

The Importance of Social Capital for Performing Participative Restoration Projects: Practice-Based Knowledge of Two Contrasting Indigenous Communities in Mexico

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Review Article

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ABSTRACT

Social capital is a theoretical construct that proposes scenarios where values such as cooperation, communication, and confidence among people can create an ideal environment for the solution of socioecological problems, reducing participative project transaction costs and guaranteeing their long-term permanence. For its part, ecological restoration, known as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed”, is gaining momentum, because the General Assembly of the United Nations declared that 2021–2030 will be a “The Decade on Ecosystem Restoration”. However, several authors consider necessary to include the human dimension in the restoration projects, since social participation of local people can ensure their permanence over time. In this regard, this study comprises the cumulative knowledge and learning acquired through the coordination of two participatory ecological restoration projects in two poor traditional indigenous communities of Mexico, with contrasting levels of social capital. One project, was carried out in La Montaña region of Guerrero state- “Landscape Restoration in the Xuajin Me Phaa Non-Governmental Organization Territory”. Another project was carried out in Cuentepec region in the Morelos state- “Barrancas del Rio Tembembe Environmental Restoration Station”. The main lesson to be learned was that, before starting a participatory restoration project, it is necessary to know that the magnitude of social capital existing in a community exceeds a certain critical mass, to ensure an effective social participation and make its long-term success possible.

Keywords: Collective action; La Montana; Cuentepec; Productive restoration; Ecological restoration; Common goods; Social participation

INTRODUCTION

Since almost six decades, Olson proposed the concept of “collective action”, as an action taken together by a group of people, whose goal is to enhance their living conditions and achieve a common objective. Although there is overwhelming empirical evidence that explain the difficulties in establishing collective actions, there are several case studies that report individuals who collaborate to achieve benefits from the group to which they belong, based on the consolidation of institutions and norms within their communities. This study cases have found that values such as reliability, trust, and a sense of justice lead individuals to act collectively ^[1].

At the same time, several studies have found a direct relationship between the theory of collective action and social capital. The first contemplates forms of social capital or constituent elements of it, mainly the existence of institutions and networks within the framework of trust relationships, which allow reducing the transaction costs that would not otherwise be achieved. Social capital, in turn, is a theoretical construct that proposes scenarios where values such as reciprocity, cooperation, communication, tolerance, and social inclusion can create an ideal environment for the solution of socio-ecological problems. Therefore, the existence of social capital is considered a facilitator for collective actions. Social capital has also been recognized as an asset of the poor, since, in the absence of material and human resources, they achieve their social capital, represented in friends, family or other close people to face several moments of crisis. However, economic crises, social conflicts and structural violence can negatively affect the relationships and wellbeing of people that live in rural communities ^[2].

Some authors have also recognized social capital as the most influential factor for the construction and strengthening of socio-organizational capacities, which can increase the probability of a collective and sustainable management of natural resources, from the point of view of the actors and their practices ^[3].

For its part, ecological restoration, known as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed”, is gaining momentum, given that, on 1 March 2019, the General Assembly of the United Nations (UN) declared that 2021–2030 will be a “U.N. decade on ecosystem restoration” with the central goal of restoring 350 million hectares around the world. This is mainly due to the growing awareness of threats such as the negative impact of global warming and a loss of biodiversity, resulting from environmental degradation ^[4].

However, several authors consider that the definition established by society for ecological restoration should be more complex, since its practice allows the participation of diverse social actors and incorporates different environmental perspectives and interests, which reinforces common ideas through shared activities. It also requires continuous learning and negotiation among those involved in the project, rather than a single solution to a single problem. For this reason, ecological restoration must have the objective of, in addition to repairing an ecosystem, generating new human values regarding to nature and political relationships with respect to the natural environment ^[5].

In developing countries, ensure local people engagement in restoration projects is pressing, as is the case of Mexico. This country is home to 12% of the world’s biodiversity with 200,000 different species but with 56.3% of the population living under poverty conditions, 20.1% lacking an access to food and 57.2% of the population only having temporary jobs. In addition, a large percentage of the poor people are indigenous, which can vary by state: from 0.22% (Zacatecas) to 58.96% (Yucatan). Another important characteristic of Mexico is land tenure, in 1917 the Mexican constitution established three different forms: private, public, and social. Social property was further subdivided into communal (established before

Spanish conquest) and “ejidal” (established after the Mexican agrarian revolution). In 2007, these social lands covered an equivalent of 53.4% of the Mexican territory. It is also important to notice that in Mexico the term "community" frequently refers to cultural/communal practices related to organized indigenous groups, that had lived in this territory before the Spanish conquest [6].

