes some of the obstacles that prevent the realization of common class interests.

> There is an incompatibility between the existence of a free peasantry, an open frontier and a class

of non-working landholders. If peasants have free access to land they can hardly be induced to work for others.

1.5 ECONOMIC DEVELOPMENT IN CONTRAST

Although the subject of economic development has been given broad coverage by anthropologists (Davis 1977; Moran 1983; Salisbury 1972; Chibnik 1980; Dewalt 1979), the methodological focus of the various studies has been quite divergent. This portion of the thesis will briefly summarize some of the more prevalent approaches to economic development. Through a discussion of what I perceive to be the limitations and weaknesses of these approaches I will explain the advantages of employing the methodological orientation utilized in this study.

Due to the abundance of literature on economic development and the impossibility of even examining a small portion of this vast literature in the context of this thesis, I will specifically focus on one aspect of economic development here--the process of labor utilization. Keeping labor as the focus of analysis, I will look at the phenomenon of capitalist expansion in Canada, Brazil and Mexico.

Economic development of the Canadian north has been preceding at a rapid pace for almost two decades (see Richardson 1972). Although the process of Canadian northern

development varies considerably from the type of development presently being undertaken in Mexico, there are a few similarities that warrent discussion. First, however, it is necessary to delineate the more obvious differences. Canadian northern economic development is not concerned with the integration of the local native population into "the productive process". The priority of capitalist development in the Canadian north is to exploit natural resources (i.e., minerals and hydro-electric power), not the local population for labor. The indigenous native population is regarded as an impediment to development because of its presence on the land that is destined for development. There are two reasons why the developmental projects have not used what would seem to be a potentially inexpensive labor source. The first reason is ideological. Natives in general are considered unreliable workers. The second reason is closely related to the first. The capitalist developers, because of Treaty Laws, do not have unimpeded access to the native labor force. In order to exploit the native labor force, developers must first engage in lengthy legal battles that in the long-run only slow down the momentum of the developmental projects (Richardson 1972). In essence, capitalist expansion is dependent on the expedient exploitation of resources, the employment of the native population is considered an obstruction to this expediency[2 . Historically, the utilization of native labor has been

avoided for this reason. This under-exploitation of native labor has contributed to the creation of erroneous stereotypes about native working habits.

Nevertheless, the natives, because of their presence on the land to be exploited, are an obstruction to developers; therefore the natives must be moved. The major focus of anthropological research on Canadian development centers on this movement (Salisbury 1972; Waldram 1983). What this type of anthropological research involves is not an analysis of the developmental process, but the study of how to get the native population more involved in the "productive process". It is the contention of this type of anthropological inquiry that capitalist development is an inevitable process, and the anthropologist's position in regards to this process should be one of accomodation whereby the anthropologist would work along with the developmental projects to ensure the active participation of the native population. Waldram (1983), in his conclusion, writes that:

> Development projects must be rationally and humanely planned to ensure that <u>both</u> (original emphasis) the larger society and the affected communities benefit. Only in this manner can development truly serve all of the people.

This type of interpretation is both incredibly idealistic and naive in its approach to the eventual resolution of the problems associated with capitalist development. Foremost, since this method (or approach) does not include in its

analysis the real reason for capitalist expansion--that of the monopolization of resources for capital accumulation (see Moran 1983)-- it is largely ineffective as a mode of analysis. As we shall see through the course of this study, where many plans were initiated to ensure the eventual participation of all parties, it is not in the interests of capitalist developers to share the rewards of their achievements.

There is an interesting relationship between the lack of recent interest in Canadian northern development (e.g., Sheridan Gordon wanting to close its mines in Leaf Rapids and Lynn Lake, Manitoba) and the proliferation of developmental projects in Latin America within the last ten years. The primary motivation for capitalist development in both areas can be looked at similarly--the impetus was the profitable exploitation of resources. The time-lag between capitalist expansion in Canada and the instigation of similar developmental programs in Latin America (in most cases, the same resources, i.e., timber and minerals, are being developed in both regions) can be attributed to the level of infrastructural development and basic economics. Initially, the Canadian north was attractive to developers because it not only contained valuable natural resources, but these resources could be transported to manufacturing centers quite inexpensively. The problem in Canada has always been the unavailability of easily exploitable labor.

Until recently, (the last ten years or so), immigrant labor was readily imported at a low enough cost (in terms of wages paid) that capitalist developers could still achieve a substantial profit. Lately, the high salary demands of workers and the heavy cost of totally subsidizing domestic reproduction in Canada have encouraged capitalist developers to seek more profitable areas of exploitation[3 . Latin America provides a perfect setting for capitalist expansion: abundant resources; cheap labor; and the existence of noncapitalist subsistence activity to ensure that wages could be kept at a minimum (see Wood 1983).

Much of the literature on capitalist development in Latin America concentrates on the Brazilian experience (Davis 1977; Moran 1983; Trebat 1983)[4 . Consequently, I have used the Amazonian material as a point of departure in the understanding of the Mexican developmental process. One of the studies that I found very helpful and that was easily transposed to the Mexican situation was Shelton Davis' (1977) study, Victims of the Miracle. Davis' book explores the relationship between foreign capital and the rapid increase in Brazilian state capitalist enterprise, and how the escalation of this relationship has upset the delicate ecological balance of the Amazon. The wholesale exploitation of the Amazon by Brazilian state enterprise has affected the socio-economic life of the region in the following way:

> First, it has threatened the already precarious territorial integrity of several Indian tribes in the Amazon...Second, it has increased the disparities between land-poor and land-rich in rural Brazil, uprooting peasant smallholders and creating a class of exploited agricultural workers (Davis 1977:132).

Davis' (1977) study, however, is confined to a macro analysis. Although he provides several case studies (all related to the displacement of Indian groups), Davis does not delve deeply into how state enterprise uproots "peasant smallholders" and turns these smallholders into an "exploited" proletariat. The understanding of this particular process of disenfranchisement is imperative because as Wood (1983:269), citing Marx, states:

> So long...as the laborer can accumulate for himself--and this he can do so long as he remains possessor of the means of production--capitalist accumulation and the capitalist mode of production are impossible.

The Brazilian developmental process is to a certain degree similar to Mexican capitalist development, but the comparison has its limitations. Brazilian and Mexican development are equatable in the sense that both relied heavily on foreign capital to fund their developmental projects. Both countries are also similar in that "the collectivization promoted by the state and controlled directly or indirectly by its institutions, tends to expropriate and proletarianize the workers, refashioning them as a dependent labor force of the capitalist state" (Bartra 1976:109). One difference between Mexico and Brazil

is demographic. Brazil has a large migratory proletariat who move from developmental project to developmental project in response to the "boom-bust" cycles that have characterized Brazilian history (see Furtado 1963). According to Mahar (1979), the developmental process in Brazil can be summarized in the following way. Migrants are lured to frontier regions through promises of small-land grants, but on their arrival they find that credit to develop these small pieces of land is unavailable (Moran 1983:13). The migrants, therefore, find they have no recourse but to seek wage employment offered by the larger development projects in the same area, or to move on to another frontier. If the migrants stay to work, the small piece of land is either used as a subsistence base by the migrant, or it is incorporated into the larger developmental project. Whatever the case, capitalist expansion produces a situation where subsistence activity is necessary to supplement the meager income realized through wage labor. Capitalist development in Brazil does not only contribute to the perpetuation of a pre-capitalist mode of subsistence production, but imposes conditions (low wages and the allotment of small plots for subsistence production) that leads to the creation of a subsistence mode geared to domestic production.

Although this study of <u>resineros</u> also concentrates on capitalist expansion into frontier areas, the process of the

articulation between capitalist expansion and the "preservation" of pre-capitalist modes of subsistence and petty commodity production in Mexico has a much deeper historical base than that same articulation in Brazil. De la Peña (1982:21) writes that:

> The dilemma of capitalist development is not exclusively Mexican (Brazil appears to be in a similar situation), but some of its characteristics stem from the historical matrix of the bourgeois-democratic revolution of 1910-1940, which incorporated important popular elements (agrarian reform, labor legislation, 'socialist' education), a particularly solid ideological structure that acquired bourgeois content as the country under-went capitalist industrial development, and the formation of a powerful centralized and authoritarian state that has succeeded in creating a broad popular consensus.

The specific nature of Mexican capitalist development is intrinsically related to the "revolutionary" programs that de la Peña mentions. The agrarian reform programs of the Mexican government have complemented rural development in a number of ways. First, much of the land that was redistributed through agrarian reform was marginal and could not be exploited effectively without government financial assistance (i.e., for irrigation). This led to a process where "within the ejidos themselves the amount of irrigated land declined, while the number of landless laborers increased" (Goodman and Redclift 1981:207). The outcome of the aforementioned process has been well documented in the literature on Mexico. Mexico's rural populace has been forced to migrate to Mexico's cities and to the United

States in search of work. The migrants, who can be viewed most appropriately as a reserve labor force, were drawn to areas where wage labor was available on a temporary or seasonal basis and then returned home to their precarious subsistence existence when their labor was no longer needed (Wiest 1983:62; see Whitten 1974 for a case study of this "proletariat-peasant" interchange). The above scenario worked to the Mexican government's advantage when it embarked on its rural developmental programs. Because of the scarcity of available productive land, there was a large labor surplus in the rural hinterland. There was no real incentive for this labor force to engage in full-time agricultural production and the nature of their relationship with employers who hired them for wage-labor was tenuous at the best of times. So circumstance mitigated against the establishment of a full-time "proletariat" class, yet also ensured that this rural labor force engage in periodic wage-labor.

One of the primary objectives of the Mexican government in the 1970's was the organization of this visibly disparate labor force. The vehicle for this organization was the collectivization programs of Echeverria's (1970-1976) presidency. "Echeverria looked to the peasantry partly as an alternative means of political support and partly as a vehicle for pursuing rural developmental goals" (Goodman and Redclift 1981:207). Goodman and Redclift, citing Montes de

Oca, state that the object of this collectivization was "first to create state enterprises from above and the second was to create solidaristic peasant organizations from below. The first won out" (Goodman and Redclift 1981).

Through the above process of proletarianization, "the state tends to displace the local exploiting class and, in occupying their place, 'rationalizes' the functions that this class previously exercised" (Bartra 1976:210). In this study I will focus on the relationship between state enterprise and the peones of the forests of Michoacán, with state enterprise being perceived as a self-serving entity whose primary interests are aligned with foreign capital and capitalist appropriation. The purpose of this section of the thesis has been twofold: to contrast Mexican development with similar development projects in Brazil and Canada and to outline some of the more common approaches to economic development that appear in the academic literature.

1.6 PARTICIPANT-OBSERVATION

The data in this study was collected by employing a specific anthropological technique known as "participant-observation." The term participant-observation itself is sometimes generally referred to as just another research tool that can be effectively employed if the subject group is of a manageable size. Because of this association

between participant-observation and small groups, many anthropological studies, which are undertaken in urban and larger settings, have abandoned this technique in favor of more highly quantitative methods, or at least in the final analysis place more emphasis on the numbers than on the experience. In the case of this study no other research tool would have been as effective as participant-observation. The study demanded a great deal of mobility and flexibility and a more formalized approach would only have limited this freedom.

When one participates in a Mexican cultural context it is not done as an individual but as a connection in a much larger sphere of social interaction. Through the course of this study I was continually being included in events where I clearly had no place, yet the people found one for me. With each new friend I made, I found I had ten more. As the study progressed, these friendships became invaluable. At first, some of the people approached me with caution, but as time passed and they grew used to my presence I was able to participate in some work activity (e.g., measuring trees and recording resin data) without causing a great deal of commotion. Part of my success in obtaining data can be attributed to the fact that I was eventually regarded as just another empleado (employee). This acceptance on the part of PROFORMICH's employees is not as unusual as it may sound. The company regularly brought in technical experts

from other parts of the world to conduct studies, so the employees were used to having strangers around.

Although I had read articles and even books on network analysis, the experience of moving through a social network as rapidly as I did is one I did not anticipate. My association with any particular person that supplied me with information was always based on my relationship with another person. Some of the data in this study is derived from firm reports and other company documents, but this data was in almost all cases obtained through my participation in a social network.

Rather than outline the source of each piece of information that appears in the thesis in this section, I have chosen to incorporate my sources in the appropriate part of the text. For example, if I include a table, I will explain in detail underneath the table how I collected and arranged the data.

Initially, my research methods were hindered by my inability to communicate in Spanish. In most instances I could make out what my informants were saying, but they found it difficult to decipher my noise. As the study progressed, I did not attain fluency, but owing to the exceptional patience and tolerance of the people, I could make myself understood.

1.7 FIELD RESEARCH TECHNIQUES

When I left Canada I was not aware of certain logistical problems that I would encounter in the field. I naively assumed that I would be studying a group of people who were geographically situated in close proximity to each other. I thought that the town of Villa Madero would serve as a residential base for *resineros* who would leave in the morning to collect resin and then return to the town in the evening. This was an erroneous assumption that at first caused me numerous problems. Most of the people that I wanted to study lived in rural hamlets, on small farms or *ejido* plots deep in the forest. First, simply travelling to meet the *resineros* was an insurmountable obstacle. I did not have a vehicle, and even if I had my own transportation, to be able to master the maze of roads that had been built within the last ten years would have taken at least a year. Second, because the people I wanted to study were so dispersed, I was continually faced with the prospect of establishing new connections. Due to these problems, the research plan that would have me living in the town of Villa Madero where I would observe the daily interaction of the *resineros* had to be abandoned.

My main residence during the course of the study was in the town of Acuitzio del Canje. Except for short periods, when I stayed in the homes of *resineros* in the more remote

areas, I slept in Acuitzio del Canje and commuted to Villa Madero on a daily basis. I arrived in Acuitzio in February, 1983 and departed in the middle of November, 1983.

