

Indigenous Peoples and Lake Basin Management

Lessons from Lake Atitlán, Guatemala

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Introduction

Many lakes of the world sustain indigenous people in their basins. In our present global society, working towards sustainable use of lakes in a culturally diverse context represents a greater challenge to scientist, lake managers, and decision makers. According to the UN Human Development Report, "one of the greater challenges that generate more division in contemporary policy debates are indigenous issues, extractive industries in their territories, and the intellectual rights to their traditional knowledge" (UNDP, 2004).

In this material we will be concerned with indigenous issues pertaining to lake use and basin management. Considering first, general issues of the contemporary situation of indigenous people and their relation to lakes and basin resources. Second, tools to engage with indigenous people in the challenge of sustaining the benefits from

lakes, and third, the experience working with Maya indigenous people at Lake Atitlán in Guatemala.

The main objective of promoting a sustainable use and management of lakes lies in securing the benefits that these precious ecosystems provide to humanity. In the case of working with indigenous peoples, cultural issues must be taken into account to succeed in sustaining and increasing such benefits, considering that their relations to nature usually differ significantly from western values.

The nature of lakes is extraordinarily diverse. The main characteristics of lakes such as origin, geology, climate, drainage basin type, water quality, energy regimes, and species composition already produce very diverse ecosystems. Cultures shaped by lakes, such as indigenous peoples, are much more diverse than the nature of lakes. Therefore, the importance of learning to work in diverse cultural set-

Table 1. Census and estimated population of indigenous people in Latin America by country, during the last decade.

Country	National Census			Other Estimates		
	Year	Population	%	Year	Population	%
Bolivia	1992	3.058.208 (a)	59	1992	5.600.000	81.2
Guatemala	1994	3.476.684	42.8	1992	4.600.000	49.9
Perú				1992	9.000.000	40.2
Ecuador				1992	3.800.000	35.3
Chile	1992	998.385 (b)	10.3	1992	10.900.000	12.9
Panama	1990	194.269	8.3			
Mexico	1990	5.282.347 (d)	7.4			
Colombia	1993	744.084	2.2			
Nicaragua	1995	67.010 (d)	1.8			
Honduras	1988	48.789 (c)	1.3			
Brasil	1991	294.131	0.2	1992	1.500.000	1
Venezuela	1992	314.772 (d)	0.9			
Paraguay	1992	29.482	0.7			

Translated and adapted by J.Skinner

Source: Bello, Alvaro y Marta Rangel (CEPAL), *Etnicidad, "Raza" y Equidad en América Latina*, CEPAL, Santiago, 2000, p. 17.

(a) Ages 6 years old or more

(b) Ages 14 years and more.

(c) Ages 5 years or more.

(d) Censo Indígena.

tings to develop integral views, plans, and actions for lake sustainable use and management.

1. Overview of Indigenous Peoples

All indigenous peoples belong to an ethnic group as long as they are “people that self identify and differentiate themselves on the basis of descent.” (Adams, 2002). There are over 5,000 ethnic groups, speaking 6,000 languages in 200 countries of the world. (PNUD, 2004). They usually represent minorities within a state or nation (Table 1), which has made indigenous people vulnerable to social inequalities. “All individuals and groups will manifest *differences*. These differences become *inequalities* when they are evaluated, and deemed to be *desirable* or *undesirable*, *good* or *bad*. They then are used as a basis for *prejudice* and *discrimination*. It is important to remember, however, that not all differences are seen as inequalities by all peoples” (Adams, 2002).

One clear indicator of the exclusion of indigenous minorities is the conditions of poverty into which they have been submitted. In (Table 2) we may observe the differences in poverty levels between indigenous and non-indigenous people in countries of Latin America, indicating a much larger percentage of indigenous populations below the poverty line.

Table 2. Indigenous poverty in Latin America.
(Percentage of the population below the poverty line)

Country	Indigenous	Non Indigenous
Bolivia	64.3	48.9
Guatemala	86.6	53.9
Mexico	80.6	17.9
Peru	79	49.7

Source: G. Psacharopoulos y H. A. Patrinos (1994), in Bello, Alvaro y Marta Rangel, *Etnicidad, “raza” y equidad en América Latina y el Caribe*, Economic Commission for Latin America and the Caribbean, CEPAL. Santiago, Chile.

