

UNDERMINING MAYA AGRICULTURE IN YUCATAN: A HISTORY OF SOCIAL AND ECOLOGICAL INJUSTICE

Amarella Eastmond

Unidad de Ciencias Sociales,
Universidad Autónoma de Yucatán
(espencer@tunku-uady.mx)

Prepared for delivery at the 1998 meeting of the Latin American Studies Association,
The Palmer House Hilton Hotel, Chicago, Illinois
September 24-26, 1998

INTRODUCTION

Yucatan reflects in a nutshell world tendencies of concentrating capital, diminishing rural and farm-based populations, a rapidly deteriorating natural environment and the rising incapacity of small farmers to make a living from traditional agriculture. It exemplifies the irony of simultaneously rising world food production with increasing levels of malnutrition and destruction of the environment. It is argued here that global capital, with its insatiable desire for profit and control and its need for, and creation of, inequality, is at the roots of these tendencies. This paper describes how Maya slash and burn agriculture in Yucatan (known as *milpa*) has, through a history of social injustice, become one of global capital's victims. In spite of having contributed importantly to world germplasm, of being adapted to harsh local conditions, and potentially favorable for long term conservation of natural resources, *milpa* presently stands poised between survival and extinction, threatening to take with it much biodiversity.

The roots of *milpa*'s present-day decomposition and its incapacity to adequately fulfill its environmental and social functions - including providing at least part of the basic sustenance to some 500,000 people or 30 percent of Yucatan's population (Arias-Reyes, 1992: 195) - are explored here with reference to three critical moments in the region's history: the arrival of the Spaniards in the sixteenth century, the rise and fall of the henequen industry and the widespread application of neoliberal policies in recent decades. It is argued that an ideology based on social inequality and the profit motive, implanted by the Spaniards, upheld by the Creoles and implicit in neoliberal policies, is largely responsible for undermining the agricultural production system of *milpa* that was, and still is, more environmentally friendly and socially fairer than modern agriculture. Organized around subsistence needs and a religious view of nature, rather than the market and globalization, *milpa* has been increasingly unable to defend itself from the predatory practices of global capital. Escape from the downward spiral in which it is now immersed appears difficult, in spite of the impressive growth in recent years of environmentally friendly projects aimed at promoting sustainable agriculture. However, as the social and environmental costs of inequality grow and the glittering prizes of modernity fade for the majority of people, rethinking and backing *milpa* agriculture may be one of the few alternatives left for those who still value local control over their own resources.

GEOGRAPHIC CHARACTERISTICS OF YUCATAN

The State of Yucatan has a surface area of 43,183 square kilometers (2.2 percent of the country) and a population which reached 1.5 million in 1995, highly concentrated in Merida. Underlying the whole of the Yucatan peninsula is a limestone plateau covered by a thin layer of young and extremely poor, porous, stony soil, unfit for mechanized agriculture except for small scattered areas in the south. The remaining rural land is only suitable for slash-and-burn *milpa* agriculture, small scale fruit and vegetable production, or extensive cattle grazing (Tahal Company, 1985).

Rainfall is unreliable and unevenly distributed throughout the year with a long dry season; It varies spatially along an ascending gradient which runs from the northwest to the southeast and which has been critical in determining the suitability of crops for different zones. Temperatures are consistently high and there is an almost complete absence of surface water. The difficulty of accessing ground water from as far down as 130 meters has been responsible for slowing down the process of introducing irrigation and attempts at agricultural intensification. Various agronomists have concluded that slash and burn agriculture is the only productive system that can be applied in most of Yucatan (Teran and Rasmussen, 1994: 9).

Throughout Yucatan's post-conquest history the spatial differentiation of agricultural production into defined regions has been determined by the development of monoproduction systems against the backdrop of persisting multicropping *milpa* agriculture which has been forced into relative retreat. Today four distinct agricultural regions can still be detected.

