

# The rainforest farmers

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In the tropical rainforest that blankets southeastern Mexico, a small group of Indians is struggling to keep alive an ecological heritage passed down to them generation by generation, since the time of the ancient Maya. Numbering less than 400 men, women and children, the Lacandon Maya of the Mexican state of Chiapas still practice an agricultural strategy that cycles food and forest on the same tropical soil year after year.

At a time when the world's rainforests seem destined to destruction, the environmental knowledge of the Lacandons could serve as the basis for preserving and wisely using the rainforests that remain. Yet the Lacandons themselves are threatened by the same forces of exploitation that are destroying the jungle for quick profits while placing the environment in peril and jeopardizing the health of the world's population.

In the rainforest that surrounds the settlements of the Lacandon Maya lie the stone ruins of a civilization that flourished for six centuries. The Classic Maya turned the apparent disadvantages of this tropical jungle into the organic base for a civilization that stretched its trading ties throughout Middle America. They practiced highly diverse, intensive agriculture and harvested a rich crop of forest plants and animals—a combination that enabled them to support hundreds of thousands of people.

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In the end, it was the vagaries of their commercial and political maneuverings—not the rainforest environment or problems of food supply—that led to the disintegration of their society. Gradually, between 700 and 900 A.D., the stone cities and ceremonial centers of the Classic Maya empire were abandoned to the vegetation that lay poised on the edges to reclaim them.

Today, only faint traces of Classic Maya grandeur are preserved in the small thatched huts of the men and women who inherited the territory and name of the ancient Maya. Yet something else survives. Within the language, rituals and farming techniques of the Lacandon Maya, the wisdom of the ancients prevails. In the face of missionary efforts, development projects and massive destruction of the rainforest ecosystem, the Lacandons are guarding the detailed ecological knowledge of their ancestors.

By historical standards, the Lacandon Maya are recent immigrants to the Chiapas jungle. The aboriginal inhabitants of the area were Chol-speaking Maya, and it was this group that constructed the Classic centers of Palenque, Yaxchilan, Piedras Negras and Bonampak.

This Chol population apparently declined sharply following the collapse of Maya civilization, but thousands continued to inhabit the Chiapas jungle when Spaniards invaded the Maya world in the early 16th century.

At first seeking gold and silver, the *conquistadores* soon turned their attention to a more accessible resource: the area's Indian inhabitants. The Chol who survived the epidemic diseases the Spaniards brought with them from the Old World were forcibly removed from the Chiapas jungle and relocated into Spanish-controlled towns on the



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jungle's western fringe. There, they were forced to labor on colonial plantations and cattle ranches for the benefit of the Spanish god and king.

In the Chiapas jungle, the population vacuum created by the death and relocation of the Chol Maya was filled by small groups of Yucatec-speaking Maya, the Lacandons, who migrated into Chiapas from the jungles of western Guatemala. Fleeing disease and disruption in their original territory, they brought with them the ecological knowledge they had developed during centuries in the Guatemalan rainforest—an extension of the same tropical forest that covers eastern Chiapas.

Unaware of this migration, Spanish authorities lost interest in the Lacandon Jungle for several centuries and turned, instead, to the details of their new colonial economy. As a result, the Lacandon Maya were allowed some measure of isolation from the deculturating forces that changed the lives of other Maya peoples.

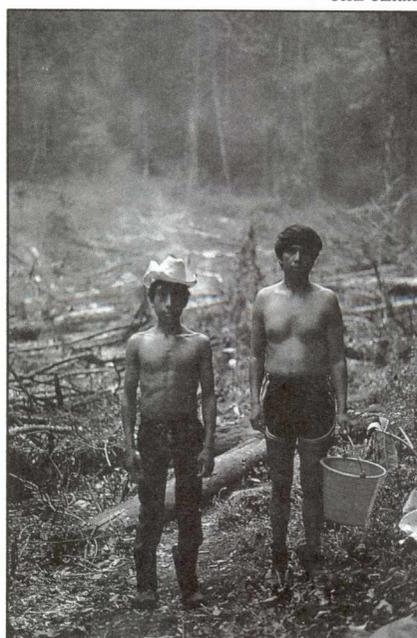
Neglected and forgotten, they preserved their ability to produce a large and continuous food supply without destroying the regenerative powers of the tropical forest. The key factor in this ability is their strategy of *milpa* agriculture—a system of forest agriculture also called swidden or slash-and-burn cultivation.

Each spring, Lacandon families clear small, one-hectare plots in the tropical forest (one hectare equals 2.471 acres) and allow the felled trees and vegetation to dry. In April, they clear fire-breaks around these areas and incinerate the dried cuttings in a blaze of branches, tree trunks and leaves. They have good reason for this seemingly destructive practice.

In tropical forests, the majority of nutrients are suspended in the living canopy of trees and vegetation that shades the thin, rapidly-leached soil. Organic litter dropped to the forest floor is quickly decomposed by

temperature, fungi and microscopic life to be lifted back into the canopy once again. Lacandon farmers release this organic matter by burning the forest vegetation, then quickly planting crops in the nutrient-rich ash. Clearing the land without burning would expose a soil only minimally capable of supporting crop plants. More than this, openly exposing the soil to the torrential rains of the tropics would cause the loss of valuable organic matter.

