

Conservation and Cultural Values: Brazil

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Summary

Just a few decades ago, the Kraho Indian communities in Tocantins state in Brazil discovered that they were not only undermining their region's environmental well-being but worsening their economic plight as well — and, in the process, becoming even more dependent on the government.

The shift from itinerant to permanent site cultivation, along with the use of new commercial and modern input-requiring crop varieties, as well as reliance on a single permanent crop system, encouraged the Kraho Indians to adopt agricultural practices that degraded the soil and consequently reduced agricultural productivity. In addition, seed varieties, which had been selected by their ancestors and maintained from generation to generation, began to disappear due to the introduction of modern crop varieties. According to the Krahos, loss of these seeds contributed to a gradual loss of both plant and community roots. The latter, after all, was given life by rituals associated with traditional agricultural methods, the annual rhythms of the agricultural calendar and the food supply.

The withering away of agricultural and cultural sustenance forced many Indians to abandon their traditional lands and migrate to already impoverished urban areas. Such movement contributed to the cycle of dependence of entire Indian communities on government welfare programs. In some areas, this dependence led to severe malnutrition due to the inadequacy of grains distributed to the community or caused a lack of food supply for year-round consumption.

By the time the Krahos realized that the substitution of their native grain varieties inherited from their ancestors by commercial varieties was a bad decision, the seeds of the ancient varieties had already disappeared. During the search for the original seeds, they found that many varieties fortunately were conserved at the National Center for Research on Genetic Resources and Biotechnology (CENARGEN).

In 1976, with the help and financial support of the International Plant Genetic Resources Institute (IPGRI), CENARGEN organized a series of expeditions for germplasm collection in Brazilian Indian lands to collect seeds, tubers, and other material with the aim of rescuing the endangered germplasm. The collected seeds were stored in special chambers for long-term conservation at CENARGEN as well as in other seed banks throughout the country.

At CENARGEN, the Krahos have received samples of seeds from the ancient varieties. Based on the information and knowledge of their elderly community members, they have reintroduced their ancestral and traditional agricultural methods, customs and values that were lost when they had unsuccessfully tried to adopt “modern” agriculture. These seeds have brought about the revival of their old and long forgotten traditions related to the cultivation, harvesting, food preparation, and communal ceremonies that are now being taught again by the elderly people to the younger members of the community.

The rescue of ancient seed varieties by the Krahos is bringing a gradual improvement in the quality of life due to nutritional improvement, an increase in self-esteem and a return to sustainable agriculture based on traditional farming methods. Following the repatriation of the seeds, the Kraho Indians are again acting as curators of the germplasm of the old varieties cultivated in their regions. Indeed their cultural and natural calendar has served as an efficient mechanism for conserving the genetic resources used by Brazilian Indians for food and agriculture throughout the millennia.

For the first time in 500 years, an historic debt is being paid back to the Brazilian Indians, the original inhabitants of the Americas for at least 12,000 years, through the restitution of their seeds.

Background and Justification

CENARGEN is one of 39 research units and special services of the Brazilian Agricultural Research Corporation (EMBRAPA). It was created in 1974, according to the guidelines of the United Nation's Food

and Agriculture Organization (FAO), to protect genetic resources for the sustainable development of agriculture and to guarantee an adequate supply of food sources. Since 1986, CENARGEN's objectives have coincided with FAO's through initiatives to introduce new biotechnological techniques for characterization, to evaluate and transform genetic resources, and to strengthen their uses in agriculture, agroindustry and forestry.

CENARGEN conducts research and training activities for the enrichment, conservation, characterization and evaluation of germplasm, all aimed at the preservation and exploitation of genetic variability. Such activities are recorded through proper information systems. Special attention has been given to the germplasm that comes from abroad since about 80 percent of Brazilian food production is genetically based on exotic species.

Nevertheless, field collections of native species have greatly enriched germplasm banks, focusing on the biological diversity of Brazil and neighboring countries. In this region, the diversity of *Manihot*, *Ananas*, *Arachis*, *Anacardium*, *Hevea* and forage species of *Centrosema*, *Stylosanthes*, and *Paspalum*, is outstanding. Collections in regions of traditional agriculture have allowed the accumulation of many varieties of exotic agricultural products whose traditional usage led to the formation of countless landraces. The process involves a complex and continually evolving collection of local crop varieties that reflect interactions with wild species, adaptations to changing farming conditions, and responses to the economic and cultural factors that shape farmers' priorities.