- 1) The henequen zone, situated in the Northwest of the state surrounding the capital city of Mérida.
- 2) The citrus area, located to the south on the more fertile soils at the foot of the Puuc hills where monocrop citrus production coexists with traditional *milpa* in its diversified form and with small scale mixed fruit and vegetable growing.
- 3) An expanding cattle ranching area is located to the east around Tizimín.
- 4) Finally, in an area of the southeast of the state, the traditional *milpa* economy has continued to dominate production (Villanueva, 1990). It should be noted, however, that the relative economic importance of animal production has increased in all the regions so that their names are now somewhat misleading.

MILPA AGRICULTURE IN YUCATAN

Today, as in the past, *milpa* consists of a complex mixture of agroforestry activities in which the production of the staple food crops of corn, beans, and squash is combined with small scale fruit and vegetable production, the raising and hunting of animals, the collection of forest resources, bee keeping, and the making of handicrafts for sale (Arias Reyes, 1992; Terán and Rasmussen, 1994; Hernández Xolocotzi et al., 1995). Since time immemorial it has enabled peasant families to meet their basic consumption needs and, when conditions are good, to sell the surplus for cash.

Milpa activities revolve around the one, two, or at most three year production cycle of corn, beans and squash which are grown on small plots of land cleared from scrub and then

abandoned, allowing secondary vegetation to grow up again. The cycle begins with the selection of a suitable site, usually chosen from the *ejidal* land reserve which is then cleared and burned ready for sowing when the first rains arrive in May or June. A mixture of corn varieties, beans, and squash seeds are planted together with the use of a digging stick in the patchy soil and weeding is carried out at least once to reduce competition for nutrients and water. So long as the rains arrive on time the corn can be harvested from early autumn onwards. Usually after two years, rampant weed growth and diminished soil fertility reduce yields to unacceptably low levels and the peasant farmer is forced to look for a new site. Ideally the land should be left fallow for some twenty years before it is reworked, but increasing population pressure has imposed much shorter periods (an average of eight years is common today) which has added to the reduction of yields (Warman, 1985:30; Terán and Rasmussen, 1994:262). Corn yields in Yucatan have always been amongst the lowest in the country: in 1991 INEGI reported an average yield of 684 kg per hectare for Yucatan compared to a national average of 1,327 kg (INEGI, 1994).

In spite of the apparently primitive technology involved in *milpa* production, archaeological and ethnohistorical evidence suggest it was capable of supporting a large population in prehispanic times than it does today (Garza and Kurjack, 1980).

In their thorough examination of *milpa* as reported by various sources from the 16th century, Teran and Rasmussen (1994) conclude that *milpa* was undoubtedly the dominant system at the time of the conquest, that all the evidence points to greater production at that time than now (hence the system's capacity to sustain a far larger population than it does today) and that today's *milpa* is a direct descendent of what the Spaniards found. They cite reference to texts which emphasize the abundance of the harvests and the fact that these allowed the Indians to feed themselves, pay their tribute and sell a surplus. Mention is also made of areas where two harvests per year were frequent.

The strengths and weaknesses of *milpa*

In spite of the simplification and degradation of *milpa* over the centuries, it is clear that its success is built up on the diversity of its genetic resources and the integration of a variety of agricultural and non agricultural activities into a unified production strategy. Rather than trying to maximize production (a difficult task in such agriculturally limiting conditions), the strength of *milpa* resides in its ability to spread the risk of crop failure from drought, pests and disease. It is this defensive aspect that has given *milpa* the resistance to survive for so long.

One of the most interesting aspects of Teran and Rasmussen's study is the light it sheds on the diversity of plant genetic resources and their fundamental importance then as now in making *milpa* a viable system. The authors found mention of 53 edible plants in the 16th century sources. Later colonial sources refer to an amazing 107 different native food species found growing in Yucatan, all of which can still be found today (Colunga and May, 1992). Teran and Rasmussen suggest that because the farmers in ancient times were able to do so little with the soil, they concentrated their efforts on plant breeding, particularly on the production of plants which matured at different times and in different ecological niches. In this way they increased their chances of obtaining a harvest however variable the weather, the incidence of disease and pests. Another way of diminishing risk was through the

cultivation of not one but various *milpa* sites. Variations in microclimates and soils assured that even if one or two sites failed to produce a harvest there would always be others to fall back on.

