



MODULES MUSHROOM IN THE DESERT

Until recently, effective management of natural resources has not been the primary concern of the Mexican government or of the people living in the arid, semidesert region of northeast Mexico. Today, the disappearance of certain plant species near populated areas has given rise to concern.

The simultaneous growth in population and needs, adverse weather conditions, and, especially, unrestrained exploitation have all endangered these natural resources.

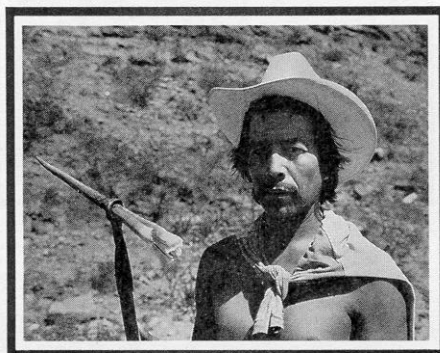
Confronted with this situation, the federal department of agriculture (SARH - Secretaría de Agricultura y Recursos Hidráulicos) has stepped up its research aimed at improving harvesting and extraction techniques to encourage the sustainable use of resources. In carrying out the research, the department has relied on the National Institute for Forest, Agricultural and Fisheries Research (INIFAP-Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias).

As rural families are generally involved in multiple activities such as agriculture, herding, and gathering forest products, SARH, with IDRC support, is testing a system of cultivation that integrates agricultural, forest, and forage products. Called "multiple use modules," the system makes it possible to ensure that the population is self-sufficient in food to maintain and even increase the "campesinos" (peasants) income and to provide enough forage to feed the animals.

For examples of problems that have plagued the people in these regions in the past, Mr Luis Armando Gonzales Leija, the national coordinator of INIFAP, points to the villages of Hipolito and San Cosne, located in the northeastern part of Mexico. These villages are bounded by mountains with chalky soil and lakes and rivers that have dried up. In this semidesert setting, the vegetation, although sparse, is highly varied. Hillsides and

valleys are dotted with dwarf shrubs, stunted palm trees, and cactus. The vegetation consists largely of nonlignaceous forest products. Free-range cattle, watched by young cowherds, graze on overexploited common land.

In Hipolito, the extraction of "candelilla" wax is the inhabitants' primary source of income. On the outskirts of the village, the campesinos have set up a processing plant where



The harvester uses a metal-ringed pole to break off the plant.



Melchor García Valdez, the researcher on site at San Miguel, Mexico.

the plants, after being harvested and dried, are heated in a pot filled with water and sulphuric acid. The slender shrub can contain up to 5% wax, which is sought after in the manufacture of a wide range of products including chewing gum, glaze for candies, varnishes, paint, floor wax, shoe polish, coating for records, and the wax finish with which fruits and vegetables are coated for preservation and export.

More than 9,500 campesinos living in the Mexican states of Coahuila, Chihuahua, Durango, and Zacatecas, produce candelilla wax. Their output in 1988 was over 3,000 tonnes of wax worth 6 billion Mexican pesos, equivalent to US\$2,400,000. Nearly 30% of the output is for domestic consumption, whereas 70% is exported to the United States and Europe.

Unfortunately, these statistics do not reflect the worry felt by the producers themselves. Does the disappearance of some 150,000 tonnes of candelilla every year jeopardize the plant's existence, as claimed by people who must now travel up to 35 km to gather the plants, now found only in locations increasingly remote from the villages?

"We have reason to believe that this plant species will survive," stresses Mr Leija. "However, the campesinos need to learn to use a tool to cut the stem without damaging the roots. They will have to stop harvesting the plant by pulling the root up with the stem, as they have always done. To pull up the root destroys any hope of regrowth."

Considerable research has been done in recent years to determine harvesting methods that protect regrowth. "Selective pruning is still the best way," says Mr Leija. "This plant takes 3 years to reach maturity. Thus, if only one-third to one-half of the branches are removed each year, this promotes a natural rotation which ensures not only the plant's survival but also a stable, sustainable annual harvest for the wax producers."