It was my good fortune that the señora, in whose house I resided, knew a man whose father-in-law was a resinero. I contacted Manuel[5 and he readily agreed to introduce me to his father-in-law. Manuel, who was also an employee of PROFORMICH, insisted that, before meeting his father-in-law, I should become acquainted with other aspects of forestry exploitation. The next day I accompanied Manuel to his job at the factory in Villa Madero. Through compadrazgo (ritual kinship), Manuel was firmly entrenched in the socio-economic milieu of all aspects of PROFORMICH's activities. Through Manuel and his contacts I met all the people who were responsible for obtaining the data I needed for my study.

The method I pursued was quite simple in nature. I arrived at the factory in Villa Madero in the morning and waited for the employees to be assigned their daily jobs. The assignments varied from day to day. Some days they (usually a boss and three or four laborers) would go out and mark trees that were destined to be cut. Other days they would have to locate the dueño (the owner) to negotiate cutting rights or reforestation plans. What this continuous movement allowed me was a chance to obtain a wide range of information. I witnessed labor recruiting, property deals

being contracted between PROFORMICH and private land owners, how reforestation projects were being implemented, and the patterns of interaction between jefes (bosses) and peones (mostly contract laborers). I was also allowed to roam through the forest at will and subsequently I met many resineros at work. During this aspect of the study I took notes on a small note pad and then transcribed these notes into a larger diary in the evenings. At times when I was questioning someone about a certain activity (e.g., reforestation policy) and he observed me taking notes, he would mention that what I was doing was totally unnecessary as he already had in his possession the information I was inquiring about. As a result of this type of cooperation, I received a great deal of formal documentation pertaining to PROFORMICH's activities in the area.

Until this point my research strategy had been more spontaneous than systematic. I was constantly meeting new people and they were introducing me to different aspects of forest exploitation. If, for example, I met a new source and he explained that his job for the day was to find a particular dueño and negotiate a deal for further tree marking, I would probably go along with him. If, in another instance, he was simply going to spend the day at the nursery (where I had been many times), I would probably find someone else to go along with. Whatever the case, no single person or crew would return to the same place two days in a

row (the reason for this will be explained in Chapter IV). Because of this frequent movement, I was not obtaining the indepth socio-economic data on resineros that I required. I had met and informally interviewed many resineros, but I wanted to spend longer periods of time with them.

When I informed Manuel of my interest to study resineros in more detail, he introduced me to José. José was in charge of tabulating resin production data. Twice a year José would visit all the deposits in the two municipalities of Madero and Acuitzio and record the amount of resin collected in the area of each deposit. I asked José if I could accompany him on his next round. José agreed and informed me that he had already started, but I could accompany him for the duration of this round. Since José had to visit areas that were locally considered inhospitable, i.e., the tierra caliente, his job required more than the mere collection of data. For José to effectively do his job he had to first engage in a great deal of social discourse. José never presented himself formally as a government representative who had come for the sole purpose of collecting data. In fact, José never seemed very concerned about when he was going to get his data (a process that never took more than half an hour). The visits to the various deposits were always social events; business was a by-product and never a reason for the occasion. José's approach to his job worked to my advantage in a

number of ways: I now had a source of transportation that allowed me to reach the resineros in the more remote areas; José served as my guide and provided the initial introductions; and because of José's extensive social obligations, we would normally spend a day, and sometimes more, at each deposit. Because we would normally eat and stay in the houses of resineros, I was able to develop a broader perspective on how the resineros actually lived. This portion of the field work took approximately two months.

When the rainy season approaches, forest exploitation activity decreases appreciably. With the rains the roads become impassable, so no timber can be brought out and no peones can be taken into the forests for further marking. José finished collecting his data at the start of the rainy season; consequently I was left with little to do for awhile. Since I had met most of the senior officials who worked for PROFORMICH, I had easy access to all the records that were relevant to PROFORMICH's activities in Madero and Acuitzio. I spent about two weeks compiling and photo-copying these data.

The remainder of my field work time involved substantiating the information that I had already acquired. Acuitzio del Canje, where I lived for the course of the study, was frequently visited by resineros who came to town

for commercial reasons. I had already established a sizeable network of contacts in the area that allowed me access to resineros during the rainy season if they ventured out of the forest. Many resineros purchased products from don Diego, in whose house I lived, and I would meet them when they came to collect their supplies. I knew a number of truck drivers who would offer me a lift if they encountered me on the road and they frequently had resineros for passengers. And many times I would just run into resineros on the street or in the plaza of the town.

As the date of my departure grew closer, I became aware of sizeable gaps in my data and important areas that had only been given superficial attention. For example, I was unable to obtain important information on forest ejidos and how these differed from agricultural ejidos. I have a good understanding of forest ejidos, but I was unable to obtain formal government documentation that related to their structure. Although a great many issues remain unresolved in my mind, I believe that I have acquired sufficient evidence to accurately present a small case study on resineros and the problems they are encountering.

NOTES

[1 Montaña is the general literature reference. Monte is the word used locally.

[2 The "reserve" policy of the British Crown, which was ostensibly created to protect the native population, is

presently being replicated in Brazil. The Villa Boas brothers are convinced that the only way to protect Brazilian Indian groups from inevitable extinction is the establishment of protective reserves (Davis 1977).

[3 The movement of capitalist enterprise to "underdeveloped" areas of Latin America coincides with a phenomenon that has become universal. Within the last decade capitalist oriented industry has found it more profitable to move industry to areas abundant in cheap labor than to induce labor to areas of industrial development (Marchak 1983).

[4 The present phase of Mexican capitalist development has been critically examined in a number of recent studies. Some of the studies, such as de la Peña's (1982) treatise on the development of Mexican state capitalism, are highly theoretical (Harris 1982), and only serve as a foundation for more empirically inclined studies. Many of the more pertinent studies are available only in the form of theses and dissertations that are difficult to obtain (see Goodman and Redclift 1981 who include many of these recent studies in their discussion on Mexican "agrarian transitions".

[5 Although none of the information I received could be considered confidential, the passing of this information to me might be interpreted by some in a negative way. For this reason, I have used pseudonyms to protect the identities of all the sources I mention.

Chapter II

DEPENDENCY AND DEVELOPMENT IN MEXICO

2.1 THE DEVELOPMENTAL PROCESS

This portion of the thesis will critically examine the "developmental process" and some of the schools of thought that have emerged as a response to this process. First, it is necessary to define or at least theoretically establish the purpose of the concept of development. To accomplish this the epistemological and pragmatic leanings of the "diffusionist" approach must be explained in light of its overall objective (Chilcote and Edelstein 1974). Secondly, the school of thought known as the dependency approach (see Palma 1978 for a discussion on whether the ideas of dependency constitute a theory or a school of thought) will be examined in the context of its analysis of capitalist expansion and how development (as it is being undertaken in Mexico) is an integral and exploitive component of this expansion.

> Doctrinaire ideas of development die hard, partly because the economic theologians make a living on it--and partly because it is not easy to admit that they have led people down the garden path into deepening wretchedness for three misnamed "development" decades (Vittachi 1983:3).

What exactly is the developmental process and why has it become a recent source of academic concern? To multi-national corporations, western governments and those academics (Milton Friedman and the "Chicago Boys", see Encuentro 1983b as to their success with the post Allende Chilean economy) who forward the economic theories that define capitalist policy decisions, development is an obligatory moral undertaking. Without development the majority of the people in the "Third World" would wallow in poverty and ignorance with no vehicle or method to transcend traditional practices that only perpetuate their misery. Peacock (1981), in a study of a developmental project in West Malaysia, lucidly describes the real problem that impedes development:

> There was a failure to recognize that poverty was a result of these traditional patterns...the strategies, perpetuating peasant smallholdings in fact acted to reinforce and bind the farmer into a structure that he needed to get away from if he were to escape poverty.

Peacock's statement is consistent with an approach, that for the lack of a better term, can be called the "transitional" approach. First introduced to anthropology by writers such as Lewis (1966) and Foster (1967), this approach basically states that "poor" or "traditional" people possess certain traits (be they psychological or social) that prevent their upward mobility. The perspective that Lewis (1966) coined "the culture of poverty", was quickly refuted by Valentine (1968) and Leacock (1971); they demonstrably challenged its

empirical validity. Although this perspective was never seriously established in anthropological circles, it has found considerable credence in other academic streams.

Economists (e.g., Silvers and Crosson 1980), who write in favor of capitalist development projects, derive their ideas from the same ideological framework that influenced Lewis and Foster. For these academic thinkers, the Western world represents the apex of what is possible for humans to accomplish. It is only natural that they spread this wisdom so that those "less privileged" be at least aware of the possibilities of educated development. Among the most prevalent adherents to this approach are the "diffusionists" (see Chilcote and Edelstein 1974 for an actual definition). The diffusionists argue that the underdeveloped world can only achieve a standard of living comparable to that experienced in developed countries if they (the underdeveloped) follow the same economic formula.

> Development means advancement towards certain well-defined general objectives which correspond to the specific condition of man and society to be found in the most advanced societies in the world (Dos Santos 1969: 58)[1 .

The data utilized to determine which countries are developed or underdeveloped, or advanced or not, are open to debate. To determine levels of development, diffusionists employ economic indices through which they place countries in different stages according to certain criteria (e.g.,

gross national product or level of industrial development). The three successive stages usually isolated are: underdeveloped, developing, and developed. According to this schema, Mexico, which has socio-economic problems akin to many of the most impoverished countries in the world, is curiously listed as developed or "newly industrialized" by the Mexico Report (1983b). It is presupposed by the diffusionists that the establishment of a capitalist industrial infrastructure will cure "the teething troubles of an infant economy which would be overcome with economic growth and modernization" (Sunkel 1973:134). Unfortunately Mexico, with all its industrial accomplishments, has not been able to overcome many of the problems usually associated with underdevelopment. Sunkel (1973), in a critique emphasizing structural inequalities, lists these problems as: "regional disequilibria, instability, inequality, unemployment, dependence on foreign countries, specialization in the production of raw materials and primary crops, economic, social, political and cultural marginality".

> But being experts in survival, the poor may also begin to realize that many of their problems are iatrogenic - that is, brought about by the doctors of development in their bumbling efforts to effect a cure (Vittachi 1983).

2.2 THE DEPENDENCY APPROACH

For almost three decades, beginning with the Economic Commission of Latin America's identification of a center/periphery relationship where the development of the center was a direct contributing factor in the underdevelopment of the periphery, social scientists of all persuasions have been concentrating on a theoretical approach known as "dependency theory". Although many dependency theorists believe Paul Baran (1957) to be the progenitor of the dependency approach (Palma 1978; Goodman and Redclift 1982), the work of Andre Gunder Frank (1967, 1969, 1970[2) was the catalyst that promoted the dependency approach to a position of serious scholarly inquiry. As a consequence of Frank's early work, many anthropologists (e.g., Shoemaker 1981), political scientists (e.g., Seligson 1980) and sociologists (e.g., Petras 1978) began to expand their analyses to include the world capitalist system, and subsequently to see how this system affected the lives of the people they were studying (see Gilbert 1982 on how the dependency focus changed the orientation of many studies).

The purpose of this thesis is to demonstrate a particular case of dependency. Therefore, the focus of analysis will not be on the problems associated with the dependency approach, for these issues have already been heavily debated

(Chilcote 1974; Lall 1975; Laclau 1977; Palma 1978; and Petras 1978), and as yet there is no real consensus on the polemical outcome of these disagreements. Palma (1978:383) writes that:

> The complex roots of the dependency analyses and the variety of intellectual traditions on which they draw make any attempt at a comprehensive survey difficult.

So in order to circumvent a lengthy theoretical discourse, the intentions of this study are to employ some of the basic tenets of dependency theory in an attempt to present some of the forces that influence and control the lives of a group of forest occupationalists in rural Michoacán, Mexico. The problem of applying dependency theory to a particular situation is a sometimes difficult task. As Henfrey (1982:49) explains:

> Franz Fanon once stated that Africa's great problem was its lack of theory. In the case of Latin America, it is tempting but dangerous, to suggest the reverse is true.

With an overabundance of theories already attacking the reasons for Latin American underdevelopment, there is now an increasing tendency by Latin Americanists to recognize the need for what Palma (1978) calls "the study of concrete situations of dependency".

Nevertheless, there are certain areas of dependency theory that are problematic, and these areas need to be addressed. Foremost, dependency theorists, such as Frank (1969) and Wallerstein (1979), put too much emphasis on the

global interplay of the "metropolis satellite" dynamic, and ignore the fact that "class and state variations within core countries are determinants of their relative position in the world capitalist system" (Petras 1978:34). Frank's contention--that all Latin America is well integrated into the capitalist mode of production--proves problematic to the present study. Frank's treatise on metropolis-satellite relationships was aimed at the prevailing dualistic view of the diffusionists (Laclau 1971). Because of Frank's position in regards to dualism, it would have been contradictory for him to examine the real reasons for the persistence of pre-capitalist modes of production--that it is in the interest of the capitalist mode of production not to subsidize domestic reproduction in situations where only a seasonal labor force is required. For example, in the area that this study focuses on, the capitalist mode of production articulates with, and directly contributes to the persistence of a pre-capitalist mode of subsistence production. The capitalist mode of production has contributed to the maintenance of activity that is solely related to domestic consumption in the following manner: the area has a high incidence of seasonal out-migration to the United States. In most cases, the migrating males have considerable domestic responsibilities (Wiest 1973, 1983). Since the wages the migrants receive are not adequate in relation to their domestic and personal expenses (the cost

of living in the U.S., or away from home), the migrant's domestic group is partially dependent on subsistence production for it maintenance and reproduction. Therefore, the dominant capitalist mode is successfully maintained and perpetuated because wages can be kept at a minimum in the United States for migrant labor; capitalism need not be responsible for assuming the cost of feeding the domestic group; and the employers of the migrants can achieve a substantial profit (Wiest 1979, 1983).

> Mexico's process of capital accumulation has relied since late colonial times on an abundant supply of cheap labor, accompanied in recent decades by the preservation and refunctionalization of noncapitalist forms of economic activity in order to maintain the reproduction of the labor force at minimal cost to the employer (Cockcroft 1983:253).

