



Systematization of Geographical Knowledge and Ecological Knowledge of Peasant Families. Development Strategy in a Community of Mexico

KEYWORDS

Geographical knowledge, ecological knowledge, subsistence and local development.

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ABSTRACT *Geographical knowledge and ecological knowledge in social knowledge and daily life of peasant families in Mexico is important to know, understand and use natural resources. In the community of Progreso Hidalgo, located in the Ecological Transition Zone of the Mexican Subtropics, geographical and ecological knowledge have families determine the subsistence, economy and social welfare.*

Management of natural resources in aquatic and terrestrial ecosystems is the basis for successfully survive in the context of a globalized world. Geographical knowledge and ecological knowledge are present in 100% of the families living in this community and are manifested in soil management, wild vegetation, crops, rainfall, rocks, sunlight, altitudinal gradient, residual moisture, force of gravity, water, shade trees, wild animals and aquatic animals.

Introduction

Peasant families in Mexico have confronted complex situations, for example, the impacts of modernization of the agricultural sector, implementation and execution of huge projects in rural areas, expansion of industry on land with agricultural and forestry potential, changes land use, environmental impacts and processes of globalization of the economy (Pérez et al., 2014). This factor generates other problems that manifest in erosive soil processes, changes in the modes of agricultural production, deterioration of landscape, water pollution, decreased biodiversity, changing sociocultural patterns, migration from rural environments to the cities, land abandonment and loss of traditional knowledge (Juan, 2014).

In Mexico, traditional agricultural systems based on cultural adaptation, knowledge and management of environmental components are linked since time immemorial food sovereignty and food security of peasants, for this reason, it is necessary to vindicate their practice and promote continuity for local development of communities (Gliessman, 2002). Recent research (González, 2011; Juan, 2014; Miranda et al., 2009; Pérez, 2014) and have studied and shown that traditional Mexican agriculture has been supported by the geographical knowledge and traditional ecological knowledge of peasants, and practiced for hundreds of years.

Objective

The objective of the research was to demonstrate that the systematization and application of geographical knowledge and traditional ecological knowledge represent a strategy to promote local development in Progreso Hidalgo, community located in the Ecological Transition Zone of the Mexican Subtropics.

Method

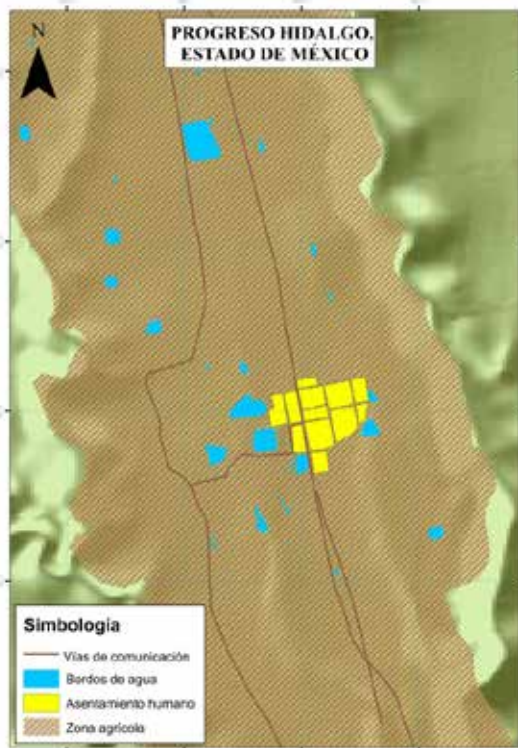
With the techniques of direct observation, participant observation, trips of natural ecosystems, growing areas and implementation of a research instrument to 125 (100%) peasant families in the community was determined the importance of the use of geographical knowledge and traditional ecological knowledge as basis for the family subsistence.

Geographical knowledge and traditional ecological knowledge

In Mexico, before the arrival of the Spaniards, families practiced and established various agricultural systems, all supported by the knowledge and management of environmental components. Recently, in several regions of the country, even these systems are practiced, of course, adapted to geographical, environmental, ecological and socio-cultural conditions for to produce food (Pérez et al., 2014).

Traditional ecological knowledge (traditional environmental knowledge, local ecological knowledge or popular knowledge) is the result of the experience of contact of people with their environment. This knowledge is considered as a cumulative body of knowledge, practice and belief, evolving by adaptive processes. The transmission is cultural through generations and it is generated by the interaction of people with the components of their immediate environment (Berkes et al., 2000; Concheiro y López, 2007; Miranda et al., 2009). Documenting knowledge is important to promote local development programs oriented to communities and local ecosystems, to consider efficient technologies ecologically, to know ecological processes for use and management of natural resources and evaluate impacts generated in the forms of management (Maimone et al., 2006).

Geographical knowledge and traditional ecological knowledge are linked to geographical, ecological, biological, environmental and socio-cultural conditions and have a significant contribution to the sustainable development of local communities, because when families apply this knowledge in their activities and their everyday life, sustainably use natural resources also preserve them for future generations. This knowledge is present in rural communities and is manifested in two dimensions: a) tangible and b) intangible. The first is linked to the provision and management of natural resources in the environment of the communities, while the second refers to the worldview that people have about the nature, natural phenomena and beliefs associated with the management of resources (Berkes et al., 2000; Concheiro y López, 2007; Miranda et al., 2009; Pérez, 2008).



Map 1. Progreso Hidalgo, State of Mexico.

Results

To demonstrate the importance of geographical knowledge and traditional ecological knowledge in agriculture and family subsistence, it was studied the rural community of Progreso Hidalgo (Map 1). The economy and social welfare of this community is based on the following: a) management of physical and biological components, b) conventional agriculture (strawberries, flowers and onions for regional and national markets), c) traditional agriculture (corn, beans, pumpkin and chili for family food), d) management of natural resources in terrestrial and aquatic ecosystems, e) migration to the community, f) mutual aid.