But, just as the Spaniards were surprised by the abundance of plant species they were dismayed by the scarcity of domestic animals, especially draught ones. This prompted them to start the genetic exchange between the Old and the New Worlds which included introducing cattle from Spain, thus initiating one of the ecologically most destructive activities in the region.

It has been observed that at any one moment a large proportion of the nutrients of tropical ecosystems are stored in the vegetation, hence the latter is sometimes referred to as a farmers “capital”. In order to make use of these nutrients for agriculture, the vegetation must be felled and burnt. These practices have sometimes led *milpa* to be unfavorably compared with other agricultural systems especially as burning under very dry conditions can result in uncontrollable forest fires. The consequences of short term destruction, however, must be weighed against the long term regeneration of the vegetation and the survival of a diversity of species. Ecological studies have shown how adaptation to fire has taken place in these environments and how it contributes to the rapid regrowth of the dominant species (Levy and Hernandez, 1989). Other systems, such as cattle ranching, do not rely on fire but they have permanently replaced the diverse forest with a few species of grass which, in the long run, contributes far more to climatic change, soil erosion, flooding and the loss of biodiversity.

In summary, the principal differences between *milpa* today and how it was practised in prehispanic times would appear to be derived from socioeconomic circumstances - the greater availability of forest-covered land, the communal system of land ownership and a ruling class that favored it, or at least did not actively undermine it by introducing competing systems and relegating it to the most marginal areas.

The erosion of *milpa*

This slash and burn system has been undermined both spatially and structurally in two fundamental but closely interrelated ways: 1) through the destruction of its basic resource, which, it has been emphasized, is not simply land but land covered by mature forest and 2) through establishing closer linkages with international markets and world trade.

1) The felling of mature forest for a small farmer in Yucatan is tantamount to losing his/her capital, or at least seeing it diminished because, as less forested land becomes available, the fallow period is reduced and yields fall. Instead of having access to land which has “rested” for some 20 years, most peasants today are now clearing areas that were cultivated as few as 5 or 8 years ago. Yields have fallen as a result.

The two agricultural systems that have had the greatest spatial impact on *milpa* are the henequen industry (from the second half of the last century till the 1970s) and, extensive cattle ranching, since the 1950s.

- 2) The structural undermining of *milpa* by linking Yucatecan agriculture to international markets and world trade is more subtle, complex and ultimately more pernicious as it has been achieved by gradually diminishing small farmer control over their resources. Government control over prices, limiting farmer access to finance and conditioning the way such finance is used, bringing in competition from other areas and encouraging the adoption of new technology are just some of the mechanisms that have been frequently adopted. *Milpa*'s organization around satisfying subsistence needs rather than maximizing profit makes it unfit for competition. Thus as international links have spread and gained in intensity *milpa* has found itself at a growing disadvantage with less land, a smaller and older labor force and now even threatened with losing control over its germplasm through the World Trade Organization's insistence on extending intellectual property rights and such developments as "terminator technology".

THE SPANISH CONQUEST AND ITS IMPACT ON *MILPA*

The Spanish conquest marked the beginning of a subordinate position for the Maya in the new socioeconomic order: it signified the imposition of a new culture, new technology, a new religion and the pressure of new external economic interests. As far as the Maya were concerned there could be no question of justice in a situation where war and disease had decimated their population. For the Spaniards, on the other hand, "just war" or "pacification" (Chamberlain, 1948) was waged if and when the Maya failed to submit to their new masters and comply with their demands. The Spanish made no secret of their consideration of the Maya as inferior beings to be exploited in their search for wealth. Thus social and economic inequality, backed by the force of law, was established on the basis of an ethnic line drawn between the Spanish and the Maya populations. This line marked the division between those who had power, status and access to resources and those who did not; between those whose value system was upheld by the force of law and those who were obliged to abandon their cosmovision, their customs and their most sacred values in favor new ones. Although with time the division blurred, its legacy of turning people against people, people against environment and system against system is still with us. A quick glance at some socioeconomic indicators (Table 1) shows, for example, how unequally education and wealth are still distributed between those who speak Maya and those who do not, in other words the predominantly rural and urban populations.