The subject of the persistence and intensification of pre-capitalist subsistence activity will be elaborated on further in chapter IV.

Another issue that is inherently problematic with the dependency paradigm as presented by Frank (1967), is the absence of an emphasis on class relationships and how these class relationships are represented in a national context (Petras 1978). Hopefully, the data presented in this study will help fill this void and demonstrate the relationship between foreign capital and national and local class interests.

Taking into consideration dependency theory's deficiencies (the absence of a class analysis and the emphasis on a single system approach), the theory still has considerable utility in understanding the developmental process in this study. Although this study will synthesize class analysis with dependency theory, it is useful to first outline the basic premises of the dependency approach.

The forces of capitalist development, argue Frank (1967, 1969, 1970), Wallerstein (1974, 1979) and Dos Santos (1969), are contributing to increasing impoverishment and underdevelopment in countries that are undergoing the developmental process. The main body of Frank's work emphasizes the metropolis-satellite relationship. The metropolis-satellite paradigm, which is the heart of dependency theory, emphatically states that the development of the center (metropolis) is being accomplished at the expense of the periphery (the satellites). Baran and Sweezy (1966) argue that this process of accumulation is an inherent aspect of capitalism. Capital is invested in the periphery to obtain profits, and capital accumulation, or the flow of resources to the center, is the logical culmination of the developmental process. Capitalist development, Frank (1967) asserts, is a process by which primary resources are extracted from the periphery by the center at exhorbitantly low prices and consequently returned to the periphery in the form of consumer goods at much

higher prices. Profits, therefore, are retained in the metropolis. The satellites simply serve as suppliers of resources (both natural and labor) and as abundant markets to which the metropolis can sell its consumer goods. Proponents of the dependency approach consequently see underdevelopment as a direct result of the developmental process.

> Economic development in underdeveloped countries is profoundly inimical to the dominant interests of the advanced capitalist countries (Baran 1957, cited in Palma 1978:401).

2.3 DEPENDENCY IN A NATIONAL CONTEXT

Recently, theorists such as Petras (1978) and DeWitt (1983) have argued that the work of Frank and Wallerstein is reminiscent of the open-ended theorizing of the nineteenth century armchair evolutionists.

> This is not to say that dependency theory does not have some defects such as the tendency of dependency theorists to be grand theorists who often fail to provide researchable indicators of dependence (DeWitt 1983:viii).

In order "to provide these researchable indicators" the particular character of Mexico's relationship with the capitalist system must be examined. Unlike other Latin American countries, Mexico has a policy that limits foreign investment (see Table 4).

TABLE 4

MEXICAN FOREIGN INVESTMENT LAW

FOREIGN INVESTMENT ALLOWED AND AREA OF INVESTMENT

UP TO 40%

Petrochemicals, auto parts and mining

NO INVESTMENT

Oil, radioactive mineral exploration and nuclear energy generation, electric utilities, banking and credit institutions, postal service, radio and telegraphic communications, gas distribution, forestry exploitation and all forms of urban and interurban transportation.

Source: The Mexico Report, Vol.4, No.5, Mexico Communications, El Paso, Texas.

Table 4 is significant in a number of aspects. One of the priorities of the Cárdenas administration's (1934-1940) expropriation of the oil industry in 1938, was to put the Mexican economy in a position where it was less dependent on foreign capital. Nationalization of the oil industry was a revolutionary departure from an era of foreign investment in Mexico's economic affairs. The pre-revolutionary development strategy of Porfirio Díaz (1876-1880; 1884-1911) "was to take all the measures necessary to lure foreign investment into Mexico 'on the theory that the capital, skills, and markets which foreigners had at their command were critical for Mexico's growth' " (Hansen 1982:15). In 1959 there was a slight reversal of the Cárdenas policy limiting foreign investment--the Mexican parliament legislated the Petroleum Law.

> To ensure foreign capital's cooperation in its expensive rush to obtain the equipment and technical know-how required for its sudden expansion of oil production, the Mexican government has relaxed its regulatory laws on machinery imports for the petroleum industry and foreign investment in petrochemicals (Cockcroft 1983:262).

Initially, the Mexican government's decision to allow the penetration of foreign capital in secondary areas of production (i.e., the refinement of oil and the manufacture of petrochemicals) was so the country would be able to meet its domestic energy requirements. Until 1974, Mexico's domestic energy consumption outweighed production and Mexico imported the balance to meet domestic requirements.

Following major discoveries of oil in the Reforma region of Chiapas and Tabasco and the Cotaxtla area of Veracruz, Mexico's increasing oil production led to an export surplus (Quarterly Economic Review of Mexico 1983c).

Because of the tense situation in the Middle East, where governments were using their vast reserves of oil to achieve political aims, Western governments wanted to decrease their reliance on Middle Eastern oil. Mexico's oil discoveries were thus greeted optimistically by Western governments for two reasons: 1) Mexico was seen as a politically stable supplier of oil; 2) because of the turmoil in the Middle East, there was always the impending danger that oil would suddenly be in short supply on the world market. Oil found outside of the Middle East would escalate in price if this shortage on the world market were to occur. Investment in Mexico's oil future subsequently became an imperative undertaking for the world community of financial entrepreneurs (see Barkin 1975).

As Table 4 illustrates, there were severe limitations on foreign investment in the Mexican economy. Foreign capital was already deeply entrenched in the secondary areas allowed by Mexican law and could not exceed the stipulated 40 percent. Due to these investment restrictions, further capitalist penetration of the Mexican economy would have to be achieved through other means. The international

community of financial investors accomplished this by providing the Mexican government with huge loans with repayment based on Mexico's potential future oil earnings. Mexico, desperately wanting to diversify production and expand its industrial base, was receptive to this form of foreign investment. Foremost, Mexico did not see itself becoming dependent on the manipulation of foreign capital as it had been in the pre-nationalization era, because earnings from Mexico's huge oil reserves would prevent this from occurring. Petras (1978:158), in a discussion of the relationship between foreign capital and "national industries," describes the dilemma "third world" nations encounter in their quest for economic self-determination:

> The reliance on external funds to finance "national industries" added a note of ambiguity. The financial dependence of the regimes would limit their capacity to grow out of the influence and dominance of the United States. But this was perceived as a "long-run" problem, which would be dealt with when the new productive facilities began to operate; their earnings, it was argued, would pay back old debts.

Mexico, with the foreign capital it had acquired, embarked on a massive development program. The program's chief aims were to decentralize industry that up to this period had been chiefly concentrated in the Valley of Mexico, and to provide jobs for the rural under and unemployed. The program ran into immediate problems. First, the private sector, even after being guaranteed financial subsidization, was opposed to the idea of

decentralization. Members of the private sector argued that the transportation infrastructure was not developed enough to provide adequate service in the outlying regions. Even with financial subsidization the private industries would still incur financial losses if they relocated, for the Federal Labor Law stated that severence pay would have to be paid to all the workers who lost jobs due to relocation (Castellanos 1983). In order for the Mexican government to create jobs in the rural sector through private industry, it would first have to concede to the high financial demands of the private sector. Second, once the government provided industries the capital for regional development there were no assurances the money would be spent in the way dictated. A Mexico City businessman explained the phenomenon of saca dolares (those who take money out of Mexico) in the following manner: he claimed that one would have to be crazy to engage in regional development in Mexico. One was sure to lose money. It was better to take the money and invest it in the United States. Because of this very common economic mentality, President José López Portillo stated that "in recent years a group of Mexicans led, counselled and supported by private banks, have taken more money out of the country than all the empires that have exploited us since the beginning of history" (Dziobek 1983:40). As a result, many of the businesses that were started in the regional areas were skeleton industries, purposefully

underfinanced and annually dependent on the government for continued subsidization. The problem was endemic to state-run industry as well. High appointments in Mexican state-run government agencies and enterprises are political appointments that only last the tenure of the presidency (the Mexican president is elected to one six year term and cannot serve again). Many high level state employees consequently perceive their jobs as once in a lifetime opportunities to establish themselves economically. The long-term implications of this type of economic behavior are obvious; the "new productive facilities" would never pay for themselves.

The drop in world oil prices had an immediate effect on the Mexican economy. Mexico, faced with high quarterly interest payments and a shortage of dollars, was forced to nationalize the banks to prevent further capital flight. Still, Mexico could not meet its financial obligations to the foreign bankers who held the loans. The public reaction to Mexico's "crisis" has been well publicized. Initially, newspapers and weeklies speculated on the prospects of Mexico defaulting and refusing to meet its interest payments. In financial circles, however, the situation was never that ominous. In 1981, Mexico was quickly provided with money to meet its interest payments by the International Monetary Fund (IMF), the Bank of International Settlements (BIS) and the World Bank. These same

international bodies also arranged for Mexico to restructure its loan schedule on the condition that it realign its economic policies and reduce social spending. Mexico would have to follow an austerity program that would effectively freeze wages and show restraint in its food subsidization policies (Quarterly Economic Review of Mexico 1983a). In effect, the Mexican economy, despite measures that had been taken to reduce its dependence on foreign capital, was now totally under the administrative control of the international agencies that represented the interests of foreign capital (For an interesting discussion on the relationship between U.S. capital and the World Bank and IMF see Brett 1983.) The foreign bankers that held Mexico's loans were delighted with this new arrangement.

> Characteristically, the international bankers made the most of their improved prospects. They collected handsome fees for renegotiating old loans and raised the interest charges on renegotiated and new loans (The Editors, Monthly Review 1984).

There is also speculation that, in order to alleviate some of its economic problems, Mexico will have to modify its nationalization policies, thus making it more dependent on foreign capital.

> The Govt.'s policy over the last two administrations has been to "Mexicanize" business, but in light of Mexico's current economic crisis there will be an easing of the policy (The Mexico Report 1983b).

As the Quarterly Economic Review of Mexico (1983a) reports, "the banks (foreign) stand to do well out of the deal".

2.4 THE IMPLICATIONS OF MEXICAN DEPENDENCY

The subject of this thesis concentrates on those who through no fault of their own will not "do well out of the deal." The IMF austerity program, while ensuring a secure haven for foreign capital, will unequivocally undermine the precarious socio-economic situation of the majority of Mexico's populace. Mexico's already poor will undoubtably suffer more as they become what Shelton Davis (1977) refers to as the "Victims of the Miracle." To foreign capitalists and Mexico's national classes who collaborate to ensure economic development, the developmental "Miracle" has already been achieved. The country's resources are being tapped and the profits from these endeavors are ending up in the foreign banker's pockets.

Mexico's nationalization programs and attempts to control its own economic destiny had presented a problem to foreign capitalist expansion. Through the present "crisis" this problem has been resolved. What appears to be a "save Mexico" program is actually the best business opportunity foreign capitalists have had in Mexico in decades. The Monthly Review editors (1984:3) cite a statement by Willard Butcher, chairman of the Chase-Manhatten bank, as an example of the prevalent business attitude to Mexico's crisis.

> Mexico owes $85 billion. Is Mexico worth $85 billion? Of course it is. It has oil exports of $15 to $20 billion. It has gold, silver, copper. Has all that disappeared over the last week? I expect to be repaid my Mexican debt.

This case study will, hopefully, demonstrate that Mexico's reliance on foreign capital for economic development is irrevocably altering the socio-economic lives of the people living in the area under exploitation. Because of the IMF-imposed freeze on wages and high inflation due to the devaluation of the peso, the "newly proletarianized" forest occupationalists are being forced to rely more heavily on pre-capitalist subsistence production to meet their domestic consumption needs. Since much of the land the forest occupationalists have access to is rainfed and agriculturally marginal, even this type of subsistence activity does not provide any long-term security.

NOTES

[1 Dos Santos is describing the unilinear mind frame of the diffusionists; he is not a diffusionist.

[2 Although Frank's work is most often cited in reference to dependency theory, the "seminal" work on dependency theory was done by Fernando Henrique Cardoso and Enzo Faletto. The work, Dependency and Development in Latin America, was not translated into English until 1979 and is therefore less known than Frank's work (Gereffi 1983).

Chapter III

ECOLOGY AND DEVELOPMENT

In general, the ecology of Mexico is seriously being threatened. The Mexican population is being informed about the problem through explosive headlines that appear in the country's daily newspapers. Zetina (1983), in Excelsior, exclaims that "159 million hectares are being eroded in the country." "Federal District Forests Face Threat of Extinction" writes Cespedes (1983) in The News. Castillo (1983), in El Sol De Morelia, states that "fires have destroyed more than three thousand hectares of forest" in the state of Michoacán.

Although Mexico has a long history of ecological problems, the exact reasons for these problems have been the subject of much contention. The most common explanation revolves around agricultural management. How did swidden or slash and burn agriculture contribute to the collapse of the pre-hispanic Maya centers (Helms 1975)? Are traditional practices of cultivation being maintained in marginal areas (those most susceptible to erosion) because certain peoples resist innovative changes which would allow them to farm their land more efficiently (see Wasserstrom 1978 for a critical refutation of this perspective)? Or like Ruben

Lopez Cano (1983), a Mexican biologist, deduces, "To stop erosion, soil conservation methods like crop rotation must be employed." Striker (1951), in a report on Mexico for the U.S. Department of Agriculture, maintains that:

> Again, as all over the world, the farmers directly responsible for this misuse of land did not do it entirely through ignorance. They were, and are, being forced to bad soil management by the sheer necessity of wresting a living from a land that is poor and getting poorer.

In this chapter of the thesis I will focus on some of the factors that are contributing to massive deforestation and erosion. Hopefully, it will become apparent that the intensification of agriculture in ecologically sensitive areas can be directly attributed to rural development in the immediate area and to the Mexican government's relationship with the world capitalist system. Because of the large foreign debt, state enterprise in the study area is no longer being totally subsidized through government developmental project funds. As a result, reforestation programs and wage labor opportunities for the local populace have steadily declined. Many rural inhabitants (especially ejidatarios) have no alternative but to turn their remaining forested land over to subsistence production.