César Carrillo.



*Milpa agriculture, key factor in non-destructive, continuous food supply.*

To avoid this situation, Lacandon farmers plant fast-growing species of tree and root crops to provide immediate shade and soil protection to the cleared forest plot. After a few weeks, they seed the area with corn, their primary grain crop. Then, throughout the six-month rainy season that follows, they plant up to 80 different varieties of food and fiber crops—sweet potatoes, onions, taro, manioc, pineapples, chile peppers, squash, lemons, cotton, tobacco, bananas, avocados, beans, cacao and rice, among others.

The days when specific crops must be planted are indicated by the

flowering of certain natural species in the forest. When the mahogany tree flowers in late May or early June, the farmer knows to plant the spring corn crop. Use of these indicator species allows the Lacandons to plant and harvest in concert with yearly fluctuations in temperature and precipitation.

Equally significant in Lacandon ecological knowledge is the practice of planting crops in separate bunches throughout the garden plot; they plant no large clusters of any single species. Thus, although the garden may contain 20 bunches of onions, none of these bunches will be planted within ten feet of another. Through this system of dispersing their crops throughout the garden plot, Lacandons imitate the diversity of the surrounding tropical forest. Just as it does in the forest itself, this diversity impedes the spread of plant-specific diseases and prevents plagues of tropical insects.

Rather than plant long rows of single crop species, Lacandon farmers create a living mass of food plants that occupies the entire cleared area both above and below the soil. Between clumps of growing corn, trees of papayas and bananas shade ground-hugging vines of squash and *jícamas*. Beneath the soil in distinct layers lie the tubers of taro, sweet potatoes, manioc and yams. By following this system of multilayered, compatible crop agriculture, Lacandons utilize available space, water and soil nutrients in a highly efficient and productive manner.

Families continue to plant and harvest crops in the same garden plot for three to seven years, depending on how frequently they weed the area. If they keep the garden free of competitive species during each of these years, they can harvest two corn crops per year with only slight decreases in yield. Then, when weeds have encroached on the garden to the

## The threatened Lacandon Jungle

The Lacandon Jungle, situated in the far east of the state of Chiapas, is the last sizable portion of tropical jungle that Mexico possesses. In recent years, huge expanses of this jungle have been converted into land for agricultural production or cattle-raising.

Yet with very few exceptions, the production systems implemented proved inefficient and unproductive, and were soon abandoned or transformed into extensive and inefficient systems. As a result, in addition to the land's failure to satisfy the economic and nutritional requirements of its owners, its fertility has declined, at the same time as the region's enormous biological wealth has been destroyed.

The peasants and cattle ranchers who stepped up their penetration of the jungle from 1960 onwards were mostly Indians who had been driven out of their villages by the lack of arable land and the inhuman living conditions on the farms in Chiapas' Los Altos region. By 1976, the new settlers numbered 70,000, two thirds of whom lived in villages with fewer than 500 inhabitants. Instead of facing and solving the agrarian problem *in situ*, the state government encouraged the spontaneous exodus to the jungle as a timely escape valve. Thus many people abandoned their traditional communities in the sierra, convinced that uncultivated lands in the jungle were not owned by anyone and that the authorities would be pleased to see them occupied and exploited.

Another destructive element that affects the jungle's integrity has been the excessive logging of tropical woods. This dates from the end of the 19th century, but increased dramatically in the 1960s and '70s in line with private exploitation of the forests.

The federal government's attempts to halt destruction of the jungle date from 1967, when an area of over one million acres was declared national property in order to encourage controlled settlement. In 1974, private timber exploitation passed into the hands of federal and state governments and in 1978, the Montes Azules Biosphere Reserve, with an area of 828,000 acres, was created as a further attempt to protect the heart of the jungle from unlimited logging.

These have not been the only measures. Dozens of projects and programs, designed by federal and state institutions, have so far failed to achieve the desired results. The three fronts of destruction—peasants, cattle ranchers and loggers—continue to advance over the jungle's forestry reserves.

The destruction of the jungle's environment and the lack of resources for its inhabitants should be tackled at the same time and with equal zeal, simultaneously respecting the demands of nature and the population's needs. This is the challenge faced by those with the scientific vision, technical ability and political power to be able to intervene in this matter.

Taken from: *Lacandonia, el último refugio* (Lacandonia, the Last Refuge). Mexico City, UNAM-Agrupación Sierra Madre, S.C., 1991.

point that cutting a new plot is easier than weeding the current one, the family clears a new one-hectare garden and begins the cycle anew.

Still, the family does not abandon the original garden plot. Instead, they plant the area in tree crops—citrus, cacao, rubber trees—and continue to harvest from it as the plot regrows with natural forest species. The native term for this stage of land use—*pak che kol*, “planted tree garden”—symbolizes the Lacandon intent to cycle food and

forest on the same plot. When the planted trees and natural jungle growth have reached a height that will produce a good burn—a process that requires 5 to 20 years, depending on soil conditions—the family will clear and plant the garden again. In this fashion, they reuse the same plots as long as they remain in the area.