Disappointed by not finding minerals in Yucatan, the conquistadors lost little time in establishing the systems that would effectively harness the Maya labor force in order to satisfy their masters' needs for food, tribute and other services. First this was done by means of *encomiendas*. These were royal licenses to collect tribute and labor from designated Indian communities given by the Spanish Crown to the conquistadors in return for services rendered. Although the Crown attempted to limit abuses, in practice the *encomenderos* were free to make the rules they pleased. This new institution profoundly influenced both the pattern of population distribution and the way traditional Maya agriculture was practised. Maya slash and burn agriculture could only function on the basis of a highly dispersed population due to the soil requirement for a long fallow period of some twenty years. The *encomienda* system, on the contrary, demanded the concentration of the indigenous people into more easily controllable villages.

Competition for resources increased as Yucatan's population began to recover slowly from the initial impact of the conquest. Demographic growth occurred fastest in the northwest, near the maize and cattle *haciendas* which the Spaniards established around Merida. Throughout the rest of Yucatan it advanced at a slower pace, especially amongst the isolated groups of Maya who were still only very loosely integrated into the new economic system and who continued to live off subsistence agriculture.

The development of sugar plantations around Tekax, at the beginning of the nineteenth century provoked the first serious competition with Maya *milpa* agriculture for land and labor. The Maya who refused to capitulate were deprived of the best lands and pushed further into the forest to the south and east, where they gathered force and later violently counterattacked in what became known as the Caste War (Reed, 1964), one of the bloodiest Indian revolts in Mexico in which half of the population of Yucatan was killed. The effect of this rebellion was to temporarily redisperse the Indian population and oblige the Yucatecan elite to look for new ways of making money.

THE RISE AND FALL OF HENEQUEN

Towards the second half of the nineteenth century, this took the form of henequen production which began to transform the landscape and fuel Mexico's most prosperous agroindustry of the time. As the industry grew, so did its insatiable demand for land and labor to such a degree that most of the free villagers in the northwestern part of Yucatan were converted into resident hacienda workers and their communal lands incorporated into the haciendas. Native forest, maize and cattle haciendas and *milpa* agriculture were all engulfed by the new henequen plantations which stretched outward from Merida in all directions for some 80 kilometers, covering a maximum of 250,000 Ha. in 1920. The rise of the henequen industry marks the second important turning point in the accumulation of social and economic injustices. The intensive demands of the industry for land and labor throughout the whole year came into direct conflict with the needs of *milpa* agriculture for extensive areas of fallow, and labor concentrated in a few months. Encouraged by the Liberal Reform Laws of 1855-57 which divided up community lands into individual plots and unscrupulous practices, the large land owners met their needs for an expanding area by buying up, often very cheaply, vast tracks of so called "vacant" land. In fact, it usually represented fallow areas for *milpa* agriculture in the process of recuperating soil fertility before being cultivated again and considered by the Indian communities to be theirs since time immemorial. This process of appropriating land left the Maya peasants with little or no space in the northwestern region in which to grow their crops. Henequen came to completely dominate the landscape for a radius of 80 kilometers around Merida, replacing both the cattle and maize haciendas and the areas of tropical forest periodically used for *milpa*. At the same time as depriving the Indians of land the hacienda owners assured themselves of much needed labor to tend the henequen fields. The workers were forcefully held through a manipulated system of debt peonage in conditions that have been compared to slavery (Batt, 1991). Social inequality could hardly have been more stark.