However, with globalization and neoliberalism, the great Mexican cultural tradition of collective actions fuelled by its high environmental diversity is at risk of disappearing. In fact, the mere presence of strong traditional institutions does not guarantee organization and trust, because social capital and community institutions are not equivalent. Community institutional strength is based on social capital, the level of dependence on natural resources and organizational practices (they are all interrelated). Therefore, social capital is considered a fundamental asset of a community when it comes to the common lands' management and may also ensure the effective social participation of the community members in restoration projects. In addition, the possibility of being a collective activity is what makes restoration different from traditional strategies for protecting and preserving nature, as it offers all types of social actors involved, an opportunity to have a positive and active relationship with the natural ecosystems, because ecological restorers not only help natural processes, but participate in them [7].

In this sense, this study was using practice-based knowledge with in two participatory restoration projects, in two contrasting communities regarding social capital. One project, “Landscape Restoration in the Xuajin Me Phaa Non-Governmental Organization Territory”, is a traditional indigenous community in La Montana of Guerrero state, with high level of poverty, where was created in 2006 a NGO called Xuajin Me Phaa with the aim of growing and selling organic products. This NGO presents a high social capital (8.5 on a scale of 10) measured by Galicia -Gallardo et al. The landscape of the region has a spatial pattern of a highly human-modified landscape. Most of forest fragments were considered “open” by fuelwood extraction, half of them is small (>21 ha) with irregular shape, indicating strong forest edge effects [8].

The other project, “Barrancas del Rio Tembembe Environmental Restoration Station” (henceforth Restoration Station) was also carried out also in a traditional indigenous community of Cuentepec, in Morelos state, with high poverty and socio-ecological external and internal conflicts (mainly about land and water resources), leading to a low social capital. In this zone, most of the forests were destroyed by the sugar mills at the end of the last century, and were later overgrazed. Currently, they are lands with very low productivity (areas with a rangeland rate of 25 ha per livestock head), with agricultural crops and very meager pastures that experience in some areas, erosion rates up to 80 tons/ha [9].

The main objective of this practice-based study was to highlight the importance of the magnitude of social capital in the indigenous rural communities, for guarantee the success and permanence of participatory restoration projects [10].

LITERATURE REVIEW

Study region

The Xuajin Me Phaa indigenous NGO is in the municipality of Acatepec (17° 00' and 17° 22' N, 98° 49 and 99° 11' W) (Figure 3) in La Montana zone of Guerrero state; the altitude varies between 300 and 2 600 m.a.s.l. The area for the landscape restoration project comprises 13 468.8 ha and three micro basins. The climate is warm and subhumid with rains in summer and with a total annual rainfall of 1 800 mm. The rainy season begins in April and ends in November, with the highest rainfall in September (434 mm). Annual rainfall is 1520 mm, and annual mean temperature is 27.7°C. The orography is mostly rugged: 70% of the relief is mountainous, 20% is semi-flat, and only 10% is plain. The vegetation is composed mainly of small, isolated fragments of low deciduous forest in the lower parts and coniferous and oak forests in

the higher parts ^[11].

Mexico's state of Guerrero has been characterized by high levels of poverty (64.4% of inhabitants in poverty and 23% in extreme poverty). La Montana is one of the poorest regions in Mexico, with one of the lowest Human Development Index in Mexico). In this region, ethnic groups of tlapanecos or mee phaa, mixtecos or naa savi, nahuas and amuzgos share the territory. This region is also affected by continuous structural violence, which keeps it marginalized from health, education, and communication services ^[12].

The project history

The indigenous NGO Xuajin Me'Phaa was created in 2006 to integrate around 300 farmers and their families from 14 communities, who were engaged in the organic production of honey, beans, bananas, pineapple, coffee, and *Hibiscus* the most important crop in terms of income. The NGO consists of 40 members of the General Assembly of Delegates: Seven from the Council of Principals, three from the Directing Council, three from the Vigilance Council, and 27 community technicians from the 14 communities. The NGO has also an operational team of 20 people led by a general coordinator. This team, together with the community technicians, designs and carries out activities involving the following six topics: Projects design, forest and nursery supervision, agroecology supervision, organic certification and beekeeping, administration and accounting, and training ^[13].