CENARGEN protects these varieties of germplasm through several processes. Plant germplasm is maintained *ex situ*, as seeds in conservation chambers at -20°C, or *in vitro*, based on the various conditions required by tropical and temperate species. As a guarantee for the future food production, approximately 400 socio-economically important plant species are stored in the "base collection" located at CENARGEN in the form of about 82,000 seed samples placed in cold chambers and 3,000 samples preserved *in vitro*. Plant species that are difficult to conserve *ex situ* are maintained *in situ* in five genetic resource reserves. Genetic and population parameters are investigated to guarantee the appropriate conservation of their variability.

In 1997, CENARGEN initiated projects on the conservation and characterization of wildlife genetic resources with priority given to species with potential for production. The first two projects aim at the conservation of capybara (*Hydrochoerus hydrochaeris*) and paca (*Agouti paca*), which may also be reintroduced into Indian territories where they have been practically extinguished due to predatory hunting.

Recently, a new conservation approach has been tried with the repatriation or return of old varieties to native Brazilian communities. This approach has become necessary given the changes among Brazil's native population.

To understand these changes, one must look at the history of colonized Brazil. When the Portuguese navigators first landed on the Brazilian coast in the 16th century, the native population, estimated to total 5,000,000, consisted of 900 different ethnic groups who spoke 180 different languages and dialects. Today, there are approximately 400,000 Indians residing in 215 ethnic groups.

For this native Indian population, the Brazilian government has agreed to set aside up to 1 million square kilometers of land as Indian territories. Currently, 510 areas have been created, representing slightly more than 10 percent of the Brazilian territory. Despite the fact that many Brazilian Indian communities inhabit apparently large areas, there is no longer sufficient space for the ancient agricultural practice of shift cultivation that the Indians have practiced historically. Consequently, the native population has been forced to cultivate the same area for several years.

The Kraho is one of Brazil's 215 surviving native nations, and one of the few tribes that has been able to maintain many aspects of their traditional ways of life. The nation has survived despite the waves of diseases brought to America by European colonizers. During the 1940s, moreover, it withstood violent attacks carried out by non-native settlers to drive them off the land. In 1951, after negotiations with the Brazilian government, the nation was granted 3,200 square kilometers of territory in Taconites state.

The greatest threat to the survival of the Kraho people, however, may have come in the 1970s when government policies encouraged the native Indians to abandon their traditional farming practices and to cultivate the land according to the modern commercial agricultural system. The aim was to improve the quality of life for indigenous communities by integrating them into the broader national agribusiness-

based economy. This entailed the cultivation of a single cash crop, acquisition of modern equipment, use of chemical inputs, and planting of improved seed varieties. In the case of the Kraho, this meant learning how to grow rice, a crop that was completely alien to its culture.

After several years, it became apparent that the switch to commercial rice production was not bringing prosperity to the Kraho people. Contrary to traditional itinerant systems, growing rice required intensive cultivation using large quantities of fertilizers, pesticides and other chemicals never used by the Kraho people, all on a permanent site for cultivation. Kraho farmers watched helplessly as their soil became degraded and their agricultural productivity declined. Malnutrition in Kraho communities rose, as did their dependence on government social programs.

The policies that sought to modernize Kraho agriculture also failed to consider how such a radical shift away from traditional farming practices would affect the Kraho people's sense of cultural identity. The multicolored corn of the Kraho, for instance, was the product of more than a thousand years of seed selection and preservation. These native farmers had successfully developed varieties that had best suited their growing conditions and social needs. Kraho Indians planted a variety of seeds to better assure their families that, regardless of the weather conditions during a particular season, some corn would survive.

Over centuries, the rhythms and routines of the growing seasons determined their social calendar and found expression in Kraho folklore, religion, art and rituals. Now more than 300 different rituals were slowly abandoned as a "generation gap" began to divide the community. Elders no longer passed on traditional knowledge to their children and grandchildren. With increasing poverty and fading cultural identity, many Kraho Indians chose to leave for the dubious prospects of finding ways to survive in larger cities.