At the end of the nineteenth century, Yucatan was the only producer of henequen, which had rapidly become an attractive investment because of a sharp rise in demand. Various

factors contributed to increasing demand but undoubtedly of greatest significance was the invention of the combine harvester in the US which opened up an undreamed of market for baler twine (Joseph et al., 1985). Henequen was ideally suited as the raw material and its price rose rapidly to levels which more than compensated for the long (seven year) unproductive establishment phase of the plant. The prospect of attractive profits encouraged the rapid spread of the monocrop at the expense of all other agricultural activities in the northwest of Yucatan except backyard animal and crop production. As the henequen industry grew, the regional economy became ever more concentrated in the modern and elegant city of Mérida where the *hacendados* lived sumptuously. At the same time it came under the control of ever fewer families, called by Salvador Alvarado, the *Casta Divina*. However, surplus capital was not used to diversify local production but only to purchase luxury goods from abroad which, at best, promoted some local commerce but did little in the way of establishing the basis for a diversified economy. Greed and the fatal collaboration of Olegario Molina with the International Harvester Company were to prove fatal (Joseph, 1988). Henequen exports reached their zenith in 1916 (210,000 metric tonnes) after which they began to gradually decline, recovering slightly during the Second World War and again in the Korean War. In spite of its decreasing share of the international market, henequen continued to play an important role in the regional economy until the mid 1980's, largely because of massive subsidies, which were estimated at 800 million pesos in 1980 (Ewell, 1984:85). Large scale State interference with the industry finally culminated in 1991 with the closure of Cordemex and in 1992 with the liquidation and early retirement of 42,425 henequen field hands (Baños, 1996:140). Within a matter of months, fifty-eight municipalities, occupying 27.2 percent of Yucatan's territory, were left virtually without sources of employment.

For the majority of Yucatan's rural population the coming and going of henequen did little other than reduce the social and ecological viability of traditional agriculture, making it impossible to go back to and offering no alternative way forward.

CATTLE RANCHING

One of the various investment alternatives to henequen, which emerged in the 1970's for Yucatecans with surplus capital, was cattle production. On a world scale, there was a general tendency during this time for beef production to be displaced spatially from temperate zones to humid and subhumid tropical regions, characterized by low population densities and shifting agriculture. Initially located near large consumer markets, rising production costs of both beef and milk (caused by such factors as increased land prices) began to squeeze them further away. At the same time, improved communications, availability of land, and disease control in tropical areas made these increasingly attractive for extensive beef production systems.

Extensive beef production in tropical areas such as Yucatan requires only minimal infrastructure, inputs, and labor (one cowherd per 300 heads of cattle). The largest investment has been in genetically improved animals and, more recently, in the development of grasslands. However, it does require vast areas of cheap land. In Yucatan one hectare of land is required for every 0.51 head of cattle (SARH-COTECOCA, 1990) so that in order to feed the present 700,000 heads, 1,400,000 hectares are needed. These vast areas

have been obtained at the expense of tropical forest. In the 1970's the initial expansion of cattle grazing allowed the survival of intermittent *milpa* areas but more recently these have been completely wiped out in a vast area in the eastern part of the state and increasingly in the north and the south as well. Both in terms of space and value animal production is now more important than crop production. In Yucatan alone grass for cattle has replaced over one million Ha. of mature forest.

Although cattle ranching cannot be singled out as *the* cause of traditional agriculture's deterioration and decomposition, it has certainly been a significant factor in speeding up its demise by providing a more financially rewarding use for land. Being market oriented and overwhelmingly controlled by private hands, it represents a formidable competitor for traditional agriculture in the struggle to appropriate rural resources, in spite of the fact that cattle ranching contributes only sparsely to economic growth and often only represents a cattle owner's secondary economic interests. It has contributed significantly to increasing ecological and social injustice (Toledo, 1990).