In 2008, the Regional Center for Multidisciplinary Research of the National Autonomous University of Mexico (CRIM-UNAM in Spanish) began to work with this indigenous NGO in local and landscape restoration projects, and in 2013, a formal agreement was signed between them. The work methodology used by CRIM-UNAM researchers was the Participatory Action Research methodology (PAR) that emphasizes collective inquiry and experimentation grounded in experience and social history. Within a PAR process, "communities of inquiry and action evolve and address questions and issues that are significant for those who participate as co-researchers". PAR can be considered an ad hoc methodology since the NGO also operates with the methodology of organized common work, based on indigenous knowledge, organizational tradition, and collective effort. At the NGO assemblies, issues are periodically presented by monitors while CRIM-UNAM researchers do it twice a year, and participants' opinions are recorded. Task forces are formed by interested people who appoint a leadership committee, that takes part in the design and execution of the projects and the agreed work plans to address the problems identified by the group. The NGO committee and CRIM-UNAM researchers submit reports to the communities and to the NGO. The above-mentioned organizational characteristics have helped the NGO achieve a high level of social capital which is reflected in a great participation and confidence, along with good capacity for increasing innovation, adaptability and resilience. These characteristics have strongly influenced the success and long-term persistence of restored projects.

The main objective of this landscape restoration project was to diagnose the socio-ecological problems of the organization through research projects and, to try to solve these problems through applied research, always with the effective participation of the members of the NGO ^[14].

A synthesis of project's achievements

The restoration planning scale agreed upon between the CRIM-UNAM researchers and the NGO was the landscape, consisting of large-scale physical areas with overlapping ecological, social, and economic activities, as well as multiple functions and services, including food, biodiversity, water, housing, and so on ^[15].

A diagnostic study revealed that the landscape exhibited a typical spatial pattern of heavy human-made modifications. Remnants of native vegetation were isolated, small, and irregular in size (<21 ha), as well as susceptible to alterations by

their surroundings. A study showed that 100% of the families use fuelwood to cook and developed restoration models based on people perceptions about their landscape degradation and fuelwood needs. A systematic analysis of organic *Hibiscus* production showed high sustainability levels, well above those of the conventional system. This current success of the organic *Hibiscus* system has been achieved *via* a high level of social capital inside the NGO, which reflects great participation, confidence, innovation, and adaptability. One of the critical points of the analysis was the low *Hibiscus* yields. Thus, the CRIM-UNAM group began to research how to improve *Hibiscus* and corn yields by experimental studies of organic amendments and agroforestry systems with great success. So far, this project has been the source for ten graduate dissertations, 11 papers and 13 book chapters [16].

Lessons learned

The essence of the social participation model was an intense dialogue of knowledge between members of the CRIM-UNAM group and of the NGO, as of the planning phase of every research project. For this, in the NGO assemblies, an agenda of socio-ecological problems and their possible solutions was defined [17]. Project planning was based on the viewpoints of the NGO members and the perception of their agricultural and ecological problems. Since it is impractical for all members of the community to be involved in all stages of the project, the NGO designated working groups reduced to a manageable size, which, together with the members of the CRIM-UNAM group, were responsible for planning, implementing, and monitoring each research project [18]. It was also important to consider the ecological and social limitations of the restoration project during the participatory decision-making process and to maintain the socio-economic viability of the projects (e.g. research seeks to work with local material or local tree species as amendments for agricultural crops). Only after five years of a constant knowledge dialogue between CRIM-UNAM researchers and NGO members, it was already possible to check a recognized social learning about the importance of ecosystems restoration among NGO members. In 2013, the NGO has obtained external financing by its own initiative to carry out a participatory productive restoration project, focused on the use of multipurpose species of cultural importance, which could produce tangible goods for the local population, help increase landscape connectivity and improve their food security [19]. This project aimed at restoring species from 200 Traditional Homegardens (THs) in the backyards of community members.

Therefore, it is possible to notice that in this community, an environmental paradigm shift is emerging, because of the collective learning generated by the effective participation of NGO members in the various restoration activities, associated with their high level of social capital.

The difficulties that the organization has encountered are the bureaucracy of the institutions and the government, that hinders community action and administration of the resources. The development processes in the region are very slow and long because it is necessary to operate with all the limitations imposed by poverty. Therefore, it is not always possible to lay the foundations for community improvement in a short time, especially because as progress is made, several communities want to join the programs, and the resources become insufficient [20].