Translated by J. Skinner

What makes indigenous peoples a special group of lake stakeholders is their different relations with nature. “Indigenous people are distinct populations in that the land on which they live, and the natural resources on which they depend, are inextricably linked to their identities and cultures” (World Bank, 2004). Poverty, or a lack of development, in indigenous populations is usually attributed to policies of exclusion from traditional lands and natural resources, including lake resources.

Specific national and international policies and law to protect the rights of minority ethnic groups have evolved substantially in the last two decades. The most significant comprise: (1) the 2007 United Nations Declaration on the Rights of Indigenous Peoples, (2) the International Labour Organization (ILO) Convention (No. 169) of 1989 concerning Indigenous and Tribal Peoples in Independent Countries, and (3) the work of the UNDP Human Development Reports.

1.1 Global Policies for Indigenous people

In the past, the policy approach to manage cultural diversity was based on assimilation which is a conventional approach to try to build a single dominant identity. Experience shows that assimilation policies violates cultural freedom and leads to social and political conflict, since is very difficult to change world views and ways of life of people.

Contemporary policies for multicultural societies are based on respect and recognition of human differences. They include cultural rights as part of social justice, promote multiple and complementary identities inside societies, and foster sustainable development. The most important international law and policy towards indigenous rights are the following.

Box 1. Selected articles from the United Nations Declaration on the Rights of Indigenous Peoples

Article 25

Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard.

Article 26

1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.
2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired.
3. States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples

<http://daccessdds.un.org/doc/UNDOC/GEN/N06/512/07/PDF/N0651207.pdf?A/RES/61/295>

1.1.1 *United Nations Declaration on the Rights of Indigenous Peoples*

The most recent international policy instrument is the United Nations Declaration on the Rights of Indigenous Peoples, approved in 2007. There are two articles that concern directly to the management of lake resources in their territories.

Article 25 is concerned with the spiritual relations of indigenous peoples with nature, and their right to transmit their spirituality to future generations. Article 26 is more concerned with ownership and control of access to land and its resources (Box 1). Between both articles alone, spiritual, cultural and economic rights of indigenous people are meant to be protected. This recently published policy is still to be legally ratified by most countries with multicultural societies that include indigenous peoples.

1.1.2 *The International Labour Organization Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries*

The Convention 169 on Indigenous and Tribal Peoples in Independent Countries was adopted in 1989 at the Conference of the International Labour Organization (ILO), after the revision of the Convention 107 of 1957 which was an integrationist policy. It is also based on the various international instruments on the prevention of discrimination,

such as the Universal Declaration of Human Rights (adopted by the UN in 1948), the International Covenant on Economic, Social and Cultural Rights (adopted 1966, entered into force on 1976) and the International Covenant on Civil and Political Rights (adopted by the UN General Assembly in 1966 and entered into force on March 23, 1976).

The spirit of Convention 169 grants indigenous peoples the same fundamental human rights enjoyed by the rest of the population in the countries they inhabit. These people have suffered exploitation, discrimination and exclusion. Their thoughts, ideas, feelings and how they understand and live their lives, have been much less included in national and international law and policy.

The basic concepts in this instrument is consultation, participation and the right of these people to decide on their development in full respect for their beliefs, institutions, spiritual well-being, their relationship to land, and everything that affects their lives. This instrument presumes the permanent and enduring existence of these people, if they so choose. Including the word “peoples”, is understood as a recognition of a collective social identity, organization, culture and beliefs of their own, with the right to self-determination.

Box 2. Selected articles from the ILO Convention 169 on Indigenous and Tribal Peoples in Independent Countries

PART II. LAND

Article 13

1. In applying the provisions of this Part of the Convention governments shall respect the special importance for the cultures and spiritual values of the peoples concerned of their relationship with the lands or territories, or both as applicable, which they occupy or otherwise use, and in particular the collective aspects of this relationship.

2. The use of the term “lands” in Articles 15 and 16 shall include the concept of territories, which covers the total environment of the areas which the peoples concerned occupy or otherwise use.