NEOLIBERAL POLICIES

Neoliberalism is posited on the essential wisdom and generosity of the market rather than the State. Policies derived from this perspective became widely adopted by the Mexican authorities after 1982 when Mexico requested help from the International Monetary Fund (IMF) and the World Bank to solve its external debt problem. The IMF's condition for renegotiating the debt was for the country to establish a "stabilizing program" based on neoliberal principles and the Asian model which the IMF admired so much. This involved opening up its economy to world capital and subordinating its internal demands to external exigencies (Ramirez, 1989:99). Since embarking on this structural adjustment course, Mexico's agricultural policies have complied with the IMF and World Bank stipulations (Robles and Moguel, 1990). In 1986 the country joined the General Agreement on Tariffs and Trade (GATT, now known as the World Trade Organization) which initiated the gradual deregulation of prices so as to approximate international ones. Since then, agricultural parastatals have disappeared, subsidies (such as for fertilizers and seeds) eliminated, import and export restrictions lifted, State participation in commercialization, storage and processing of agricultural products reduced, and the research and extension service restructured and reoriented (Villanueva, 1993:14). As a result, at a national level agricultural production has steadily moved away from staple foods towards cash crops for export.

Most dramatic of the policy changes associated with the neoliberal package were those related to Article 27 of the Constitution which refers to the ownership of land (Cortés Barragán, 1993). Introduced in 1992, the new national law effectively privatized *ejido* land¹ making it possible to legally sell, rent, or buy it for the first time since the Mexican Revolution (1910-1917). Recognizing the urgent need to inject capital into the countryside, the new law also made provisions for the associations of *ejidatarios*, *ejido* land, and private capital, a phenomenon that can be observed in Yucatan today. Social acceptance of the changes was carefully orchestrated by convincing many of the official peasant leaders that there was no land left for agrarian redistribution and that the changes were necessary for the

country's advancement. Finally, in what initially appeared to be a triumphant moment for neoliberalism, the North American Free Trade Agreement (NAFTA) was signed in 1993 and a few months later Mexico was accepted into the Organization for Economic Cooperation and Development (OECD). Events in 1994, however, (first the peasant uprising in Chiapas and then the financial crisis) provoked widespread doubts regarding the viability of the neoliberal package for such a socially and economically diverse country as Mexico. The Asian and Russian crises have merely confirmed them. Yet there has still been little change in macroeconomic policies. Arguing we have no option, the Mexican government continues to play into the hands of global capital and foster even greater inequality.

INTENSIVE POULTRY AND PIG PRODUCTION AND THEIR IMPACT ON *MILPA*
Yucatan, suitably located for exporting and, for many years, a drain on federal resources, was a prime target for the application of neoliberal policies. First, they were responsible for the removing state participation in the henequen industry and, more recently, they began converting Yucatan into a haven for maquiladoras. In the agricultural sector the transformation of pig and poultry production is illustrative of the results of neoliberal policies.

Until the 1970's, pigs and chickens were predominantly raised in the backyards of rural households widely dispersed throughout Yucatan. While chickens were traditionally considered an attractively inexpensive source of protein, fed on left-overs, and cared for by the women, pigs represented a common form of family savings which could be cashed in when illness or a bad harvest struck.

Pork and poultry production lend themselves to technification and a minimum of high priced labor, which make them obvious targets for capital investment. Beginning in the 1970's, the modernization of poultry production in Yucatan occurred more or less simultaneously with a similar process in other parts of the country. The establishment of the first intensive poultry farms on the outskirts of Mérida, involving considerable sums of private capital and conveniently located for the principal market in the region, coincided with the construction of a government-built feed concentrate plant.

Capital-intensive pork production, on the other hand, did not take off till a decade later. In the 1970's, family-based pig production was concentrated in the east of the state, particularly around Valladolid, known locally for its sausages and ham products. The area of activity expanded rapidly in the 1980's, partially stimulated by a series of government-sponsored pig production units aimed at diversifying the economy of the henequen zone. In the early 1990's it tripled in size, converting Yucatan into one of the most important pig suppliers in the country and making pork production the most economically valuable of the state's agroindustries.

Yucatan was considered an attractive site for modern pig and poultry production because of its relative isolation from disease and its proximity to the Central American and Caribbean meat markets. In addition, its proximity to the US was particularly significant because Yucatan produces none of the crops used in the preparation of animal feed, all of whose ingredients have to be imported from the US entering the country via the port of Progreso.