As I mentioned in Chapter I, the municipalities of Acuitzio and Madero do not have an abundance of what would locally be considered prime agricultural land. Much land in both municipalities is heavily forested and there has been

no reason[1 until now to clear this land for agricultural use. The maintenance of this timber land by forest occupationalists suggests that it is not the archaic agricultural habits of "third world" farmers that is responsible for present deforestation, but economic realities associated with capitalist expansion that have forced forest occupationalists to engage in agricultural practices that are unsound ecologically.

3.1 THE LOCAL ECOLOGY

The forested areas of Acuitzio and Madero contain a plethora of botanical families, genera and species that are specific to Michoacán (Correa 1974). For the local inhabitants who depend on the forest for their livelihood none is as important as the ubiquitous pine. It is from certain species of the pine that the forest occupationalists obtain the resin which provides the cash[2 for purchasing necessities for domestic consumption. The genus Pinus is almost exclusively found in the altitudinal zone known as the tierra fría (see appendix for a list that denotes local altitudinal variation). To area residents the distinction between the tierra caliente and the tierra fría is crucial. Although the tierra fría is agriculturally productive in areas where irrigation (de riego) is possible, the majority of the tierra fría is dependent on seasonal rainfall. The pine's natural resilience is perfectly suited for a

temperate climate. Mitov and Hasbrouck (1976:30), stressing the pine's adaptive features, write that:

> To prevent water loss during the hot hours of the day, pine needles have a hydraulic mechanism that permits them to shut off the stomata when transpiration is in excess of water intake by roots...In pines of the temperate region the stomata open their little shutters early in the morning; by noon they are beginning to close, and just before sunset they are almost totally shut for the night. During excessively hot and dry days the stomata open for only a short time in the early morning and then close for the hottest hours.

It is the appearance of the pine at an altitude of about 2000 meters that locals demarcate as the division between the tierra caliente and the tierra fría. Other cash and subsistence crops can be grown in the temporal regions of the tierra fría, but as Tables 5 and 6 denote local residents strongly associate certain plants with each altitudinal zone.

TABLE 5

LIST OF PLANTS LOCAL INFORMANTS USE AS A GUIDELINE TO DISTINGUISH BETWEEN THE TIERRA CALIENTE AND THE TIERRA FRIA IN THE MUNICIPALITIES OF MADERO AND TACAMBARO, 1983

PLANTS SUITABLE FOR THE TIERRA CALIENTE

Yellow oak

Avocado

Peach

Orange

Lemon

Lime

Banana

Papaya

Mango

Maguey (for mescal)

PLANTS SUITABLE FOR THE TIERRA FRIA

Red oak

Apple

Pine

Membrillo

TABLE 6

PLANTS RECOGNIZED AS BEING PRODUCTIVE IN BOTH THE TIERRA CALIENTE AND THE TIERRA FRIA

Corn

Maguey (for pulque)

Tomato

Nopal

Capulin

Ciruela

Chabacano

Source: The above tables were compiled by asking five informants which plants were typically associated with each altitudinal zone.

Tables 5 and 6 may be somewhat misleading as many of the plants in the tierra caliente category could be grown in irrigated areas of the tierra fría. Plants such as avocado trees are grown in the tierra fría but the fruit yield varies. For example, as Table 7 shows, there is a substantial difference between the municipalities in terms of fruit yields for the avocado.

TABLE 7

FRUIT YIELDS IN THE MUNICIPALITIES OF MADERO AND ACUITZIO

COMMON NAME	TYPE OF LAND AND NUMBER OF TREES		KILOS PER TREE
ACUITZIO:	RIEGO	TEMPORAL	
avocado	810		50
peach		1250	21
MADERO:			
avocado	9000		30
peach	3000		30
peach		4000	25

Source: Plan Estatal De Desarrollo Michoacán: Subregion Centro 1978, Gobierno de Estado de Michoacán.

When I questioned locals about the variations in yields of the avocado and peach, I was told the differences were related to the altitude, climate and the availability of water. The avocado trees in Acuitzio were planted in an area that could produce a high yield, but the avocado would not necessarily do as well in other parts of the municipality. The same was true for Madero. I received the same response to the data on peach trees. The local inhabitants of both municipalities are extremely sensitive to what grows well where, and they claim that the introduction of the peach to an area where it does not do well is more an attempt by PROFORMICH to repopulate areas of extreme erosion than it is an effort by local farmers to experiment with this type of cash cropping. I will go into

more detail on the introduction of fruit trees in the following section on reforestation.

By examining Tables 5 and 6, and by recognizing, as in Table 7, that most cash crops do not do well in most areas of the tierra fría, one can see that the disappearance of certain crops (trees) that are suited for the tierra fría would have an adverse effect on the region.

3.2 STATE ENTERPRISE AND THE ECOLOGY

The method of forest exploitation by PROFORMICH has followed a consistent pattern. Before the saw mill was built in Villa Madero, the road between Tiripetío and Villa Madero was paved to allow for the movement of large vehicles. When it started to exploit the forests in the area, PROFORMICH, for the most part, cut trees in the forested areas adjacent to this road (see Figure 2). At the same time this area was being cleared, roads were already being built to exploit the neighboring ranchos (a unit of land that varies both in size and population). The pattern is as follows: 1) state enterprise clears an area of land; 2) while this land is being cleared the road system is being extended to the next property; 3) as the road is being constructed surveying crews enter to mark the trees to be cut. According to supervisory personnel, what PROFORMICH envisions is a road system that will eventually incorporate

all the rural ranchos in the two municipalities. This type of infrastructural development would allow PROFORMICH total access to all the forested land in the vicinity. This road system is well on its way to being completed (see Table 8). The ecological implications of this type of infrastructural development must be understood in terms of the geographic parameters of the two municipalities. Madero and Acuitzio combined only cover an area of 1093 square kilometers.

TABLE 8

CONSTRUCTION OF ROADS IN MADERO AND ACUITZIO OVER A PERIOD OF FIVE YEARS

YEAR	DISTANCE
first	52.374 km.
second	36.500 km.
third	104.179 km.
fourth	216.400 km.
fifth	92.049 km.

Total Construction 501.502 km.

Source: Subsecretaria Forestal y De La Fauna Direccion Tecnica Unidad De Administracion Forestal #4, Acuitzio-Villa Madero-Tacambaro.

In order to understand the economic impact this road system will have on the area, the ecological implications must first be outlined. What this type of infrastructural development means in economic terms will be discussed in the following chapter. Because of the geography of the area,

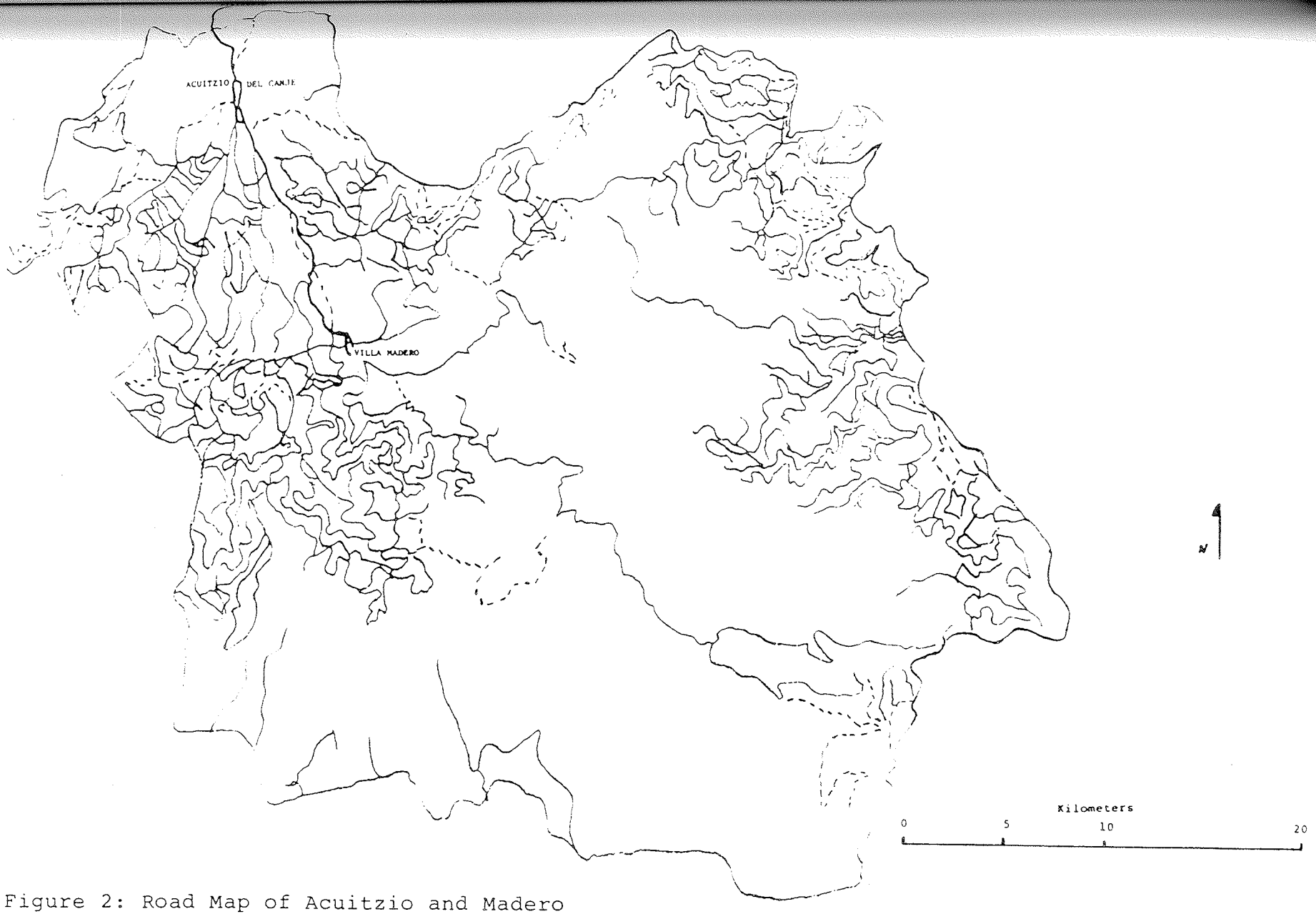

Figure 2: Road Map of Acuitzio and Madero

with its contrasting hills and valleys, the creation of a road system is in itself ecologically disruptive. Parsons (1976:123) explains that:

> When the route has been dictated by engineering, rather than ecological principles, the land it passes through may be ill adapted to farming. Within a few years...such land is often exhausted and left to return to valueless secondary scrub. Budowski has observed that more destruction of landscapes has probably been achieved in recent years through the opening of roads than for any other reason.

Most of the forests in Acuitzio and Madero are in the more mountainous regions of the two municipalities; the land in the valleys, in most cases, has already been turned over to agricultural production. Roads thus must be built through existing farm lands to reach the trees. Travelling to the higher altitudinal areas involves a continuous opening of gates as the trucks dissect their way through the agricultural lands. Children from the nearby hamlets keep watch at the gates to earn a few centavos for opening and closing the gates as the trucks go by. When questioned, local farmers are not happy with this arrangement, but there is little that they can do. The farmers claim that if they do not keep careful watch, the gates are left open and their cattle escape. The truck drivers are also not very concerned about where they drive. The roads through the agricultural lands are usually nothing more than tire tracks left by previous vehicles. If there is an obstruction on this trail (e.g., a log that has fallen off another vehicle,

which happens quite frequently, since the logs are not firmly tied down), the vehicles simply go around, driving over whatever is in their way. The drivers do make an effort not to intentionally damage the farmers' crops, but schedules are usually tight and they do not have the time, they say, to stop and pick up somebody else's logs.

The damage the roads do once they reach the timber regions, or even when they pass through the small forests that protect the agricultural lands from wind and soil erosion, is more severe. Whole areas of forested land must be opened up so the roads can be built. As this land is usually located on a steep incline, most of the trees near the road also suffer from this exposure. I observed many trees dead or dying within ten feet of the road because their roots were exposed or there was massive soil run-off leading to nutrient depletion (see Photo 1). Once these trees are removed, either by locals for firewood or the company for lumber, it is only a question of time before the trees further up also die. When the trees on the side of the road are removed, further soil run-off occurs and the trees further up the slope are exposed to the same conditions (root exposure and nutrient depletion) that the previous trees experienced. Consequently, large spaces are created simply to gain access to the trees.

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Photo 1

The tree cutting itself follows designated ecological principles. First, the experienced markers (usually engineering students working on degrees) enter the area to be cut next. They mark the trees by making a cut on the outward side of the tree. Trees are never cut if they are below 15 centimeters in diameter (these are only cut if the area is particularly sparse), and the trees to be cut are normally spaced at ten meter intervals. Trees are never cut if they are close to an open area (beside a road or an open gully) unless they are dead or in the way. Because the roads cannot reach all the cutting areas, cranes are brought in to pull the trees down with cables. This method of moving trees is probably the most damaging aspect of the cutting process. The trees are pulled down or up, which destroys the underbrush and starter saplings of larger tree species. When I inquired about the destructiveness of this method of tree removal, I was told the reforestation program is intended to rectify this damage.

3.3 REFORESTATION

PROFORMICH has an active reforestation program. The company maintains a nursery and has several employees working there on a casual basis. In previous years there had been three employees assigned to the nursery and replanting on a full-time basis, but this practice has been discontinued. Reforestation is an annual event, usually

taking place in September right after the rainy season. The employment record for reforestation (the actual planting of the trees) shows a steady decline for the past four years.

TABLE 9

NUMBER OF EMPLOYEES INVOLVED IN REFORESTATION

YEAR	NUMBER OF EMPLOYEES
1980	100
1981	40
1982	20
1983	50

Source: The numbers were obtained from employees involved in the September reforestation. The numbers are just estimates on the part of these employees, but they all agree the numbers have decreased decreased dramatically.