Description

The true extent of the problems resulting from the shift to rice monoculture became apparent to Kraho leaders after much research. With the help of Fernando Schiavini, staff at Brazil's Federal Agency for Native American Affairs (FUNAI) investigated the causes for the decay of the Kraho community and its ancient culture and concluded the need to re-establish traditional crops. In trying to implement the next phase of the research, it was discovered that the Kraho no longer had any seeds and that no plants were left growing in the fields. The corn had become extinct.

At this time, Schiavini directed the Kraho leaders to CENARGEN. Fortunately, nearly 20 years earlier, staff at CENARGEN had determined that the introduction of new higher yield crop varieties in native territories posed a serious threat to local plant diversity. In 1978, with the financial support of IPGRI, CENARGEN and CNPMS (today, known as the EMBRAPA Maize and Sorghum Research Unit), a series of expeditions was organized to collect and conserve seeds, tubers and other materials and to rescue endangered germplasm. During one of these expeditions, corn from the Kraho territory was taken back to the CENARGEN genebank where it remained in frozen darkness until its resurrection by Kraho leaders.

As a result of the successful reintroduction of corn into the Kraho territories, family nutrition increased and community ties grew stronger. The Kraho nation experienced a resurgence of native pride. This rebirth of a community inspired stories that received considerable attention in the Brazilian news media. After such a long history of oppression and often counter-productive assistance programs, people throughout the country were happy to learn about a project that had genuinely contributed to strengthening of the native culture. The message conveyed from these stories was that Kraho grandparents would now be able to pass on to their children and grandchildren the skills and knowledge developed over the course of hundreds of generations. Kraho children, moreover, will now grow up with pride about their heritage and not face a grim future lost among the impoverished masses of the urban underclass. The survival of the Kraho nation, nevertheless, is a sober reflection on society's dependence on just a handful of seeds.

Commercialization

Commercialization of Kraho's traditional crops is a possibility in the future given improvements in roads and bridges for transporting of commodities from community sites to markets in nearby villages. In the past, the food needs of the Kraho community were so intense that all production had to be utilized for

local consumption and the replenishment of seeds. Recently, however, a few families have registered a surplus production of gourds and pineapples that unfortunately could not be commercialized due to transportation deficiencies. With more families recording surpluses, pressure could mount for improving transport systems even more to take advantage of the market potential of these crops.

Partnerships

CENARGEN has joined with several national partners to help it introduce new plant varieties and maintain high sanitary conditions for the protection of agricultural products in Brazil. Germplasm repatriation to the Indian nations is being carried out under a formal cooperation agreement that includes provisions for the multiplication, conservation and periodic return of new samples to CENARGEN's seed banks for *ex situ* conservation purposes. With the support of EMBRAPA, CENARGEN introduces germplasm made available from other national and international institutions.

Sanitary conditions, a fundamental factor in the development and success of many new varieties, is maintained through a strong relationship with the Ministry of Agriculture. The research and quarantine services provided by CENARGEN, in cooperation with the Ministry of Agriculture, have already prevented more than 150 high-risk exotic pests, ranging from fungi, bacteria, viruses, nematodes and insects, from invading the national agriculture system.

The Center also manages the National Curatorship System for Genetic Resources that is connected to more than 200 other germplasm banks. This network is responsible for the conservation of more than 250,000 plant, animal and microorganism samples. These banks are part of the National System of Agricultural Research (SNPA), coordinated by EMBRAPA.

CENARGEN's projects have received most of their financial support from Brazil's national government. Indeed the work done to date in the Kraho project was financed from the regular budgets of the Brazilian government agencies, EMBRAPA and FUNAI, at an approximate cost of US\$20,000. As a consequence of the successful reintroduction of corn into Kraho territory, the partnership established between EMBRAPA and FUNAI resulted in an agreement in which the Kraho farmers will continue to grow their traditional corn, thereby contributing to the vital task of *in situ* seed conservation. In return, the Kraho will receive benefits from any future commercial exploitation of the germplasm.