It is also important to highlight that NGO dependence on a financing institution is recognized as negative for any project, because it generates unrealistic expectations in communities about the incoming of resources and causes conflict once support is ended. For this, the NGO objectives are to generate profitable and self-managed projects that diversify the economic options of the population. For this purpose, the last budget was used to install training centres in the communities, whose purpose is that they function as seedbeds of productive projects linked to the agro ecological project, the agricultural cooperative, and a future organic marketer with a social focus on the wellbeing of the small indigenous producers.

The CRIM and NGO continue to work together to this day. The productive restoration is also being promoted by the Federal Government in this region in a program known as "sowing life."

RESULTS AND DISCUSSION

Study region

The community of Cuentepec is in the state of Morelos in South-central Mexico (18° 54' 34" N and 99° 20' 23" W). The project covered the whole of the Cuentepec community area (7,000 ha). However, only 1,552 ha were parceled out, because they were suitable for agriculture while 2,214 ha were pasture lands and areas of common use. The village covers 67 ha and 3,192 ha correspond to rivers, streams, and water bodies of the gullies and the Tembembe riverbed. This region has a monthly temperature average of 18 to 20°C (max. 30.1°C and min. 12.8°C), and an annual precipitation of 1000 and 1500 mm with a well-defined dry season from October to May. The predominant vegetation is seasonally dry tropical forest.

Despite being located only 15 km west of Cuernavaca, the capital of Morelos state, the indigenous community of Cuentepec is one of the most marginalized and impoverished in this state, mainly because of the geographic isolation created by a series of gullies. The inhabitants of Cuentepec are descendants of the Tlahuicas, and their identity is evidenced using the Nahuatl language, the clothing of women and older men, the agricultural practices, the civil and religious rituals, and festivals, among other aspects. In this place land tenure is ejidal and communal. Theoretically, there is access to agricultural plots, and everyone can take advantage of common-use lands: pastures and forest areas.

Project history

In 2003, through a formal agreement, the community of Cuentepec on its own initiative granted by way of a loan (over a period of 30 years), 100 ha of severely degraded pasture lands to be restored by the CRIM-UNAM. After that, was created the restoration station, located 3 km from the Cuentepec village. In addition to ecological restoration (inside the Restoration Station), other three programs were developed within this project:

- Productive restoration: development of agroforestry and agro ecological techniques in agricultural lands around the restoration station to produce firewood and food for community members and connect the landscape;
- Environmental sanitation: improvement of waste management and construction of cisterns to capture rainwater and,
- An environmental education program for local elementary and high school students.

The four programs were developed through dissertation works and research projects, using PAR methodology. The general objective of the restoration station project was to restore the region's natural forests, as well as the productive capacity of the surrounding community properties, by improving the quality of the soil and providing fuelwood, fodder, and food, to enhance the wellbeing of the local people. The project also intended to solve problems such as water scarcity and the waste management and, through an effective participation of the local population (including teachers and students), to raise the social capital level through the collective action.

Water: A source of conflict

Although Cuentepec is located on the banks of the Tembembe river, one of its main problems, was the access to water, only accessible in approximately 200 meters deep gullies.

The event that had the greatest impact in relation to water resources for Cuentepec occurred in 1953, when this community signed an agreement with the Ahuatenco community, in the neighboring Mexico state. At this time, it was established that the Ahuatenco community would provide water to Cuentepec through a channel from the Mexicapán river, in exchange for the use of their communal lands to graze their cattle. In this case, it is important to notice the absence of the government in a matter that undoubtedly falls within its domain, because in Mexico, water is the property of the nation (Article 27 of the Mexican Constitution), and its supply to the population is a matter of public concern.

The 1953 agreement was renewed in the 1980s, although at this time the government of the State of Morelos contributed economically to transporting the water through pipes. The negotiation over water, however, has even generated internal conflicts within the Cuentepec community. On various occasions during the last decades, landless peasants from this community settled and fenced pasture lands, the object of the abovementioned agreement, causing a claim from Ahuatenco. Internally, the agrarian authorities of Cuentepec never recognized the rights of the petitioning local peasants, and the conflicts were always resolved in favor of Ahuatenco.

In short, throughout its recent history, Cuentepec has been forced to exchange water for territory because of its scarcity. An intercommunity agreement of goodwill among neighbors, but without legal support, has deprived Cuentepec of its autonomy to take decisions within their territory, since their Ahuatenco neighbors think that it also belongs to them. In this sense, Cuentepec people must consult them or even ask them for permission in any decision. As there is no national regulatory framework, a situation of open access has been generated in the grazing lands, which also exposes Cuentepec community land to a visible deterioration caused by overgrazing, without any action being taken to stop this process.