When I inquired about the reason for the reduction in employees, I was told that the peones (contract laborers) usually used for this work were needed for more important work (i.e., cutting trees). I was not in the area when the 1983 reforestation took place. I assumed that because in previous years reforestation had taken place in September, it would occur during that month in 1983. I was also assured by a number of people that there would be no departure from this schedule. Nevertheless, when I returned to the area in late July, after a month's absence, reforestation had already taken place. The employees who

had assured me of a September replanting were totally bewildered. They told me the company had decided very quickly to begin reforestation at the beginning of July. No one I talked to seemed to understand the logic behind this change in schedule. July is right in the middle of the rainy season and there could not be a worse time to plant trees; because of soil run-off when it rains, the young trees have very little chance of taking root and surviving. Consequently, PROFORMICH's reforestation program revolves almost totally around the maintenance of its nursery, which requires very little labor.

Another problem with reforestation is getting the landowners to agree to have their lands replanted. I was told the chance of this agreement was about fifty percent. The reasons the company gives for this low percentage are: 1) the owners want to use the land for cattle grazing, and the young trees would only be eaten by the cattle; 2) the owners are afraid that reforestation will make their land more valuable and the government will then expropriate it. Resineros and other land owners perceived the situation somewhat differently. Some land owners claimed that putting trees on their land ultimately benefited PROFORMICH and not them; the trees would only be cut again once they reached a certain size. Since they had received an exploitatively low price for the other trees PROFORMICH had cut on their land, they were not very eager to repeat the experience. In the

case of the resineros, PROFORMICH was simply not offering the same quality of tree it had taken. Tables 10 and 11 indicate the types of species that are preferred for resin tapping. Table 12 shows the species that are presently stocked in the nursery.

TABLE 10

THE RESIN PINES: SPECIES THAT ARE GOOD FOR RESIN PRODUCTION

SPECIES
P. leiophylla
P. pringlei
P. lawsonii
P. oocarpa

Source: One day when I was visiting the nursery, I asked a man working there which pines were best suited for resin production. He conferred with a fellow employee and they agreed on the above list.

TABLE 11

THE RESIN PINES: VOLUME RESIN PRODUCED BY CERTAIN SPECIES

SPECIES	VOLUME PER YEAR IN KILOS (PER TREE)
P. pringlei	3.5
P. michoacana	1.5
P. montezumae	1.5

Source: The above information was collected from informants from Las Sidras. They generally agreed that P. pringlei was the pine that provided per tree the most resin.

TABLE 12

NUMBER OF PLANTS IN THE NURSERY IN VILLA MADERO, APRIL, 1983

FOREST SPECIES	NUMBER OF PLANTS
Pinus montezumae	106,340
Pinus michoacan	38,652
Pinus pseudostrobus	83,918
Pinus oocarpa	38,784
Pinus ayacahuite	9,528
Cupressus lindloyi	11,000

FRUIT PLANTS	NUMBER OF PLANTS
Guayabo (guava)	3,600
Capulin (cherry)	850
Durazno (peach)	1,300
Aguacate (avocado)	368
Teocote	368

Source: Subsecretaria Forestal y De La Fauna Direccion Tecnica Unidad De Administracion Forestal #4, Acuitzio-Villa Madero-Tacambaro.

TABLE 13

GROWTH RATE OF DIFFERENT SPECIES OF THE GENERA PINUS IN THE MUNICIPALITIES OF MADERO AND ACUITZIO

SPECIES	YEARS TO REACH MAXIMUM HEIGHT	HEIGHT POTENTIAL
P. montezumae	30	21.46 meters
P. douglasiana	20	19.93 meters
P. pringlei	40	18.92 meters
P. michoacana	30	19.60 meters
P. leiophylla	30	20.94 meters
P. tenuifolia	20	21.46 meters
P. pseudostrobus	30	14.37 meters
P. lawsonii	20	17.10 meters

Source: Subsecretaria Forestal y De La Fauna Direccion Tecnica Unidad De Administracion Forestal #4, Acuitzio-Villa Madero-Tacambaro.

Because of PROFORMICH's activities in the two municipalities of Madero and Acuitzio, large-scale erosion is imminent (see Photo 2). The area still has not recovered from the intensive exploitation that occurred during the hacienda period (Tucker and Richards 1983). Cook (1963:280) writes about the relationship between erosion morphology and occupation history in western Mexico:

> In turning to the erosion process itself, it should be reiterated at the outset that we are not dealing with geological erosion which continues under all conditions at a relatively slow rate, but with human erosion, which appears only at the site of human intervention with soils and which may become extremely rapid.

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Photo 2

At the beginning of this chapter it was mentioned that there was some debate as to the relegation of responsibility for the persistence of ecologically disruptive agricultural practices. It was emphasized that a common position was to blame the farmer. However, if one closely examines the data introduced in this chapter the onus of responsibility clearly falls elsewhere. State enterprise is rapidly clearing trees that are essential to the livelihood of the resineros. Through PROFORMICH's cutting practices the ecological equilibrium of the area is being challenged. The type of reforestation program that PROFORMICH has introduced is not conducive to the regenerative stimulus the ecology of the area needs--"recovery is normally much slower than destruction; centuries and perhaps millenia are consumed in the complete reconstitution of mature soil profiles" (Cook 1963:286).

This is not to say that the resineros themselves did not destroy aspects of their forests, but that the resineros' interaction with the forests was closely aligned with the maintenance of their forests for continued resin production. In the next section I will describe resin techniques in order to make clear the importance of forest maintenance to the resineros.

3.4 RESIN EXTRACTION

The people that are suffering the most as a result of forest exploitation are the resineros. With every pine tree that is cut down, another portion of their livelihood is removed. One can see from Tables 10, 11 and 12, that even though new trees are offered to the resineros, the Pinus pringlei, from which the sap "runs like water," is not one of them. The reasons for this are economic. Pinus pringlei does not grow as quickly as other species of pine (see Table 13). All the species of pine in the nursery take approximately 20 to 30 years to reach their maximum height, the Pinus pringlei takes 40 years to reach a height of 18.92 meters. Also, considering most of the land the resineros own is in the higher altitudes of the tierra fría, the fruit trees that PROFORMICH offers are of little use to them (see Table 5).

The resineros cannot intensify resin production. Each tree provides a certain amount of resin per year (between 1.5 and 4.0 kilos) and because of nature's restrictions (too many cuts and a tree dies) this amount cannot be increased through intensification (Collazo and Barrera 1982). The method of resin extraction the resineros of the study area employ is known as the sistema frances. The instruments and tools utilized are:

1. Cacharro - the collecting recepticle, either a clay pot, plastic container or beer can (see Photos 3 and 4)
2. Vicera - the spout, directs resin into the cacharro (also in Photo 3)
3. Hacha - scraper, used to scrape the resin off the cara (open cut or face)

A pine tree will be tapped for resin when it is about 30 centimeters in diameter. A cut is made in the tree that is 50 centimeters long, 8 centimeters wide and 1 and 1/2 centimeters deep. A tree of 35 centimeters will have just one cut or cara, while a tree that is 45 centimeters in diameter can support two caras. The resin is collected every seven to ten days. Each cut is maintained for a period of a year. The cutting cycle is as follows: When a tree is ready to be tapped, an incision is made 50 centimeters from the ground. After a year, another incision is made 50 centimeters from the top of the first cut. This cycle continues for five years. There is now an open cut 250 centimeters in height. Once this height is reached, a new cut is made 10 centimeters from the old one, again starting at 50 centimeters from the ground. By the time the tree is circumscribed, the initial incision will be ready to be tapped again.

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Photo 3

Photo 4

Another variable causing environmental damage not mentioned in this chapter is forest fires. At the present time, forest fires are responsible for the majority of deforestation in the area. In this chapter my intentions were to relate the ecological limitations of the area, so that the chapter on economics could be understood in its wider context. As such, forest fires have more to do with people succumbing to economic pressures than resulting from natural causes (i.e., lightning). State enterprise has taken away from the resineros their means of survival; they (the resineros) have no alternative but to convert their land to subsistence cultivation. As I have shown, very little can be grown in the higher altitudes of the tierra fría. Even if the resineros accepted the government's offer of reforestation, it would be at least ten years before these trees would become productive. In the next chapter, I will examine how even the loss of just a few trees jeopardizes the resineros' chances of earning a living.

NOTES

[1 In all likelihood, the haciendas in the area probably engaged in intensive grain production and cattle grazing. Whatever the case, the area still has not recovered ecologically.

[2 Cook (1982) states that a fundamental feature of petty commodity production is that a commodity (such as resin) "can most easily be transformed into other commodities through money pricing."

Chapter IV

LOCAL ECONOMY

> Too many of the trees being cut today are performing crucial environmental services for people and would be better left in the ground or immediately replaced. Too many forests are being logged in a manner that maximizes the immediate profits of a few but jeopardizes the long term welfare of the majority (Eckholm 1979:16).

Very few anthropological studies have focused on the social implications of forest development projects (Cernea 1981). Many of the studies that have been done only focus on the reforestation aspect of forestry development. As is the case in the municipalities of Acuitzio and Madero, these studies find that local resistance to reforestation is a troublesome problem. In Acuitzio and Madero, however, the negative local reaction to reforestation is influenced by the reality that the rural populace does not see reforestation as being beneficial to their long term interests. The data in Chapter III shows that PROFORMICH's reforestation program is designed to ensure future cutting material, not to provide the local residents with an economic alternative. The local residents know that the species of trees they are being offered are ecologically unsuited to the area. Social impact studies do not take this variable of profit motive on the part of the developers

into consideration (see Kunstadter et al. 1978). Rather, these studies see local land tenure as a major impediment to reforestation. Cernea's (1981) study of the people of Azad Kashmir, Pakistan, is indicative of this trend. The Hill Farming Technical Development Project, which Cernea participated in, tried to generate commitment to reforestation projects by cordoning off sections of land to allow for regeneration to occur. Cernea argues that the project encountered continual problems with the people because of the nature of their land tenure system. Since legal (de jure) ownership of land could not be established, it was impossible to negotiate any longterm arrangement that would allow land to remain untouched for a number of years. Private land, in many cases, was also communal land for certain affairs. Cernea (1981:32), therefore, concludes that:

> It is now largely recognized that many of the sectoral issues relating to (participation in reforestation) are sociological and that securing the cooperation of local people...presents formidable problems (World Bank, Forestry Sector Policy Paper 1978).

In this section of the thesis I will discuss how capitalist development in the area of forestry exploitation has affected the socio-economic opportunities of the resineros of Acuitzio and Madero. The resineros of these two municipalities have been exposed to forest development for a number of years now, and they have still to see any

sign that they will profit from this development. In fact, the forest occupationalists' standard of living has decreased dramatically since forestry industry has expanded onto their land.

PROFORMICH's production has increased considerably over the last two or three years. The new road system has provided access to the more remote regions of the two municipalities, thereby allowing PROFORMICH to exploit a much larger area. Also, the government subsidies that financed PROFORMICH in its formative years are no longer available because of the government's overall debt to foreign bankers. Consequently, PROFORMICH's activities that are likely to show a profit (tree cutting) have increased while those that require capital expenditure (reforestation) have decreased. It was stated in Chapter I that crews never returned to an area two days in a row. I was told by a number of employees that this practice was a departure from previous years. Apparently, the company's objective is to mark as many trees as possible in order to qualify for further government subsidy. PROFORMICH requires proof that it is capable of achieving a profit, so formal government contracts between the landowners and the company must be officially recorded. If PROFORMICH can present documentation that it will be able to realize a profit in the future, further government support will be provided. Because of this financial priority, ecological restraining

measures are less rigidly enforced, and the company will usually purchase as many trees as a landowner is willing to sell.

4.1 OPPORTUNITIES FOR WAGE LABOR

PROFORMICH employs approximately one thousand employees in its forest developmental program. This figure does not include the resineros who, while also state employees, fall into a different category. Of the one thousand employees approximately fifty percent are full time employees and the other fifty percent are peones or contract laborers. The contract laborers usually work about eight months of the year, but their contract can be terminated if their labor is no longer needed. Considering the government's intentions to involve the local populace in the "productive process," not all area residents have found jobs; there has been a high incidence of in-migration since the developmental programs began. In Villa Madero permanent housing was built to accomodate about two hundred workers and their families. According to local information in Acuitzio del Canje, many of the jobs at the furniture factory also went to outsiders. Although there was a directive that local ejidatarios were to be given priority in terms of employment, this directive has been ignored.

Although hiring trends for local employment vary considerably, I was able to identify a few patterns: 1) People would line up at the factory gate in hope of a day's employment. When I inquired about the success of this strategy, I was told that some weeks they would work the whole week and the next week there would be nothing for them. Their ability to gain employment depended to a large extent on who they knew already working in the factory. For example, if a crew chief needed a couple of employees, he would usually pick someone he knew from the crowd. The day-to-day laborers hoped that their persistent efforts would one day lead to full-time employment. 2) When the engineers went to mark the land, the owner of the land might insist on some type of employment for himself or one of his relatives. Frequently, after accompanying a crew to mark land, I would notice some of the people from the vicinity of that land show up for work in Villa Madero the following day. What these patterns suggest is that it is extremely difficult to get a job with PROFORMICH unless you know somebody who already has a job there or who has influence.

The peones who do find work are paid the Mexican minimum wage of about 385 pesos a day. In an informal questionnaire survey conducted at the factory in Acuitzio del Canje, the majority of the respondants agreed that this salary was not enough to live on. While creating jobs PROFORMICH has also contributed to the loss of jobs in other sectors. Before

the developmental programs began, most of the fuel energy needs of Acuitzio del Canje and Villa Madero were provided by the forest occupationalists. After the saw mills were built PROFORMICH began to sell cheap scrap wood. Since scrap wood in the factory sells for about 10 pesos a wheelbarrow full, it is impossible for the forest occupationalist to compete with this low price. Photos 5 and 6 elucidate the old and new way of fuel consumption. When the forest occupationalists still provided wood for the towns, they would load up their burros or carts and sell the wood door-to-door. Now, the townspeople themselves go to the factory to buy the wood they need.