More recently, the Kraho community received an award of US\$6,000 from the Getulio Vargas Foundation. This award was part of a national contest for good examples of citizenship rescuing actions. The Kraho project was selected from 600 other projects.

No partnerships currently exist with other countries or international organizations; however, the need for such relationships are obvious. The existence of the many native Indian ethnic groups in Brazil who suffer the same impoverishment as the Kraho community, coupled with the large geographical distances between their territories, calls for the replication of the Kraho project. Such territories need to be targeted by similar actions as those addressed for the Kraho group. There is no doubt that, with the help of international organizations, other successful projects with similar aims will be launched.

Lessons Learned

The problems faced in implementing the Kraho project often were overwhelming. There is a unique fusion of cultural contexts in Indian communities where new values and customs live side-by-side with the remaining values and customs of the old culture. Fostering a return to traditional agricultural practices was challenging because of the difficulties in passing the message from the elderly to the younger generation on the importance of rescuing cultural origins through the rescue of traditional agriculture. The Brazilian government had already caught the attention of Kraho's youth with the promise of a more profitable future with modern farming techniques.

With the realization that government programs were unsuccessful, efforts had to be made to bolster support and a spirit of cooperation among government and nongovernment institutions associated with the Indian communities for the repatriation program. Lack of clear legislation necessary for the ordering and orientation of actions related to the resources on Indian lands resulted in a confused message to the Kraho people. Inadequate mechanisms for the recognition of the traditional knowledge aiming for

the fair distribution of benefits resulting from the use of these resources made it difficult to build a case to returning to traditional farming practices.

Because of the Kraho project, indigenous communities now recognize that biodiversity can be a valuable natural resource in their territories and that their traditional farming practices and crops represent not just an important source of nutrition but a vital factor in maintaining social cohesion.

The Kraho project enabled the Indians of Tocantins state to recover their cultural calendar, including festivities, rituals, food, handicrafts, and fairs for seed exchange within Kraho communities and other ethnic groups. Such activities led to nutritional improvement due to broader food diversity, environmental recovery due to multiple crop cultivation, a return to “on farm” multiplication and conservation, and, most importantly, a drastic reduction of the dependence of communities on governmental programs. The independence regained by the Kraho community led to increased self-esteem and a sharing of experiences among Indian ethnic groups. Because of the successful repatriation of ancient seed varieties, new recognition was given to the knowledge possessed by the community's elderly people.

Impact

National and international media has publicized the success of the Kraho project. On the national level, numerous reports and articles have been published about the project and its impact. Several television programs focused on the project, including a one-hour “Globo Rural” special report aired during the 1000th broadcast of a well-known Sunday morning Brazilian TV program. On an international level, a paper was accepted for publication in the 1999 issue of the IPGRI's *GENEFLOW*, and a renowned journalist, contracted by IPGRI, is preparing a report for distribution to the international press.

The success of the repatriation of the lost germplasm to the Kraho Indians has led to an agreement between the Brazilian Agricultural Research Corporation (EMBRAPA) and the Federal Agency for Indian Affairs (FUNAI) for the continuation of the repatriation program and the collection and conservation of genetic resources on Indian lands with the consent and direct participation of the targeted community. The contract ensures the continuation of this best practice to contribute towards sustainable development.

Though no changes in legislation resulted from the Kraho project, the repatriation of seeds contributed to a better understanding of the problem of introducing modern farming methods to a traditional society. The results of the study provide information that, at a later date, could be the basis for future legislation regarding access to genetic resources presently being discussed in the Brazilian national congress.

Future Plans

Germplasm repatriation in other Indian nations will be accomplished under a formal cooperation agreement of multiplication, conservation and periodic return of new samples to CENARGEN's seed banks for *ex-situ* conservation purposes.

Plans are underway for the patenting and commercialization of new products that originated from genetic sources rescued from Indian communities participating in the repatriation program. Once investigated and proven to be of importance to society, communities like the Kraho Indians can begin to produce traditional crops. Profits from these crops will be returned to the original owners to help them develop their communities and make them independent of the government.

The Kraho project is being publicized as a model for Indian communities to preserve their resources and traditional cultural practices. Native communities, inspired by this model, have already contacted CENARGEN for the possibility of participating in like-minded cooperative agreements.

Implementing Institution

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