Article 14

1. The rights of ownership and possession of the peoples concerned over the lands which they traditionally occupy shall be recognised. In addition, measures shall be taken in appropriate cases to safeguard the right of the peoples concerned to use lands not exclusively occupied by them, but to which they have traditionally had access for their subsistence and traditional activities. Particular attention shall be paid to the situation of nomadic peoples and shifting cultivators in this respect.

2. Governments shall take steps as necessary to identify the lands which the peoples concerned traditionally occupy, and to guarantee effective protection of their rights of ownership and possession.

3. Adequate procedures shall be established within the national legal system to resolve land claims by the peoples concerned.

Article 15

1. The rights of the peoples concerned to the natural resources pertaining to their lands shall be specially safeguarded. These rights include the right of these peoples to participate in the use, management and conservation of these resources.

2. In cases in which the State retains the ownership of mineral or sub-surface resources or rights to other resources pertaining to lands, governments shall establish or maintain procedures through which they shall consult these peoples, with a view to ascertaining whether and to what degree their interests would be prejudiced, before undertaking or permitting any programmes for the exploration or exploitation of such resources pertaining to their lands. The peoples concerned shall wherever possible participate in the benefits of such activities, and shall receive fair compensation for any damages which they may sustain as a result of such activities.

The parts of the Convention that pertain directly to the environment and natural resources are included in Part II of the Convention regarding Land issues. Selected articles are displayed in Box 2. One of the greatest problems with this policy instrument has been the lack of a clear definition of “participation”, mentioned in article 15(1), since there are multiple forms of public participation.

2. Engaging indigenous people in the decision making process

2.1 Ethnic diversity in Guatemala

The first human societies in Guatemalan territory were formed by pre-Hispanic cultures of Mesoamerica, established 2300 years before present (BP) as the Maya cultures. It distinguishes itself by becoming one of the most advanced agricultural societies, providing a wealth of important genetic resources for food production and agribusiness today, such as maize, cacao, beans, avocado, natural dyes, etc. It also developed a mathematical system, calendars, writing, hydrobiology, architecture, and surely - knowledge of the nature that housed much of its cultural evolution. Mayan culture is characterized by the development of biological technology, which is to be expected considering that unfolded in a territory rich in biodiversity, with many species at their fingertips.

Although there is extensive literature on the pre-Hispanic Mayan culture, it is important to point that since the 1970's many studies speculated that the demise of the Classic Maya Period (2300 to 1750 ybp) was a result of an ecological disaster caused by deforestation and overpopulation in the lowland rain forest. Recently, the contrary has been revealed, ensuring that the Classic Maya enjoyed a solid social organization that allowed high population densities to live in fragile ecosystems (Scarborough, VL, 2003:4367). Paleoclimatology studies show that they were affected by climate changes producing long periods of drought occurring between the years 800 and 1000 AD, when the classic (Maya) collapsed (Brenner et al. 2002:6). This indicates two things: (1) that the Mayan culture fell not to destroy its natural environment, and (2) that survived a climate crisis, migrating and continuing with its comprehensive system of subsistence to the present.

Contemporary indigenous population in Guatemala reaches 50% of the total population. In the Americas, only Bolivia exceeds Guatemala, with 81.2%. Of the 24 languages in Guatemala, 21 belong to Mayan ethnic groups, which make up to 99.5% of indigenous population in Guatemala, (INE, 2003:31). Guatemala remains a predominantly rural population, with 68.3% indigenous and 44.3% rural non-indigenous population in 2003 (INE 2003). Most Guatemalans live and work in rural areas with a steady relationship of subsistence and production based on natural resources.

2.2 Participation: the key to involvement

To the untrained eye, lakes seem static and unmovable components of the planetary landscape. Nevertheless, most lakes have significant changes during their lifetime. Cultures and ethnic groups change much faster, and they must be righteous to change with freedom, which is essential to human development. Policies and planning for development have changed substantially. Originally, the results of development policies were measured with financial and economic parameters. Experience has made of development a human issue, where our welfare and personal self-determination play an important role in economic development. What is more important for indigenous people is their relation to natural resources as part of their way of life.