4.2 THE RESINEROS

The resineros, who are also state employees, are not subjected to the vagaries of employment opportunity in Acuitzio and Villa Madero. The resineros are paid by the government for the resin they collect. Although a few peones are former resineros, their relative social and economic isolation have prevented them from establishing the prerequisite contacts for wage employment. If a resinero is employed by PROFORMICH for wage labor, chances are that he owned a large amount of land and gained employment from this advantage.

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Photo 5

Photo 6

Although I could not get an accurate count of how many resineros there actually are in Acuitzio and Madero, one state employee estimates there are between 1200 and 1500 in the two municipalities. The amount of resin each resinero collects is dependent on how much land he has access to (see the discussion on land tenure in this chapter). Some resineros collect as much as 15,000 kilos a year, while many collect only about 400 kilos a year. The majority of cases fall somewhere between these two amounts. 15,000 kilos a year is an extremely large amount of resin for one man to collect and by area standards it would make him a wealthy man. As Table 14 demonstrates, 15,000 kilos would provide an income of 240,000 pesos a year.

TABLE 14

AMOUNT PAID FOR A KILO OF RESIN
BY YEAR IN ACUITZIO AND MADERO

YEAR	PER KILO
1981	10 pesos
1982	12 pesos
1983	16 pesos

Source: I interviewed a number of local informants as well as certain people involved in local state enterprise. The figures I received were the same in all cases.

However, a person who collects only 400 kilos a year would earn only about 4,400 pesos a year--not nearly enough to live on. Most of the cases fall between these two extremes. The following cases are examples of this variation within the predio (property area) of San Pedro Piedras Gordas.

TABLE 15

RESIN PRODUCTION AND PROPERTY SIZE
FOR SAN PEDRO PIERDAS GORDAS, 1982

CASE NUMBER	LAND OWNED IN HECTARES FORESTED	UNFORESTED	TOTAL	RESIN PRODUCTION (KILOS)
1	17	0	17	3,400
2	18	0	18	3,025
3	2	23	25	400
4	18	1	19	3,750
5	40	5	45	10,000
6	11	7	18	2,100
7	23	1	24	5,750
8	18	0	18	1,800
9	44	1	45	20,000
10	33	0	33	15,000
11	18	5	23	3,125
12	25	54	79	5,000
13	42	1	43	5,000
14	36	0	36	3,600
15	12	23	35	11,250
16	6	0	6	1,000
17	40	79	109	13,000
18	7	2	9	1,250
19	30	11	41	5,000
20	25	39	64	2,500
21	24	0	24	3,000
22	15	11	26	3,750

TABLE 15 (continued)

CASE NUMBER	LAND OWNED IN HECTARES FORESTED	UNFORESTED	TOTAL	RESIN PRODUCTION (KILOS)
23	20	11	31	6,250
24	6	2	8	1,200
25	9	5	14	1,800
26	8	3	11	1,600
27	10	0	10	2,000
28	23	1	24	14,100
29	21	1	22	8,750
30	19	2	21	4,750
31	13	0	13	10,000
32	11	7	18	3,400
33	13	6	19	2,600
34	6	12	18	2,700
35	5	9	14	2,125
36	10	9	19	2,000
37	17	2	19	3,400
38	40	6	46	1,150
39	13	0	13	7,000
40	12	0	12	8,000
41	25	0	25	5,000
42	20	0	20	4,000
43	20	0	20	3,000

Source: S.A.R.H. Representacion General en el Estado de Michoacan, Delagacion en Morelia.

As Table 15 shows, there is in a few cases very little correlation between land size and resin production. In most instances, this vast difference (e.g., the 13 hectares that case 32 has would not produce 10,000 kilos of resin) can be explained in terms of a sharecropping arrangement. Resineros generally agree that ten hectares of fairly dense forest will produce about 2,000 kilos of resin per year. It is also generally agreed among resineros, that in terms of today's (1983) expenses, a resinero must earn about 40,000 pesos a year to meet domestic consumption requirements. This means that any resinero collecting under 2,500 kilos of resin is in some type of financial difficulty. Again, individual cases may vary. Some resineros have larger amounts of agricultural land to help sustain them. If one looks at Table 14, and calculates the wages the resineros received in 1981 and realizes how little these wages have been incremented in the last two years, it becomes obvious why the resineros are concerned about a loss of income. In terms of Table 16, the resineros have to sell almost twice as many kilos of resin to purchase one kilo of beef. The staples--beans and tortillas--have almost doubled in price, while the resineros' increase in earning power is less than thirty-five percent a year.

To many of the resineros in San Pedro Piedras Gordas, the rapid escalation in price of essential subsistence foods and the decline in purchasing power of the income they receive

from resin, has forced them to re-align their priorities. The resineros have three options open to them: 1) they can look for wage labor in the immediate area; 2) a resinero family can pool its resources and send one of its members to the United States to work; 3) or they can turn over their forested land to subsistence cultivation. In the first instance a resinero may find seasonal work to supplement resin activity, but despite the development projects there is still a chronic shortage of jobs in Acuitzio and Madero. The second alternative of sending a family member to the United States requires considerable capital investment (about 35,000 pesos). This alternative is seriously being considered by some resineros (see San José de las Sidras: Case Study II). The third option is sometimes precipitated by the first two alternatives. In order for a resinero to engage in full-time wage labor, he must give up his resin collecting activity. The collection of resin is labor intensive while maize cultivation only requires a serious commitment of time during planting and harvesting.

TABLE 16

LOCAL FOOD COSTS IN THE YEARS 1982 AND 1983
IN ACUITZIO DEL CANJE

PRICE IN PESOS

TYPE OF FOOD	JAN. 1982	JAN. 1983	NOV. 1983
Tortillas (kilo)	8	11	15.50
Sugar (kilo)	20	28	38
Beef (kilo)	100	120	300
Pork (kilo)	100	150	250
Chicken (kilo)	100	100	200
Beans (kilo)	20	20	40
Lettuce (head)	6	8	20
Tomatos (kilo)	30	40	80
Corn (kilo)	15	15	19.20
Milk (liter)	20	20	36
Bread (loaf)	-	18	62
Milk (package of powder)	-	148	202
Cooking Oil (liter)	-	95	123

Source: The food cost table was organized by asking various people the price of a certain commodity. Since no one person was familiar with the whole range of food costs, a number of people were relied upon for estimates. For example, the shop keeper, in whose house I lived, was only familiar with those articles he actually sold in his store, e.g., cooking oil, powdered milk and bread. Meat and vegetable purchases were the responsibility of the lady of the house. Also, I purchased many of the articles for her on occasion, so I was personally acquainted with price fluctuations. I did, however, encounter certain problems with this approach. Prices have spiraled so rapidly in the last number of years that it was impossible to produce a totally accurate index. People in the village (even the shop keeper) retrospectively

had a difficult time relating to past prices when the peso had 200 percent more purchasing power. Consequently, this table is intended as an indicator of inflation in the area and it should not be regarded as an accurate price list.

The resineros usually clear their land by burning down the trees. There is no really good answer as to why the resineros clear their land in this manner, but one could assume that it has some relationship to the state's control of timber rights in the two municipalities. The government and local people routinely attribute the high incidence of forest fires to vandalism or accidental causes (see La Voz 1983). If it were publically accepted that the resineros were burning their own land, legal action may be taken by the authorities (in terms of the ejidatario this may mean the loss of usufruct rights to the land). Land clearing must, therefore, appear accidental.

The cartoon in Figure 6 aptly describes this situation, but it is difficult to translate literally. The context of the cartoon is as follows: the secretary for agriculture and water resources (Secretaria de Agricultura y Recursos Hidraulicos (SARH)), Amaro Jaramillo, is expressing a familiar government stance toward forestry development. The government acknowledges no responsibility for deforestation in the region, so Jaramillo is in the first conversation responding to queries by the forest occupationalist to government policy. Jaramillo says, "What forest fires, what quotas for the protection of the forests (are being abused), what avocado entrepreneurs are burning down the forests so they can plant avocado trees?" The forest occupationalist responds, "What forest?"

Figure 3: Source: La Voz de Michoacan, May 23, 1983

4.3 THE LAND TENURE SYSTEM

In the municipalities of Acuitzio and Madero, there are three generally recognized patterns of land tenure: pequeñas propiedades, legally defined small holdings that range in size from 2 to 400 hectares (see Table 3); comunidades, a collection of small plots worked collectively; and ejidos, government issued land held in usufruct. There is only one comunidad in the two municipalities and it is located in Madero. By far the most common type of landholding is the pequeña propiedad. The pequeña propiedad is a legally recognized landholding, but its sanctity is being questioned by some. Efren Capiz (1983), the chief representative for the Morelia-based Emiliano Zapata Union of Communal Workers, argues that:

> How can you call an owner of 100 hectares of land a small property owner when a ejidatario is allowed to work only a maximum of 10 hectares--10 times less land.

A problem that complicates recognizing the size of large landholdings is the phenomenon known as hombres de paja (name lenders). Agrarian reform laws stipulate the size of landholdings, but these restrictions are defined in terms of individual holdings. The easiest way to get around this legislation is to divide the land up into small parcels and register these parcels to different family members. This type of land division makes it difficult for the government to recognize large landholdings. For these large

landholdings to be expropriated they have to first be challenged. Landless peasants will approach the Agrarian Reform office with evidence that a certain landholding exceeds the government's limitations on landownership. The office of the Agrarian Reform will investigate, and if the claim is substantiated the landless peasants will be given plots of ejido land that have been expropriated from the larger landholding. Since the amount of mountain forest land that can be owned is 800 hectares, there are few holdings in Acuitzio and Madero that come even close to that size.

Some of the larger holdings in San Pedro Piedras Gordas are nevertheless sharecropped. Cases 15 and 38 of Table 15 provide evidence for sharecropping. In regards to case 15 it is impossible for 12 hectares of forest land to produce 11,250 kilos of resin. Conversely, case 38, unless the land is very marginal, should be able to produce more than 1,150 kilos of resin per year. The process of a medias (sharecropping) will be elaborated in San Pedro Piedras Gordas: Case Study I.

4.4 THE FOREST EJIDOS

There are twelve ejidos in the municipalities of Acuitzio and Madero that can be defined as forest ejidos --where at least part of the ejido is comprised of forest land. Table 17 lists eight of these forest ejidos. In this section I will discuss two particular ejidos: San Pedro Piedras Gordas and San José de las Sidras. These two ejidos are representative of two distinct phases of the developmental process. The ejido of San Pedro Piedras Gordas is in an area where extensive cutting has taken place. The ejido's proximity to Villa Madero (see map) made it an early target for forest exploitation. Table 17 shows that resin production between 1981 and 1982 dropped 13,652 kilos. If one uses the ratio that 10 hectares equals 2,000 kilos (a ratio that is fairly consistent in Table 15), then San Pedro Piedras Gordas has lost approximately 65 hectares or 25 percent of its forested land. In pesos, at the 1982 price for resin, the resineros' income loss is 162,754 pesos. This 162,754 pesos represents what is actually lost in purchasing power. Since the resineros received a 2 peso a kilo increment for resin in 1982 (an increase that was supposed to offset a higher cost of living) one must include this amount to measure the real loss to the resinero in income. I witnessed heavy cutting when I was in the area in 1983, but I was unable to tabulate how much this cutting affected resin production.

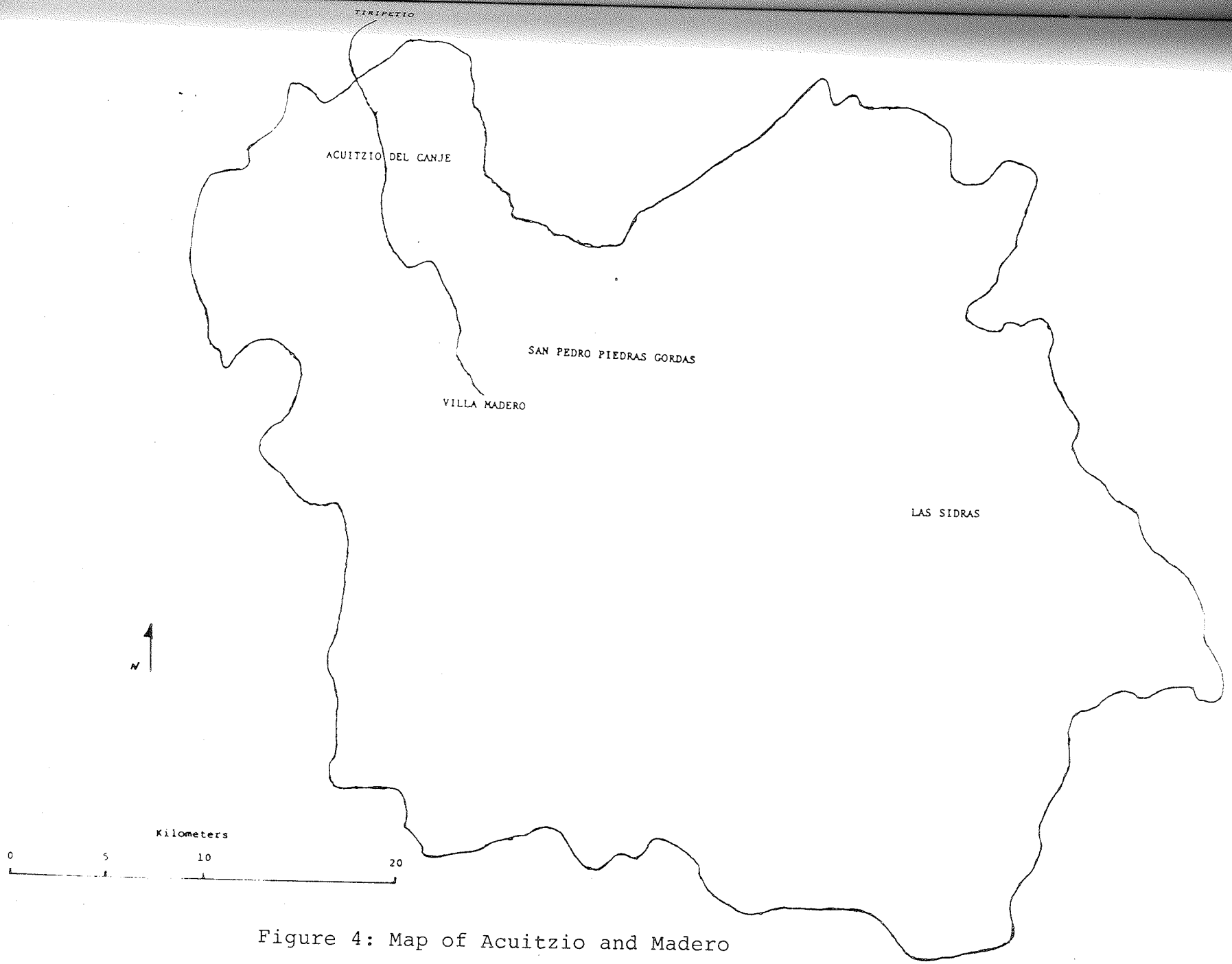

Figure 4: Map of Acuitzio and Madero

There are presently twenty-eight *ejidatarios* living on the *ejido* of San Pedro Piedras Gordas. These *ejidatarios* share 333 hectares of land, which in division works out to about 12 hectares per *ejidatario*. Taking into account the loss of the 65 hectares, San Pedro's *resineros* now have only 9.6 hectares of forest land, assuming each *resinero's* land was cut to the same extent. Since the company deals with the *ejidatarios* on a collective basis through an *ejido* representative, the cutting pattern does not relate to individual *ejido* plots but to the totality.