Foreign technology provided the key to modernizing the pig and poultry agroindustries. It included the use of antibiotics for disease control, better management of the animals, and improvements in feed formulation and breeding stock all of which contributed to faster gains, lower feed requirements, and a greater number of offspring. Nevertheless, the early success of the large pig and poultry producers stemmed principally from their gaining control of the feed concentrate business, rather than from the actual production of meat where the profit margin is considerably lower. During the early 1990's Yucatan became one of the principal producers of balanced feeds in Mexico. Reliance on imported grain and technology was no obstacle as long as the peso exchange rate with the dollar was favorable, as was the case until the end of 1994.

The vertiginous transformation of pork production was not solely the result of the free play of market forces. Without strong government support it is highly doubtful that the modernization of this sector would have occurred, at least not within the same short period of time. Subsidies, low interest credits, and special programs to encourage the association between private investment and the social sector (which involved the creation of two "mega" pig production projects at a cost of millions of pesos to the government) are just some of the ways that State interference succeeded in making pig production attractive to capital. Concomitantly, the concentration of the bulk of pork supplies in the hands of five main producers caused many of the smaller businesses to go bankrupt. Some medium-sized pork producers have managed to survive but only by linking themselves to the big suppliers through contract production. This involves considerable capital investment for the medium producers (in order to bring their operations up to standard), the potential risk of losses if consumer demand falls and, in the best of circumstances, only marginal profits because the large producers fix the selling price.

While foreign observers of pig and poultry production in Yucatan are surprised by the infrastructure and level of technification they find in the large companies, the medium and small producers complain bitterly about the unfair competition due to the side-tracking of government social funds to support the "mega" projects and the present crisis conditions which have caused debilitating changes in relative production costs and product prices. Many fear their current weakness will lead to increased foreign investment and foreign control of the agroindustry.

CONCLUSIONS

The history of *milpa* is overwhelmingly one of small farmers losing control over their land, labor and genetic resources. In spite of rhetoric to the contrary, new rules and laws have constantly been invented to maintain, reaffirm or extend social inequality which has been translated into increasing environmental degradation. *Milpa*, frequently perceived as a vestige of "inferior" Maya culture has at best been ignored and despised and at worst attacked as technologically primitive, inefficient and destructive. It is only in recent years that scientific studies have pointed out its role, over thousands of years, in conserving natural vegetation and increasing the genetic variation of local food species. These findings have given rise to growing support for sustainable agriculture projects based on ecologically

sound principles many of which are found in *milpa*. But the imposition of neoliberal policies, through such venerated institutions as the World Bank and the IMF, allows little scope for the development of *milpa*. On the contrary, present trends indicate that multinational seed and agrochemical corporations are bent on extending legal recognition of intellectual property rights and engulfing more and more of the world's agricultural production within their sphere of control. Their latest breakthrough, involving what RAFI has dubbed "terminator technology" by which seeds provide a harvest but fail to germinate if planted again the following year (RAFI, 1998) is their most daring move so far. It challenges the farmer's right to save his/her seed from one year to the next and undermines the very foundations of small scale agriculture and food security. With inequality reaching such extremes even the impressive survival capacity of Yucatecan *milpa* will be severely tested.

A COMPARISON OF SOCIO-ECONOMIC INDICATORS FOR MERIDA AND THE REST OF YUCATAN, 1990

SOCIO-ECONOMIC INDICATORS	MERIDA (Predominantly urban)	REST OF YUCATAN (Predominantly rural)
% of population that speaks Maya	17.44	82.56
% of illiteracy	6.88	25.26
% of population that has not completed high school	68.14	92.13
% of population that works in agriculture	4.91	51.82
% of population that earns less than 2 minimum salaries	66.62	100.00

SOURCE: INEGI (1992) Population and Housing Census, 1990

REFERENCES

- Arias Reyes, L. M. 1992. El proyecto: dinámica de la *milpa* en Yucatán. In *La modernización de la milpa en Yucatán: utopía o realidad*, edited by D. Zizumbo Villareal, et al., 195-201, Mérida: CICY-DANIDA.
- Batt, R. 1991. "The Rise and Fall of the Planter Class in Espita, 1900-1924" in J.T. Brannon and G.M. Joseph (eds) *Land, Labor and Capital in Modern Yucatan*. Tuscaloosa, The University of Alabama Press.