Therefore, the context of ethnic diversity in lake basin management implies the need for an analysis with great sensitivity of the relationships between indigenous and non-indigenous people and nature. This is a first step to recreate together and continue to develop social communication, policies and legislation ensuring freedom of perpetuating or changing their relationships to the lake environment. It means that there is a need to find a new direction in inter-ethnic relations which eliminate bias towards the various forms of relationship and productivity of the land, where a culture can not claim themselves to be right by the way they use and relate to the environment with respect to other cultures that share the same state and its nature.

The experience of international development work has produced many tools or methods to include indigenous people in decision making processes. From the experience of the Green Revolution, using policies of development based on technology transfer and economic incentives, surged methods and techniques to include small farmers, including indigenous and pastoral societies, in the design and management of production schemes. The focus of the methodologies developed has as a keystone “participation”. Considering such, is necessary to understand the different types of participation of citizens in public issues (see Box 3 ILO. 2002), including the sustainable use and management of a lakes.

To increase participation, one of the most popular methods are Participatory Rural Appraisals and Planning (PRA). “This has been described as a growing family of approaches and methods to enable local (rural or urban) people to express, enhance, share and analyze their knowledge of life and conditions, to plan and to act” (Chambers, 1994). The collection of tools, that are also included in Rapid Rural Appraisals, facilitate sharing knowledge of natural resource use in different cultural contexts. Many of the PRA tools provide spatial, quantitative, and qualitative information necessary to join traditional knowledge of indigenous peoples with scientific knowledge.

Participatory Mapping techniques have proven very successful in the particular context of working with indigenous people in watershed management, since illiteracy and language diversity may represent a barrier to interviewing or dialogue processes.

interpretation of nature, its benefits, environmental problems, and possible solutions.

In conclusion, when working in lake management with indigenous people is necessary to understand their

Box 3. Typology of citizen participation in public issues.

Different Types of Participation ¹	
TYPOLOGY	CHARACTERISTICS OF EACH TYPE
Token Participation or Manipulation	People sit on official committees, but they are not elected and have no real power.
Passive Participation	People participate as recipients of information. They are told what has been decided or what has already happened. The administration or project management passes on this information, but does not listen to people's responses.
Participation by Consultation	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and control the analysis. The professionals are under no obligation to include people's views.
Participation for Material Incentives	People participate by contributing resources, for example labor, in return for food, cash or other material incentives. People provide these resources, but are not involved in decisions as to what is done. They have no stake in carrying on with things when the incentives end.
Functional Participation	People participate at the request of external agencies to meet predetermined objectives. There may be some shared decision-making, but this usually happens only after the big decisions have already been made by external agents.
Interactive Participation	People participate in joint analysis and development of action plans. Participation is seen as a right, not just the means to achieve project goals. The process involves methodologies that seek all the different perspectives and use structured learning processes. Because groups are involved in decision-making, they have a stake in maintaining the project. Local institutions are strengthened.
Self Mobilization	People participate by initiating actions independently of external institutions. They develop contacts with external institutions for the resources and technical advice they need, but control how the resources are used. The mobilization may or may not challenge existing distribution of wealth and power. Government and NGOs sometimes provide support for self mobilization.

¹ This was initially designed to assess participation in development projects, but has been adapted and revised for different purposes. See Biggs (1989), Hart (1992), Pretty (1995), and Cornwall (1995).

Source: Washington Office for Latin America (WOLA). *The Action Guide for Advocacy and Citizen Participation*. 2002

3. Lessons from Lake Atitlán, Guatemala

3.1 A brief description of Lake Atitlán

The Lake Atitlán basin is located in the volcanic axis of the Pacific edge of Guatemala in Central America. The lake has its origin in a cataclysmic explosion forming a volcanic caldron 85,000 years ago. Lake Atitlán has a subsurface drainage basin and the water level has random fluctuations. The water renewal time is been calculated to be 130 years.

Lake Atitlán is oligotrophic, 342 meters deep, boasting a surface area of 130 km² in a 548 km² drainage basin, with 11 meters average water transparency, measured with a full white Secchi disk, and a volume of 25 km³ of water. The lake is situated 1,562 meters above the sea level.

Besides the spectacular volcanic landscape and living indigenous culture, Lake Atitlán is known for its water clarity, which together produce the second largest tourist attraction in the country.