TABLE 17

RESIN PRODUCTION PER EJIDO

	YEAR				
	1981	1982	SIZE IN HECTARES		
	RESIN IN KILOS		FORESTED	UNFORESTED	TOTAL
San Andres Coapa	25,637	31,875	359	605	964
Ziperapio el Alto	198,500	144,000	607	118	825
Poruas	48,457	41,750	139	105	244
Villa Madero	254,950	250,000	2846	631	3477
Turio	23,062	23,000	1985	267	2252
San Jose de las Sidras	11,329	11,125	913	0	913
San Pedro Piedras Gordas	78,662	64,900	325	8	333
Santa Marias	52,250	52,000	35	256	291
Etucuaro	7,500	7,750	506	33	539

Source: S.A.R.H. Representacion General en el Estado de Michoacan, Delagacion en Morelia.

The ejido of San José de las Sidras was until 1983 geographically isolated. Although there was regular interaction with market centers (mostly Villa Madero), the road system did not reach las Sidras until 1983. The ejido of San José de las Sidras has 913 hectares of forested land but no officially recorded agricultural land. The decline in real earnings is not as drastic for las Sidras as it is for San Pedro. Since the road system did not reach las Sidras until 1983, there is no reason to expect a decrease in resin production between 1981 and 1982. The loss of 204 kilos of resin during this period can be attributed to any number of factors.

There are 55 ejidatarios living on ejido land in San José de las Sidras. If the total income for resin production is tabulated for 1982 and divided among the ejidatarios, each would receive 2427 pesos. The size of ejido plots is larger in las Sidras than in San Pedro. The las Sidras ejidatario has usufruct rights to approximately 16 hectares of land. This amount of land, say the people of las Sidras, is no longer sufficient for domestic consumption. Consequently, the ejidatarios of las Sidras have cleared sizeable portions of land for maize cultivation (see Photos 7 and 8).

As I mentioned in Chapter III, the tierra fría, which is the altitudinal zone where las Sidras is located, is not ideally suited for agricultural experimentation. Table 18

shows that maize produces twice the yield on irrigated land than on rain-fed land. The land in las Sidras is almost totally rain-fed.

TABLE 18

MAIZE YIELD TABLE

	LAND TYPE	
PLANT	IRRIGATED (YIELD PER HECTARE)	RAINFED (YIELD PER HECTARE)
maize	2000 kilos	1000 kilos

Source: Plan Estatal De Desarollo Michoacan: Subregion Centro 1978. Gobierno Del Estado De Michoacan.

Clearing the land for agricultural production may alleviate the present economic difficulties of the forest occupationalist, but this is just a short term solution. The long-range implications of this action are two-fold: 1) the relief that subsistence production on marginal land provides might be sufficient for a couple of years, but as intensification continues the soil nutrients are depleted and the land produces a smaller yield each subsequent year; 2) after a few years of intensive cultivation the land experiences erosion and becomes virtually useless.

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Photo 7

Photo 8

4.5 CASE STUDIES: INTRODUCTION

The resineros collect their resin every eight or ten days. Since each resinero manages a sizeable quantity of trees, they usually visit different areas of their forest on alternating days. Once a week the resin is brought to a deposit, where it is stored until a truck comes to pick it up. The deposit also serves as a store where the resinero can purchase essential commodities. The person in charge of the deposit is usually a resinero, who makes 25 centavos per kilo for handling the resin.

4.6 SAN PEDRO PIEDRAS GORDAS: CASE STUDY I

The area of San Pedros Piedras Gordas has been under intensive forest exploitation since the developmental programs began. There are, however, some areas of San Pedro that are only presently being developed. This case study occurs in one of those areas.

In April, 1983, I gained access to a group of remote ranchos by accompanying a crew of markers. The road system had not yet penetrated this part of San Pedro Piedras Gordas, so our party was forced to walk and climb for about an hour and a half before reaching these outlying ranchos.

When we arrived I noticed a solitary resinero collecting resin. The resinero was quietly going about his work but he

seemed distracted by the presence of the marking crew. The land the resinero was working did not belong to him but to the owner (dueño), who was enthusiastically instructing the markers to stamp as many trees as possible. When a marker hesitated at a 45 centimeter pine tree, and questioned whether this tree should be marked since it was the ideal size for resin extraction, the owner encouraged him to mark it. When the marker tried to explain that certain trees should be allowed to stand because of their environmental importance, the owner became belligerent and argued that the land and trees were his to do with as he pleases. The owner would receive between 2,000 and 5,000 pesos for each tree, so the more trees marked the better the profit potential. In total, about 80 percent of the open-faced trees (those with resin cuts were marked for cutting in this 15 hectare area.

When the markers finished their work and stopped to rest before proceeding to another section, the resinero, who had been watching the markers stamp the trees that were his livelihood, approached the crew. The resinero inquired if there were any job openings with PROFORMICH. The engineer in charge of the crew replied that he did not know for sure about any openings but he would see. Later, when I questioned the engineer about the resinero's request, he told me that people ask him for jobs all the time but what could he do. I then asked him specifically about the

resinero's chances for employment. The engineer was sympathetic to the resinero's plight, but he said that with the resinero's experience all he could do was physical work, and there were already too many unemployed peones.

When the crew departed, I decided to stay and talk to the resinero who had asked for the job. I inquired as to what his plans were once the trees he worked had been cut. He said he did not know; resin collecting was all he had ever done.

The resinero was 40 years old and owned 3 hectares of rainfed agricultural land. The resinero worked the trees through a sharecropping agreement (a medias) with the owner who had been selling the trees. The resinero said he had worked these trees personally for 25 years and as far as he could recall his family had always worked for the present owner or his family. After a payment of 5,000 pesos to the owner, the resinero earns 20,000 pesos a year for his work. The sharecropping arrangement is thus one-fifth for the owner and four-fifths for the resinero.

On his 3 hectares of agricultural land, the resinero grows maize (for domestic consumption only) and grazes his 4 cows. The 20,000 pesos he receives annually from resin, and the produce derived from subsistence activity, is used to support himself, his wife, their four children and his brother who lives with him.

After discussing his economic situation, I again asked the resinero what he was going to do after a good portion of his 20,000 peso income disappears when the trees are cut. He said that he would look for more trees but that these trees would be difficult to find because it was the same everywhere. The resinero said he would like to work in the factory in Villa Madero, but he knew other people that had tried to work there and had not been successful.

In retrospect, I often wonder about what is going to happen to this particular resinero and others like him. For the most part, these resineros do not have the skills or social connections to successfully compete for wage-labor employment in the region. Most of the jobs the peones do for PROFORMICH involve numbers (counting and measuring trees), and this resinero had an extremely difficult time with calculations. Even for a question as to how many cows he had, the resinero had to use his fingers to arrive at the number 4.

4.7 SAN JOSE/ DE LAS SIDRAS: CASE STUDY II

The drive from Acuitzio del Canje to las Sidras takes 6 hours. The new road to las Sidras is in generally good shape most of the way, but as one gets closer to las Sidras parts of the road have already slipped into the deep terrain below. When the rainy season arrived, in June 1983, this new road was washed away.

Because las Sidras is such a great distance from Acuitzio del Canje, José, Alfredo (a friend of José along for the trip) and I had to stay in las Sidras for two days. The time factor was not important to José because he wants to use this time to become better acquainted with the people in las Sidras. José had never been to las Sidras before and wanted to ensure a hospitable welcome on his next visit.

San José de las Sidras is locally known as the place where "the resin runs out of the pines like water." The people who live in las Sidras are totally dependent on resin for their income--until the ejidatarios cleared their land for subsistence cultivation this year there was no agricultural land in las Sidras.

The resinero family we stayed with was very poor. There were, however, a few indicators (a radio and a recently constructed adobe house) that the family had known more prosperous times. The household (the household is defined here in terms of a residence unit--where people actually sleep; it is not based on domestic consumption patterns because there is a lot of sharing of food between households) consisted of an extended family that included a mother and father, both in their sixties, four single teen-aged daughters, one single son in his early twenties, and one married son and his wife and two small children. The house was situated in close proximity to two other houses

and there was continuous interaction among these three households. For example, if someone had prepared some atole, it was usually shared among these three households.

The father owned 20 hectares of forested land and was proud that he was a pequeño propietario and not an ejidatario. He claimed that resin production had been very good this year, but despite this year's high yield, life was harder than ever. Many things (e.g., meat and sugar) were now too expensive to buy. The 80,000 pesos that his 5,000 kilos of resin would earn would not be enough for the family to live on for a year. The resinero had too many obligations, his family was too large to live on this income. In order to overcome their present economic crisis, the family had decided to send the married son to the United States. This would require a great deal of money but the family figured that they had no other alternative. The son had never been to the United States but he had heard from other migrants that there were plenty of jobs.

The family's precarious economic situation was very obvious when we sat down to eat. The mid-day meal consisted of eggs, tortillas and beans. I found out later that the eggs were cooked especially for us as guests; the five chickens the family owned did not lay enough for them to eat eggs on a daily basis. We had brought along some food and the family welcomed our willingness to share it with them.

We had brought some beans, sausages and a few cans of peas. The two young children became ill after eating the peas; their reaction suggests that vegetables are not a regular part of their diet.

It was very clear that the family had a chronic food-shortage problem. Judging from the amount of coughing by both children and adults during the night, the whole family seemed deficient in essential vitamins. The pigs the family kept were also under-nourished and it is doubtful that these pigs would provide much additional food when they were slaughtered.

Forest development would help resolve some of the family's immediate economic problems. If the family sold their trees to PROFORMICH they would have cash on hand to meet their subsistence needs for awhile. But after the resinero family has sold its trees and spent the money, what will its members do? When I asked this question, the resinero was not able to project that far into the future. The changes that were occurring now were beyond his control.

4.8 PROSPECTS FOR POLITICIZATION

The resineros of Acuitzio and Madero have just begun to experience the problems discussed in this thesis, so it would be premature at this time to speculate how this disruption of their lives will affect their political

attitudes. One can, however, point to a number of factors that may prevent the resineros from organizing politically. Most resineros in the two municipalities are acquainted with only those resineros who frequent the same deposits as themselves. The deposits are dispersed throughout the municipalities and travelling from one to another requires a great deal of time and effort. For the resineros to mobilize as a consolidated political force, a dialogue would somehow have to be established. Basic class differences between the resineros would also impede political mobilization. The interests of a resinero who owns 109 hectares of land (see Table 15, Case 17) and a resinero who has usufruct rights to 9 hectares of land are not the same. The resinero with 109 hectares of land may actually benefit initially from capitalist development, for the sale of a large number of trees at one time will provide the resinero with money that can be used as capital to invest in other areas. The resinero with only a small amount of land will have to use the money received from the sale of trees for domestic consumption to offset the loss of income normally obtained through resin collection. Consequently, the resineros' geographic isolation and their divergent economic interests inhibit any sort of consolidated political reaction.

Chapter V

CONCLUSION

In the final analysis one can see that the forest occupationalists of Acuitzio and Madero have not benefited from the developmental projects in the area. In fact, the resineros of these two municipalities will soon disappear as an occupational group. With forest exploitation preceding at its present pace, very few resineros will be able to derive a livelihood from this occupation alone in the future. The resineros are destined to become, like many others in Mexico, a semi-proletariat that engages in wage labor when it is available; and when their labor is no longer required they return to their marginal land to eke out a bare subsistence living.

In Chapters I and II, I emphasized that Mexico's increasing dependence on foreign capital was directly responsible for the intensification of class relations and the persistence and perpetuation of pre-capitalist modes of subsistence production in the municipalities of Acuitzio and Madero. Mexico initially became dependent on "finance" capital in order to diversify production and thereby become less reliant on oil as an export commodity. The foreign capital that was loaned to Mexico was used to promote

industrial activity in previously unexploited areas of Mexico's hinterland. The falling price of oil on the world market, and the subsequent inability of Mexico to meet its repayment schedule, has led to the present "crisis."

Mexico's present position in the world capitalist system is best understood in terms of "debt dependency" (Chase-Dunn 1975). Debt dependency signifies a new phase of capitalist expansion in the "Third World." In general terms certain Latin American countries are more susceptible to this form of capitalist penetration than others. Petras and Morley (1983:259), although discussing foreign investment in Venezuela, describe an attitude among foreign investors that pertains to Mexico as well:

> Unlike the cases of Brazil and Peru, however, the international financial community did not see fit to elevate the Venezuelan debt to an issue of pressing importance. As one American banker who participated in an $850 million syndicated loan to the state agencies in December succinctly put it, Venezuela's oil wealth still made it 'the best place to lend your money in Latin America'.