- Baños, O. 1996. *Neoliberalismo, reorganización y subsistencia rural*. Mérida: UADY.
- Chamberlain, R.S. 1948 *The Conquest and Colonization of Yucatan, 1570-1550*, Washington D.C. Carnegie Institution of Washington, Publication 582.
- Colunga, P. and May Pat, F. 1992. El sistema milpero y sus recursos genéticos. In *La modernización de la milpa en Yucatán: utopía o realidad*, edited by D. Zizumbo Villareal, et al., 97-134, Mérida: CICY-DANIDA.
- Cortés Barragán, J.F. 1993. *El agro mexicano ¿siempre lo mismo?* Contextos y Análisis No. 3. Mexico City: Instituto Tecnológico y de Estudios Superiores de Occidente, Centro de Reflexión Teológica y Centro de Reflexión y Acción Social.
- Ewell, P. 1984. Intensification of peasant Agriculture in Yucatan. Cornell International Economic Study. A.E. Research 84-4, Ithaca: University of Cornell
- Garza T. de G. and Kurjack, E. B. 1980. *Atlas arqueológico del Estado de Yucatán*. Mexico City: INAH-SEP.
- Hernández Xolocotzi, E. et al. eds. 1995. *La milpa en Yucatán, un sistema de producción agrícola tradicional*, Vols. I and II, Mexico City: Colegio de Postgraduados.
- INEGI, 1992. *Yucatán: Resultados definitivos IX censo general de población y vivienda*. Aguascalientes: INEGI.
- INEGI, 1994. *VII censo agrícola-ganadera, Yucatán*. Aguascalientes: INEGI.
- Levy and Hernandez, 1989 “Conservación y aprovechamiento del recurso forestal bajo roza tumba y quema en Yucatan”. Ponencia en el Seminario: Problemática Agrícola y Conservación de Recursos en Yucatan. Merida, Julio.
- Joseph, G. M. et al. 1985. *Yucatán y la International Harvester*. Mérida: Maldonado Editores.
- Joseph, G. M. 1988. *Revolution from Without*. Durham, NC Duke University Press.
- RAFI, 1998. Plant Breeders Wrongs 16 September. The Biopiracy and Plant Patent Scandal of the Century. <http://www.rafi.org>
- Ramirez, M. D. 1989. *Mexico's Economic Crisis, its Origins and Consequences*. New York: Praeger.
- Reed, N. 1964. *The Caste War of Yucatán*. Stanford: Stanford University Press.
- Robles, R. and Moguel, J. 1990. Agricultura y Proyecto Neoliberal. *El Cotidiano* Year 7, No. 34, March-April, 3-12.
- SARH-COTECOCA, 1990. Coeficientes de Agostadero. In *Atlas Nacional de México*, Vol. III p.VI.3.2.
- Tahal Company, 1985. *Programa estratégico para el desarrollo agropecuario y agroindustrial del Estado de Yucatán*. Mérida: Gobierno del Estado de Yucatán.
- Terán S. and Rasmussen, C. 1994. *La milpa de los mayas*. Mérida: DANIDA.
- Toledo, V. 1990. El proceso de ganaderización y la destrucción biológica y ecológica de México. In *Medio ambiente y desarrollo en México*, edited by H. Leff, 191-228, Mexico City: CIIH, UNAM and Porrúa.
- Villanueva, E. 1990. *La Formación de las regiones en la agricultura: El caso de Yucatán* Mérida: Maldonado Editores.
- Warman, A. 1985. *Estrategias de sobrevivencia de los campesinos mayas*. Cuadernos de investigación social 13. Mexico City: Instituto de Investigaciones Sociales, Universidad Autónoma de México.