In neighbouring San Cosne, the primary source of income for the community's 150 inhabitants is cutting and extracting fibre from the "lechuguilla agave," a plant that grows on flat, well-drained terrain such as that found on gravelly soil.

The lechuguilla agave is harvested by cutting out the heart of the plant whose fleshy leaves extend 20-25 cm in length from the neck of the plant, which has no stem. Except for some villagers who are members of a local cooperative with an electric machine, most of the campesinos still use a finely honed "macnete" to scrape the

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leaves to remove the fibrous matter that they dry in the sun. To earn a daily wage of 6,000 pesos, a campesino needs to produce about 6 kilos of the fibres, which are used to make brooms, paintbrushes, thread, rope, matting, and sacks. More than 50,000 Mexican families are involved in the production of this fibre, primarily for export.

Once again, the progressive disappearance of this plant in the vicinity of the villages is a crippling blow. The campesinos now travel distances of up to 50 km to gather the amount necessary to earn a decent income. The impact of all this travel on the population is steadily increasing; the campesinos now have less time to spend on farming and, therefore, less money to buy food, seed, and tools. Every drop in production means a loss of income and their families are becoming increasingly impoverished, malnourished, and underfed. This trend has become alarming, especially because it has exacerbated the exodus of men and even families to urban and industrial centres in search of work.

Researchers like Mr Leija hope the module system will help to alter the trend of resource degradation in this region. Within a 20-hectare module there are several parcels of land where different products are cultivated. Agricultural produce such as corn and beans, the campesinos' staple diet, are grown as well as forest plants such as lechuguilla, candelilla, "Yucca carnerosana," and nonligneous shrubs that provide fibres, wax, cooking, and heating fuel. Forage such as "nopal," "costilla de vaca," "saladillo," "halimus," and "maguey" are also grown on the module.

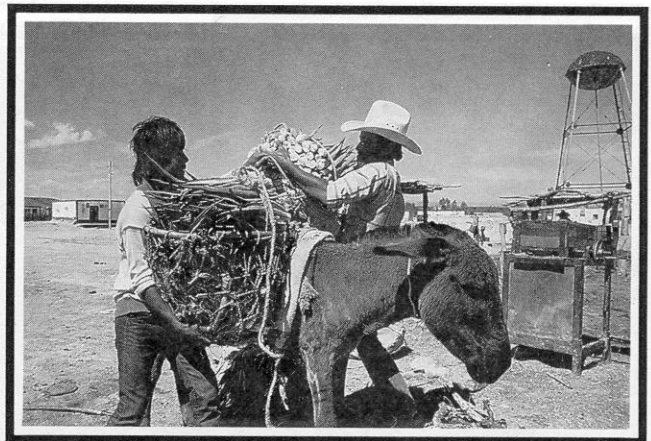
This system is ideally suited to families who rely on subsistence farming. Each family grows the quantity of products that corresponds to its own food requirements. Also, forage production, coupled with the development of enclosed pastures, is an excellent alternative to free-range cattle-raising and overgrazing. It is of enormous help in conserving and protecting vegetables on the overly depleted soils of common land.

A well-developed hectare can contain up to 20,000 lechuguilla or candelilla saplings. A planting of this size near the village means that producers do not have to travel long distances every day and ensures a stable seasonal income and adequate output to meet industry demand.

Is it thus possible to live relatively well in the semi-desert areas of northeastern Mexico? "Of course!", replies Mr Melchor Garcia Valdez, an INIFAP researcher at Saltillo. "The philosophy underlying the modular crop system is to ensure that the campesinos have a seasonal income so they have the time to grow a variety of subsistence and cash crops," he says. "This assures them of an income with which to buy clothing, livestock, farm

tools, seed, or motors. If the ecosystem is respected, if we make it work for us and harvest properly what it produces, it is possible to live on semi-arid land. Even though it's not very fertile, the land is generous. We need only convince the government and the "campesinos" of this."

Denis Marchand in Mexico



Campesinos must travel up to 50 km to gather 70-80 kg of agave, enough to earn a reasonable income.



With traditional processing methods the extract is removed with a sharp knife and left to dry in the sun.



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