The phenomenon of Mexican dependency can be related to two specific trends: 1) "The relative decline in the profit rate of industry" (Petras 1983:74) in the already industrialized countries; and 2) the Mexican government's nationalization policies. With the first trend, rising wages and the heavy cost of subsidizing domestic reproduction in the already industrialized nations (e.g., Canada; see Chapter I) has forced capitalist entrepreneurs

to seek out more profitable areas for investment. Marchar (1983:20) writes that:

> In its crudest form, this may be found in the absolute inequalities for the same work, as when a mining company intensifies production in a low-wage country in order to take advantage of cheap labor, while closing or reducing production of the same ores within a high-wage country.

The second reason for the particular character of this phase of capitalist expansion is associated with the nationalization policies of governments such as Mexico and Venezuela. These nationalization policies interfered with the freedom that capitalist investors had enjoyed in Latin America; these policies challenged and "infringed on the historically rooted free hand of business in the hemisphere" (Petras 1978:163). Consequently, foreign bankers had to find a new route to invest capital that was no longer capable of producing profitable increments in the industrialized countries to areas abundant in profitable resources but protected by restrictions on foreign investment. Although direct foreign investment was not permitted by law, international capitalists found that countries like Mexico were willing to accept loans for industrial development. Petras (1983:74) explains that:

> Finance capital flows to those countries where the productive forces are already in place and where there is a regime heavily oriented towards export growth...and possesses a capacity to extract surplus value from labor to meet payments.

The area of export growth in Mexico's case was dependent on a continued increase in Mexican oil production and the escalating price of oil on the world market. When the price of oil dropped on the world market and Mexico was unable to meet its interest payments, the International Monetary Fund imposed conditions that would ensure repayment through the extraction of "surplus value from labor". These conditions consisted of an austerity program for Mexico that would effectively freeze wages and place limits on Mexico's domestic subsidy programs (the Mexican government has subsidized food, gasoline and transportation costs to keep these essential commodities in the price range the majority of its population can afford). As a result of this austerity program, the industrial infrastructure that the Mexican government had financed through foreign borrowing would have to begin to show profitable returns.

Mexican state enterprise is perfectly suited to accomodate the demands set out by the IMF. Mexico possesses:

> a large internal market, with a state and class structure capable of converting loans into productive activity (Petras 1983:74).

In Mexico's case all that was required was an intensification of this productive activity. But the intensification of this productive activity entailed the further marginalization of Mexico's labor force. Because of wage controls and rising prices the rural labor force would

now have to depend more on subsistence activity to meet domestic consumption requirements.

In the municipalities of Acuitzio and Madero regional development had already altered the articulation of local economic interaction. Forest occupationalists who had engaged in petty commodity production before regional development took place were transformed into a proletariat labor force through their incorporation into state enterprise. Before development the forest occupationalists derived a part of their livelihood from charcoal manufacture and wood collection. This way of making a living was taken away from them when state enterprise monopolized activities related to energy needs in the two municipalities. Thus, following their integration into state regulated activity, the forest occupationalists became totally dependent on wage labor. When the value of this wage ceased to conform to basic subsistence costs, those occupationalists who owned little land (mainly ejidatarios) were forced to turn their forested land over to subsistence cultivation.

The priorities of PROFORMICH changed radically after the instigation of the IMF austerity program. But even without the imposition of the IMF program, PROFORMICH's activities would have probably taken the same course--a course that leads to increasing monopolization of the state over resources. The course of state capitalism is one where the

state receives more and more of the profits of productive activity while the workers are paid less and less for their labor. What the IMF program achieved was to change the momentum of this process. In a period of less than three years tree cutting increased immensely, the cost of living escalated by about 300 percent, while the wages the resineros received for their labor (resin collection) increased only marginally (about 60 percent overall during this period).

The change in the momentum of capitalist development in the two municipalities again altered the forest occupationalists' articulation with the capitalist mode of production. When the resineros were first drawn into the capitalist productive process as full-time proletarians, the resineros ability to sustain themselves as full-time proletarians depended on their wages staying in line with subsistence costs, and the state limiting exploitation on their land. Because of capitalism's inherent nature in terms of monopolization of resources and profit accumulation, the ideal equilibrium that would have state enterprise and a proletariat class of forest occupationalists working together "collectively and for common interests" (Cárdenas 1976) could never be achieved.

In conclusion, one can see that the forest occupationalists' chances of surviving the onslaught of

forest exploitation were extremely remote. By definition, forest exploitation entails the cutting down of trees. In order to be profitable, forestry enterprise must clear large areas of forested land. Forest occupationalists depend on this same land for their livelihood. When the trees are removed their livelihood also disappears.

What started as a program to integrate the forest occupationalists into the "productive process" by turning them into a full-time resinero proletariat, has turned into a process that has disenfranchised the forest occupationalists. The forest occupationalists must now try to use their land for subsistence activity while they seek to supplement this livelihood with intermittent wage labor. After a few years of intensive cultivation on this marginal land, even the subsistence yield from this land will diminish.

The forest occupationalists' now precarious economic situation works in the interests of capitalist expansion. Because of environmental constraints (the land the forest occupationalists have access to is too marginal to provide for all their subsistence needs), the forest occupationalists are forced to engage in wage labor beyond resin collection. As a disenfranchised people, the forest occupationalists can be easily recruited for part-time wage labor. Conversely, when the forest occupationalists' labor

is no longer needed, the capitalist mode of production does not need to assume the costs for domestic consumption.

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PLANTS FOUND AT DIFFERENT ALTITUDES IN ACUITZIO AND MADERO

ALTITUDE	COMMON NAME	SCIENTIFIC NAME
1000	Tayalote	Gnolobus sp.
"	Perra Silvestre	Cissus sp.
"	Capulincillo	Karwinskia sp.
"	Zapote Cuate	Stemadinia sp.
"	Chililllo	Acacia sp.
"	Habilla	Cassia occidentalis
"	Parota	Enterlobium ciclocarpum
"	Guajillo	Acacia sp.
1,100	Hierba del Venado	Parophyllum sp.
"	Copal	Elaphrium sp.
"	Frijolollo	Placeolus sp.
"	Pochote	Bombax elipticum
"	Tepehuaje	Acacia sp.
"	Frutilla	Lantana sp.
"	Chicahua:s	Didscorea composita
"	Sonajilla	Crotalaria sp.
"	Timbre	Acacia sp.
1,200	San Miguel	Cosmos sulphureus
"	Prodijiosa	Coleosanthus sp.
"	Tepame	Acacia sp.
"	Habilla	Cassia occidentalis
"	Casahuate	Ipomoea Pescaprea
"	Copalillo	Elaphrium
"	Ciruelo	Spondias sp.

"	Ceiba	Bombax sp.
"	Granadillo	Amerimnon sp.
"	Quiebra Fierro	Cesalpinea sp.
1,300	Atuto	Vitex mollis
"	Cinollaga	Tajetes sp.
"	Canelillo	Lippia sp.
"	Verbena	
"	Ortiguilla	Jatropha sp.
"	Amargo	
"	Pachote	Bombax Elipticum
"	Granadillo	Amerimnon sp.
"	Pinzan	Pitheolobium sp.
"	Guacima	Guazuma ulmofolia
1,400	Cascabelillo	Crotalaria sp.
"	Tambula	
"	Copal	Elaphrium sp.
"	Pochote	Bombax sp.
1,500	Anis	Tagetes micrantha
"	Raspocilla	
"	Amole	
"	Frijolillo	Phaceolus sp.
"	Habilla	Cassia sp.
"	Cualotillo	
"	Changunga	
"	Chupire	
"	Anona	Annona sp
"	Ceiba Negra	Ceiba sp.

"	Pochote	Bombax sp.
"	Encino armarillo	Quercus resinosa
"	Tepehuaje	Lisiloma sp.
1,600	Chupire	Inga sp.
"	Parota	
"	Palo Dulce	
"	San Miguel	Cosmos Sulphurens
1,700	Copal	Elaphrium sp.
"	una de gato	Acacia sp.
"	Encino blanco	Quercus candicands
"	Encino Armarillo	Quercus resinosa
1,800	Encino Colorado	Quercus sp.
"	Pichueca	
"	Sauce	Salix babylonica
"	Una de gato	Acacia sp.
"	Tepame	Acacia sp.
"	Anona	Annona sp.
"	Tepehuaje	Lisiloma sp.
"	Tocuz	Quercus sp.
"	Pino	Pinus michoacana
1,900	Cabello de Angel	Caliandra sp.
"	Santa Maria	Tagetes sp.
"	Capitaneja	Bidens sp.
"	Siemprivia	
"	Jaboncillo	Cletra mexicana
"	Madrono	Arbutus sp.
"	Encino Blanco	Quercus candicans

"	Encino Rojo	Quercus resinosa
"	Encino Pepilito	Quercus castenea
2000	Pino	Pinus Lawsoni
"	Encino Rojo	Quercus resinosa
"	Timbre	Acacia sp.
"	Capitaneneja	Bidens sp.
"	Sangre de Toro	Hamelia
"	Ortiga	Jatropha
"	Charehuesca	Dahlia sp.
"	Sosa	Solanum hispidum
"	Liendrilla	
"	Gordolobo	
"	Espinocilla	Locrelia mexicana
"	Alfilerillo	Erodicem
"	Petatillo	
"	Encino Pipitillo	Quercus castenea
2,100	Madrono	Arbutus sp.
"	Nariz de Perro	Arbutus sp.
"	Zoromuta	
"	Lengua de gato	
"	Capitaneja	Bidens sp.
"	Charahuesca	Dahlia sp.
"	Amole	Hymenocallis sp.
"	Rasposilla	
"	Pino	Pinus Lawsoni
"	Pino	Pinus pringlei
"	Encino blanco	Quercus candicans

2,200	Cilantrillo	
"	Pino	Pinus douglaciana
"	Pino	Pinus pringlei
"	Encino Roble	Quercus obtusata
"	Encino Pepitillo	Quercus castanea
"	Madrono	Arbustus sp.
"	Jaboncillo	Cletra mexicana
"	Helecho	
"	Zoromuta	
2,300	Pino	Pinus pseudostobus
"	Encino	Quercus macrophyila
"	Encino Blanco	Quercus candicans
"	Cirimo	Tilia sp.
"	Madrono	Arbutus sp.
"	Jaboncillo	Cletra mexicana
"	Garambullo	
"	Sangre de toro	Hamelia sp.
"	Habilla	Cassia sp.
"	Cardo Santo	Cirsium sp.
"	Zaramora	Rubus sp.
2,400	Pata de Leon	Geranium sp.
"	Salvia	
"	Catarinilla	
"	Tejocote	Crataegus mexicana
"	Madrono	Arbutus sp.
"	Encino Blanco	Quercus candicans
"	Encino Pepitillo	Quercus castanea

"	Pino	Pinus leiophylla
"	Pino	Pinus pseudostrobus
2,500	Teocote	Crataegus mexicana
"	Madrono	Arbutus sp.
"	Encino	Quercus sp.
"	Encino Blanco	Quercus candicans
"	Pino	Pinus leiophylla
"	Pino	Pinus michoacana
"	Pino	Pinus pseudostrobus
2,600	Jarachina	Selloa glutinosa
"	Tejocote	Crataegus mexicana
"	Helecho	
"	Limoncillo	
"	Madrono	Arbutus sp.
"	Cedro Blanco	Cupressus sp.
"	Encino Roble	Quercus obtusata
"	Encino Pepitillo	Quercus castanea
"	Pino	Pinus leiophylla
"	Aile	Alnus termifolia
"	Madrono	Arbutus sp.
"	Tabardillo	
"	Frijolillo	Phaceolus sp.
"	Hierba del Golpe	
"	Jaboncillo	Cletra mexicana
"	Limoncillo	
2,700	Encino Roble	Quercus obtusata
"	Encino Pepitillo	Quercus castanea

"	Oyamel	Abies religiosa
"	Pino	Pinus pseudostrobus
2,800	Gordolobo	Gnaphalium sp.
"	Jara Lisa	Selloa sp.
"	Salvia	
"	Catarinilla	
"	Zempazuchil	
"	Helecho	
"	Capulin	Prunus capuli
"	Jara China	Selloa sp.
"	Tejocote	Crataegus mexicana
"	Pino	Pinus pseudostrobus
2,900	Zacate	
"	Salvia	
"	Azulilla	
"	Estrellita	
"	Perrito Silvestre	
"	Jara China	Selloa sp.
"	Oyamel	Abies religiosa
3,000	Pino	Pinus leiophylla
"	Fresa Silvestre	Fragaria sp.
"	Garambullo	
"	Pino	Pinus pseudostrobus
"	Hierba del Barro	Spigelia sp.
"	Jara Lisa	
"	Perrito	
"	Gordolobo	

"	Zacaten	
3,100	Pino	Pinus pseudostrobus
"	Oyamel	Abies religiosa
"	Encino Pepitillo	Quercus castanea
"	Garambullo	
"	Burritos	Senesio sp.
"	Jara China	Selloa sp.
"	Perrito Silvestre	
3,200	Zenpazuchil	
"	Gordolobo	
"	Jara China	Selloa sp.
"	Pino	Pinus montezumae
3,300	Zacaton	
"	Hierba del Zapo	
"	Tepamo	
"	Bambu	
"	Madrono	Arbutus sp.
"	Oyamel	Abies religiosa
"	Pino	Pinus tenuifolia
"	Helecho	
"	Aile	Alnus termifolia
"	Hierba del Zapo	
"	Madrono	Arbutus sp.
"	Jara China	Selloa sp.

Source: The altitudinal chart was complied by using available government documentation and then asking informants to verify the list.