The lake is an essential part of life for local indigenous people settled in 13 picturesque shore-towns. It provides many options for subsistence and vital resources such as water and food. The lake also provides a waterway among the different villages. The largest urban centers in the lake basin are Sololá with a population of 30,155, Santiago Atitlán 28,665, San Lucas Tolimán 12,674, and Panajachel with 10,238 inhabitants (INE, 2003). The indigenous Maya in the lake Atitlán drainage basin represent 95.43% of the population, and include the Kaqchiquel, Kiche and Tzutuhil ethnic groups. Their main way of life is agriculture, and the main crops cultivated are maize, coffee, avocado, onions, flowers, and many temperate vegetable crops. An average of 73% of the population is below the poverty line, and 24% within extreme poverty (UNDP, 2005).

3.2 Experiences and lessons learned in lake management with indigenous people at Lake Atitlán.

3.2.1 Human relations with lake Atitlán

Considering the heterogeneity of Guatemalan society, we may observe different relation to lake Atitlán. A wealthy minority of non-indigenous people relate to the lake as a recreational resource, by building second homes and hotels on its shores, and driving aquatic recreational vehicles. Most of this stakeholders are absentee shore owners and have a distant relation to nature and to the indigenous society. In contrast, basin indigenous residents have a complex and close relation to the resource base necessary to their survival.

Mayan indigenous people base their relation to nature on the belief of an equilibrium between the person, family, society, nature, and the cosmos, as if all was part of a whole and placed in the same plane of existence. In their belief, if nature as part of human society is disturbed negatively by a

person, family, or society, then equilibrium is lost affecting negatively the whole system that contains our existence. This view has been changing rapidly with the process of globalization.

Lake citizens value water resources the most, considering high poverty levels and dependency on lake resources. Besides the already existing harmonious relationships of indigenous people with nature, most strategies and actions taken by NGOs and governmental organizations are directed towards changing their views to a western aesthetic appreciation of nature and criticism towards their utilitarian relation to the resources of the lake and its basin for subsistence purposes.

3.2.2 Introduction of exotic species.

The management of natural resources in Guatemala have a long and rich history starting in pre-Hispanic times. The Memorial of Sololá, on the history of the indigenous Kaqchiqueles, makes the oldest mention of the distribution of the resources of Lake Atitlán. Unfortunately, the historical record of decisions and management practices of the lake are very limited. In 1957, Edward Deevey wrote an article on Limnological Studies in Middle America, stating that the first historians were particularly uninterested in lakes and misinformed on the matter. Without doubt, "this is because they came from Spain, the one country in Europe that is least likely to have produced a limnologically minded historian" (Deevey, E. 1957).

The first introduction of fish documented in history occurred around the year 1540 by Spaniards, with the introduction of a Gerreidae (mojarra negra) to the lake from a river in the adjacent Pacific coast of Guatemala, (Paez Betancor and Arboleda, 1585). There are no records of the impact to the lake fisheries from this introduction

Studies by Eugene Meek on the lake fisheries in 1902, conclude that Lake Atitlán is oligotrophic and has very little fish habitat on its steep shores and will never have commercial fisheries, but because of its spectacular landscape its destiny is tourism development for which he recommends the introduction of Black Bass for sport fishing. This proposal was taken up and implemented by the US Fish & Wildlife Service in 1955.

Traditionally, fishing on the lake was done mainly by indigenous women, and before the introduction of Black Bass, the lake produced only small fish species, which so far we do not know whether they were native or whether they were introduced in Pre-Hispanic times. The people at the lake consumed traditional dishes of small whole fish preparations (McBryde, 1945:124), which represented an important source of protein and calcium, as it is consumed without removing the bones. All the traditional and efficient use of the lake fisheries was lost in the name of tourism development.

This introduction eliminated 16 native fish species used as traditional food of the Maya. Black bass is not sport fished by tourism as it was intended, only a minority of local fishermen with scuba diving equipment catch for local tourist restaurants. Unsustainable fishing practices continue by the use of small nets catching a large amount of juvenile fish. Indigenous people argue that they only eat whole small fish.