Like tropical forest farmers throughout the world, Lacandons prefer to cut agricultural plots from regrowth rather than from virgin forest. The reason for this is simple:

clearing a one-hectare plot of virgin forest requires 40 man-days of labor; clearing the same area of regrowth takes only eight man-days.

Planted tree gardens serve a second important function in Lacandon food production. Recent studies indicate that some tropical forest mammals, especially deer, peccaries, squirrels, pacas and agoutis, maintain higher population densities in agricultural areas than they do in undisturbed forest. These animals are attracted to the food

crops and young shoots of regrowing garden plots, and Lacandons purposely leave part of their harvest vulnerable to these animals.

Game species allowed to fatten on garden crops are later hunted in the same area. In this sense, the planted tree garden is a form of wildlife management area, and the crops allotted to wild mammals are an investment in future food supplies.

The Lacandon Maya food production system is more than ecologically sound; it is also highly productive. Each one-hectare garden can produce up to six metric tons of shelled corn per year, and an equal amount of root and vegetable crops. Even more, hunting in abandoned gardens and virgin forest provides each family member with a more than adequate supply of meat protein.

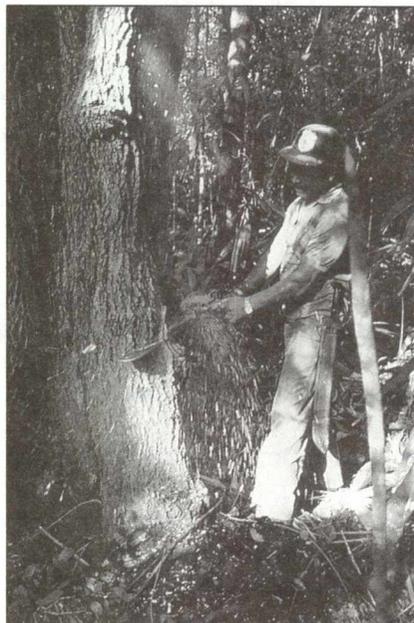
Despite its ecological soundness and high productivity, however, the Lacandon agricultural system is disappearing—along with the tropical rainforest that supports it. Like tropical forests throughout the world, the Lacandon jungle is being cleared and burned by the juggernaut of progress.

The main forces of destruction in Chiapas are colonization schemes and beef cattle production. Since 1940, more than 80,000 peasant farmers have migrated into the lowland Chiapas jungle in search of land and new lives. In a program similar to the U.S. Homestead Act, government agencies have opened up the area to families from the Chiapas highlands and other areas of Mexico. Such programs are popular because they help relieve demands for land reform in other regions, and thus postpone the need to break up the large landholdings of influential families. The increasing population of rural farm families provides an equally important impetus.

The tragic flaw in these colonization programs is that the immigrant farmers are ill-equipped to deal with the tropical forest

environment. Unlike the Lacandon Maya, they do not carry the heritage of years of coexistence with the rainforest. They lack the detailed understanding of plant-animal relationships, they plant grass for cattle instead of tree crops in abandoned garden plots, and their *milpa* fires burn out of control. As a result, they frequently destroy large sections of forest in attempting to make the land produce.

Fulvio Eccardi.



*The area's main forces of destruction are colonization schemes and beef cattle production.*

Even more destructive than colonization is the practice of clearing the rainforest to plant pasture land for cattle ranchers. Already, Mexican cattlemen have cleared and burned the northern third of the Lacandon Jungle to produce beef cattle for the nation's growing urban population. In one ironic twist to this situation, some of this beef replaces meat produced in northern Mexico for export to the United States, where it supplies consumer demands for hamburgers, frankfurters, cold cuts and TV dinners.

The forces that are eradicating the Lacandon rainforest and threatening the existence of Lacandon society are

interwoven with complex economic problems that permeate the modern world. The present trend in the Lacandon Jungle is to seek quick profits and short-term solutions to these problems. But this approach ignores the most valuable factor in the area's potential for long-term productivity and progress. That factor is the centuries-old ecological knowledge of the Lacandon men and women. Rather than alter or eradicate the Lacandon food production system—as current patterns of development are doing—perhaps national and international agencies should be learning from the Lacandons instead.

By combining the environmental wisdom of the Lacandon Maya with the technological advances of Western agricultural research, we could create new systems of food and fiber production compatible with rainforest preservation and regeneration. No scientific team understands the forest ecosystem more completely than the Lacandon Maya, yet the Lacandons sometimes lack crucial information about new crop plants, pest management techniques, intensive farming tools and marketing.

Combined, the knowledge of the Lacandons and industrial society could generate viable, ecologically sound systems of rainforest food production. These systems could then be offered to immigrant farmers in the Chiapas jungle as alternatives to their present destructive farming practices. Even more importantly, these newly created systems could compete economically with the devastating practice of beef cattle ranching.

As we turn increasingly to the world's tropical regions for additional food and fiber production, we must remember that the people who live in these regions—people like the Lacandon Maya—are our most valuable source of information and understanding. Moreover, in learning from them, we can, in turn, help them preserve the wise legacy of their past. ❧