The application of geographical knowledge and traditional ecological knowledge directly influences agricultural processes and must be understood in an integrated manner, for example, the traditional agriculture produces food for the family, while conventional agriculture, produced for regional and national markets, but, there are reciprocal interactions between the two. The family needs food and money to buy other products and services.

The geographical knowledge and traditional ecological knowledge are decisive in the economy and social welfare of the community, because not to use the diversity of natural resources, it would not be possible to survive successfully in the context of a globalized world. This knowledge is manifested in all agricultural processes, management of natural resources and social welfare.

Wild vegetation and cultivated vegetation are used to produce agricultural tools, making supports for crop management, building of rustic homes for shelter and protection of agricultural products, repair baskets, flow control in furrows, fencing of protection, fuelwood, generation shade to prevent dehydration of fruits and flowers, soil and water conservation and crop protection symbolic.

Corn is basic food of Mexicans, is a multipurpose plant. It provides many benefits: agricultural, food, medicinal, ritual, ceremonial, environmental, ecological, industrial, fuel and rustic buildings.

Families practice crop rotation also intercalates aromatic plants to contribute management of pests and diseases. Some parts of the plant are used to feed domestic animals, incorporation of organic matter to soil to improve its properties, flow control channels, space conditioning for protection of grains, seeds, fruits and flowers and establishment of hedgerows to control the wind.

The community has no sources of water for irrigation or for human consumption. Through family social organization, water originated 45 kilometers away and is conducted toward the community through a system of channels. Water management is favored by the knowledge of the topography, altitudinal gradient and the force of gravity. The water allows the establishment of 20 agricultural crops, the most important are: strawberry (*Fragaria linn*), gladiolus (*Gladiolus hybridus*), onion (*Allium cepa*), corn (*Zea mays*), beans (*Phaseolus vulgaris*) cucumber (*Cucumis sativus*) and pumpkin (*Cucurbita sp*).

The rocks are another important natural resource in agriculture. The main use of the rocks is to control the flow of water in the channels of distribution. The rocks, foliage plants and the mud allow control the entry and movement of water in the furrows.

Management sunlight is important in agricultural processes; their use is associated with dehydration and drying of grains, seeds and tubers before storage. These products must be completely dry to avoid being affected by fungi, bacteria, moths and larvae. In agricultural areas, yards and rooftops of houses is common to observe the dehydration of agricultural products.

Dehydration and drying of the manure of cattle, sheep and horses, is another use of solar radiation and heat. The mixture of manure waste foliage, fruits and vegetables decomposition process is used as fertilizer.

The use of water is associated with the knowledge of the soil, crops and wild vegetation. The conditioning of spaces for storage and conveyance of water have favored the formation of a supply system, storage and distribution for all plots. Social organization and mutual aid in association with geographic knowledge and traditional ecological knowledge for water management, soil, crops, altitudinal gradient, the longitudinal slope of the terrain and the force of gravity have contributed to management and conservation of the water.

In the dams abundant aquatic species, for example, tilapia (*Lepomis sp.*), frog (*Rana zweifeli*) and salamander (*Ambystoma sp.*), which are used to supplement the family diet. The capture of these animals is conditioned by the social organization, weather conditions and strategies for conservation.

Trees play important roles in agricultural processes. The shadow generates microclimates, where lower environmental temperatures are compared to areas exposed to sunlight, so, in the shade, families temporarily placed harvested products, for protect them from sunlight and avoid dehydration.

Peasant families use all resources in their community. Geographical knowledge and traditional ecological knowledge allow to maximize the water, intercropping, for example, strawberries and onions, this way, water is used first by the strawberries plants, and as the useful part of the onion is the tuber, and then it has enough residual moisture for growth and development.

The social organization of peasant families and mutual aid are two important strategies for managing natural resources and the daily life of the inhabitants (Juan *et al.*, 2011).

In Mexico are important governmental, academic and research strategies because they are focused to diffuse geographic knowledge and systematize the ecological knowledge possessed by peasant families. It is necessary to characterize and analyze the diversity of knowledge and its application with the finality to vindicate and promote its use towards sustainable local development of the community.

Since 2003, Progreso Hidalgo has been studied in several Mexican universities, 12 researchers and 382 students have exchanged knowledge of natural resource management, agricultural environmental risks, management of home gardens, function systems ravines (gullies), peasant mutual aid, environmental assessment, use of medicinal plants, agricultural processes, changing land use, environmental history and environment impact.

The application of geographical knowledge and compilation of traditional ecological knowledge possessed by peasant families has been used for two purposes: a) publications of scientific papers and books, and b) implementation of productive projects with finance of the Secretary Agrarian Reform. Integrated projects are: a) use of strawberries for preparation of sweets, b) equestrian agro-ecological tourism to observe natural resources, agricultural processes and environmental diversity, c) management of plants for food, treatment of diseases and activities ceremonial, d) raising goats, and e) raising pigs for market.

Conclusions

Peasant families of Progreso Hidalgo know the components of their environment directly, therefore, use them in their daily lives. The families care, manage and protect natural resources. Since 1952, the geographical knowledge and ecological knowledge have favored family subsistence in the community. The participation of university in the systematization, dissemination and application of geographical knowledge and ecological knowledge of peasant families is a viable strategy to promote local development.

Participating families are an important social reference for generating multiplier effects in the community and the region. Other families are integrated into working groups to implement new projects, of course with the advice and support of the students and researchers.

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