The ecological changes caused by the introduction of large mouth black bass also led to the extinction of the endemic Atitlán grebe, another lake species sustained by indigenous peoples for several centuries.

But the key case is the interaction of different cultural views on the use of nature, which in this case replaced the production and harvesting of thousands of small fish, easily prepared and shared in the household, for a few large, difficult to share and collect, as a sport fishing fish, which measured the challenge of catching them.

The lesson from this case is that development should never be planned for one group of lake stakeholders putting into peril the interest of another group, especially if they are indigenous people with a strong interdependence on the lake resources.

3.2.3 Species specific approach to conservation: Ducks and Reeds
From 1964 to 1984 ecologist Anne LaBastille attempted to preserve the endemic Atitlán grebe (*Podilymbus gigas*). Management efforts were limited to legal restrictions and campaigns to protect the duck species and its nesting habitat built of reed crops (*Scirpus californicus*) grown and harvested for weaving mats by the indigenous people for over eight centuries. The species specific approach to conservation failed with the grebe's extinction in 1984 and the shift of power over the reed crops from the local indigenous stakeholders to the central government resource agencies.

During early efforts to study and protect the Atitlán grebe, La Bastille accused that harvesting the reed crops planted by indigenous people created a problem during nesting and reproduction of *Podilymbus gigas* (in Spanish Pato Poc). Her interventions in central government led to the institution of the a legal decree February 12, 1968 that dictates: "That is to avoid excessive cutting of tule (reeds) on Lake Atitlan, because the plant serves as shelter to the duck (*Podilymbus gigas*), a rare species of Guatemalan fauna that only exists in that lake, and should therefore be subject to special security measures to enable it to multiply." In the wake of the same decree, the mandate to exercise centralized control of the reed crop harvesting was given to officials from the Ministry of Agriculture, who interpreted the law as a prohibition. Indigenous reed growers organized as a group of stakeholders and lobbied in Congress to eliminate the decree. Nevertheless, it was updated in 1969 to permit harvesting only half of the reed beds planted in the littoral zone. The result of the restriction caused people to

plant and maintain only half of their original plots, reducing the nesting habitat to half, instead of protecting it as it was intended. The indigenous reed growers didn't recover local control over their crops until 1999, after the countries Peace Accords of 1996 which promoted decentralization and indigenous rights.

The mats made of reeds, besides being part of the traditional furnishings in the home Maya as their beds and chairs oriental style, is represented as an important icon in the Mayan calendar, probably as a symbol of social organization in the same plane.

There are several lessons to learn from this case. One, pointing towards the problem of reductionism in science, where the efforts are concentrated in one single species, disregarding humans and the natural history of their cultural landscape. Two, the problem when indigenous peoples are not included in the decision making process over their own resources, and three, when power is given to people distant from the lake resources the decisions will not be the best to sustain lake benefits.

Today, normal migrant duck (*Podilymbus podiceps*) population continues to arrive at lake Atitlán during summer. Lately, the hypothesis that the Atitlán grebe never became a separate wild descendant species is much supported (Hunter, 1984), arguing that the introduction and planting of reeds created a nesting habitat to avoid migration, segregating a population of *P. podiceps* towards being a domesticated species named *P. gigas* or Atitlán grebe, now extinct. Then another lesson is that parts of nature are not easily classified in domesticated or wild species, especially if they are part of an ancient cultural landscape.

3.2.4 Forest and indigenous people

The forests areas in the lake basin have not reduced substantially in spite of the increase of population, now at 205,701 inhabitants (INE, 2003). It had tripled to that figure since 1960. Thirty nine percent of basin population lives in rural settings, and the average population density in the basin is 310 inhabitants per square kilometer in 2,002. Forest cover reaches 34.26% of the basin land area; the highest in the country.

Guatemala obtained its first Forestry Law in 1940, which contains rules pertinent to forest management as an industry, such as in temperate lands, and not for indigenous centuries old customary law on tropical forest management.

We can observe that the indigenous population continues preserving more forest as a product of traditional management of the natural vegetation succession rather than reforestation techniques from Western culture practiced by a non-indigenous minority. To achieve greater human development based on cultural freedom we discover that is necessary to eliminate bias on the various uses of the

forest and look objectively at economic activities that have eliminated vast tracts of forests.