Thus, Paz concluded that in Cuentepec “the traditional institutions that exist have not been intended to regulate and guide the management of natural resources; conversely, they have devoted themselves to other aspects of social life and their community identity has been built with other references”.

A Synthesis of the project's achievements

Ecological restoration program: Floristic databases of vascular plants of slopes and riparian vegetation zones of Xochicalco (an area near the station where native vegetation is better preserved) were generated to be used as reference ecosystems. Studies on the phenology and propagation of native tree species were carried out. The delimitation of landscape units was also established, as well as the analysis of fragmentation and conservation-deterioration state of vegetation. Anthropogenic and natural disturbance factors were also studied. Basic physical and chemical analyses were performed on the Tembembe River, and hydraulic flow models were developed. Experimental restoration plots were established in an area of 40 ha, to evaluate the behaviour of 24 species of multipurpose trees and shrubs under different microenvironment conditions. Around 12 papers and 13 dissertations were carried out within the program.

Productive restoration program: A first step of productive restoration program was to evaluate the fuelwood market and consumption in Cuentepec, to conclude that families used strategies for combining multiple fuels instead of making gradual changes towards modern fuel technologies. The second step was to establish productive restoration *via* agroforestry/agroecological experiments, that were carried out on the properties of the inhabitants of the Cuentepec community. The management techniques and the species used in the experiments were obtained through a knowledge dialogue between researchers and farmers. One paper and one PhD dissertation were written during this program.

Environmental sanitation program: One public (in the secondary school) and 45 private cisterns were built to capture rainwater.

Environmental education program: Environmental education program was implemented in the elementary and high school of the Cuentepec community by the CRIM/UNAM group. Interviews were conducted with teachers to find out their perception about the environment quality around the village. Results were directly reported in an institutional technical report.

Lessons learned

According to Bourdieu, a basic condition for the existence of social capital in the management of natural resources is that there are relationships that allow individuals to claim access to these resources, as well as the quantity and quality of those resources. In the case of Cuentepec, these natural resources (water and grazing land) did not belong only to members of this community, because they were also under the will of the Ahuatenco community members. Thus, the distribution of these resources has been employed to maintain positions of power, which even created situations of scarcity and degradation of these natural resources.

Although some social and several ecological objectives were met in the nine years of existence of the Restoration Station, the effective participation of the community in the programs, could never be achieved due to water and land use conflicts. In practice, only a small part of the population knew about and participated in the implemented projects. Participation has been mainly functional, that is, the same local actors always participated in one way or another in all the projects, because they were selected by the ejido authorities, who chose people from a small group of their own interest or members of their families. Few people participated in the assemblies (especially young people), since they had to be summoned by the ejidal authorities. In the end we recognized that few people within the community were aware of the project.

Finally, in 2012, among other regional conflicts, violence and a possible intentional fire that destroyed 30 ha of restored areas that had just been planted, the CRIM-UNAM terminated the agreement and ceased activities.

CONCLUSION

In Mexico's indigenous communities, the existence of autonomous traditional institutions does not guarantee sustainable management of communal assets or the presence of social capital beyond critical mass.

Even though both Cuentepec and La Montana regions showed several socioecological similarities, such as extreme poverty, environmental degradation, a strong cultural identity, and traditions in the management of common goods, the contrasting pre-existing magnitude of social capital between them, drastically influenced the development of both restoration projects.

Essential to the success of the restoration NGO project was its collective ability to take decisions, and act jointly to pursue objectives of common benefit, derived from components of its social structure as diverse as trust, networks and the presence of constituted and productive NGO.

When the social structures of a community do not work adequately, they foster authoritarian and patronage habits that concentrate benefits in a few hands. Consequently, the capacity for collective action diminishes and may even disappear. Also, the lack of essential resources for survival, such as land and water, can generate long-term conflicts and the impossibility of carrying out participatory projects.

One of the main reasons why the restoration station project ended, was the existence of historical internal and external conflicts over natural resources and that the community's traditional operating structure did not work adequately for all its

members. This fact considerably reduced the magnitude of its social capital.

Before starting a participatory restoration project, it is necessary to know if the magnitude of social capital existing in the community exceeds a certain critical mass, to make the increasing level of trust and environmental awareness among participants possible, guaranteeing the long-term project success. Also, the available natural resources and the surrounding socioeconomic conditions also play a relevant role.

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