Indigenous peoples tend to be blamed for loss of forest cover due to the practice of obtaining and using fuel wood as an energy resource. Large plantation owners or developers are rarely blamed or charged for the destruction of vast forest areas damaging watersheds.

The lesson again is that indigenous people in general have developed sustainable systems of resource use, based on need and the production potential of ecosystems. Nevertheless, it is common to find that the victims of discrimination such as indigenous people are usually blamed for the environmental problems.

3.2.5 Parks and protected areas

In 1955 the lake and volcanoes were declared national park area in response to the 1940 Washington Treaty signed by Guatemala. Only in 1978 did management of Atitlán National Park fall to the Forestry Institute. Policies were confined to restricting forest use and reed harvesting.

In 1989 Congress approved the Law of Protected Areas to conserve the country's boundless biodiversity, and the National Parks, including Lake Atitlán, were declared legally Protected Areas. Policies excluding human relations with nature continued to govern this centuries-old cultural landscape. This law was designed for woodlands, underscoring the urgency of environmental policies concerning urban and agricultural areas of the lake basin and the lake itself.

In 1998, the first staff of the Protected Areas Council was established at lake Atitlán. Upon their intention to restrict indigenous peoples from free access to forest resources, surged actions to eliminate it by setting forest fires all over the basin. The lesson learned is that people would not value resources they cannot use. The same applies to lake resources, where the restrictions or tendencies to stop using the lake water directly reflects itself in a greater lack of interest in stopping pollution.

3.2.6 New forms of organization and environmental management of Lake Atitlán.

In 1994 the Development Council of Sololá, at citizens' request, called a meeting to discuss the lake's environmental problems, concluding it was indispensable to build an institution to preserve the lake's water quality and ecosystems, with due representation at the basin level. Workshops with local governments, NGOs, environmentalists and social scientists led to the design of AMSCLAE. In 1996 Congress passed a bill granting AMSCLAE legal status and allocating the necessary funding.

AMSCLAE consists of two bodies: the Executive Secretariat and a Council, represented by the 15 mayors of the municipalities in the drainage basin, the Governor of the

Department of Sololá, NGOs and lake resource use committees, the Ministry of Agriculture, public and private tourism institutions, the Office of the Vice-President, and the Executive Director. This form of organizing permitted a participatory process of planning and implementing sustainable management projects that has proven successful in controlling water pollution, raising environmental awareness, conserving forest cover and involving citizens in preserving the water quality of Lake Atitlán. The only policy that invites to collaboration and participation is in the AMSCLAE legal base. Nevertheless, in a change in government in 2004, the participation of all mayors of the basin and local stakeholders, most indigenous authorities and leadership, was eliminated from its institutional policy. This centralizing change caused a great downfall of the efforts of the 15 local municipal governments and citizens in preserving the lake environment.

In response to such changes, where the spaces for dialogue and participation were absent, a greater amount of independent stakeholder organizations acted on their own, instead of coordinating and collaborating, creating conflicts between groups of stakeholders.

The lesson of this case is that lake basin institutions must include the participation of all stakeholders, including all local governments, to be effective in planning and acting towards sustaining the lake environment.

3.2.7 Lessons solving the problems of the human environment

3.2.7.1 Wastewater management

Over 11,487 shore-town households rely on lake water for daily consumption, and other 19,284 households rely on water sources from springs and creeks in the basin. Piped water distribution systems cover 82% of the households in the lake drainage basin.

There are 4 communities in the basin that have wastewater treatment plants, and two are not operating. The means of wastewater and human waste disposal in the lake basin is presented in Table 3. Sewage pollution of shore areas is a critical problem for the tourist benefits of the lake and a public health hazard due to the use of lake water for domestic purposes. The two main rivers in the basin represent the largest sources of fecal bacteria pollution to the lake. Water sampling in the lake displays little to nonexistent quantities of fecal bacteria, probably due to the high alkalinity, low temperature, and a lack of nutrients and organic matter in the lake water.

Nevertheless, the great majority of indigenous households use latrines to manage human waste, considering that using water for such purposes is against their belief of the sacredness of water and a waste of a vital resource. The wastewater treatment systems that have sustained the most are those that simulate natural systems, such as facultative lagoons and constructed wetlands.

3.2.7.2 Litter pollution and solid waste management:

The consumption of industrial and processed foods by the indigenous population started in the 1980s. Due to the lack of waste management systems, litter has become the most visible pollution in urban settlements, roads, rivers, and the lake and its shore. Table 3 displays the methods of disposal of solid waste by households in the lake drainage basin.

It is important to point out that different cultures have different perceptions of solid waste, where traditional waste material are better managed than industrial waste alien to their culture.

The litter problem has diminished substantially in the last 10 years. To achieve this improvement, it has been extremely strategic to first assign defined final destiny landfills, to be followed by culturally adapted environmental education and neighborhood organizations.

3.2.7.3 Agricultural chemical pollution:

The main land use in the lake basin is for agriculture, covering 33% of the land. Traditional maize based agriculture is changing to use synthetic fertilizers, and the production of vegetables for regional and export markets implies a growing use of pesticides. Due to the practice of water diversion for irrigation and the use of pesticides, wildlife of rivers and creeks have been practically eliminated.

Without government regulation of chemical use it has been impossible to change the tendencies of misuse of agricultural chemicals. The low literacy rate in the population makes labeling inefficient for handling of dangerous chemicals to human and environmental health.

4. Towards the Future

At lake Atitlán, unleashed shore development produces a loss of littoral habitat and beauty of the natural landscape. The water front of 13 shore towns has been urbanized and construction of recreational homes have duplicated in the last ten years. There are no urban or shore development plans or regulations, and there are conflicting laws and policies regarding land tenure. Indigenous people have lost or sold their agricultural land to tourism and recreational developers, restricting their access to agriculture and lake resources. Construction increased demand for sand, mined at the lake shore and creeks altering riparian and littoral zone ecosystems

In the previous section, experiences display how equivocal policies and planning will not give positive effects in sustaining a lake environment within indigenous territories. When adding all the experiences, we may come to the conclusion that in developing countries with marginal investments in environmental management infrastructure, the most important issue to people is the improvement of their daily environment and the assurance of access to

Table 3.1. Human waste disposal in the Lake Atitlán Basin

Name of Municipal area	Location	Number of Houses	Sewage network connection	Septic tank	Latrine	No service
1. Panajachel	Lakeshore	2,302	1,382	558	278	59
2. Santa Catarina Palopó	Lakeshore	505	10	131	324	35
3. San Antonio Palopó	Lakeshore	2,081	23	169	1,619	160
4. San Lucas Tolimán	Lakeshore	3,864	38	1,029	2,545	162
5. Santa Cruz La Laguna	Lakeshore	780	8	28	613	128
6. San Marcos La Laguna	Lakeshore	429	11	188	90	140
7. San Pablo La Laguna	Lakeshore	1,135	10	44	292	788
8. San Juan La Laguna	Lakeshore	1,487	149	6	988	312
9. San Pedro La Laguna	Lakeshore	1,987	20	116	1,598	224
10. Santiago Atitlán	Lakeshore	6,681	1,025	1,592	2,804	803
Total Lakeshore houses	—	21,251	2,676	3,861	11,151	2,811
% Lakeshore houses	—	57%	13%	18%	52%	13%
11. Sololá	Upper basin	10,148	1,709	372	6,800	1,161
12. San José Chacayá	Upper basin	428	22	37	328	38
13. Concepción	Upper basin	606	75	1	325	204
14. San Andrés Semetabaj	Upper basin	1,683	407	27	1,183	55
15. Santa Lucía Utatlán	Upper basin	3,310	244	111	2,817	133
Total Basin houses	—	37,426	5,133	4,409	22,604	4,402
%Basin houses	—	100%	14%	13%	60%	13%

Elaborated by J. Skinner (Source: INE 2003, Censo de Población y Vivienda)

vital resources. Considering that certain level of life quality and human development is necessary for people to be concerned of nature as a whole, policies and investments should attend first the improvement of peoples living conditions, mainly urban environmental problems that affect their health. Then it should be easier to be concerned and participate in sustaining or recovering rivers, lakes, forests, and biodiversity. And the joy and challenge of working with people with different views of the world should continue.

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