The Role of Social Learning Processes in the Emergence and Development of Aymara Land Use Systems

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A typical traditional Andean land-use system was analyzed as the outcome of long-term social learning processes. From this perspective the land-use system is the result of coevolution between society and nature, representing a successive embodiment of ethical principles corresponding to different periods in history. Ethical principles, understood in this study as the main values in which social and spiritual life is rooted, emerge from and are shaped by a process of dialogue between the local worldview and external historical influences. The degree of differentiation among ethical values corresponding to different stages of local history greatly depends on the type of cognitive competence developed by members of a community. The interplay between cognitive competence and concrete social action develops through a system of rotating duties aimed at lifelong learning and development of social competence derived from the ethical principles of the Andean worldview. The equilibrium between cognitive and social competencies creates social coherence, which was and still is necessary for withstanding moments of crisis and conflict. The learning process evolve from single- to double-loop learning, meaning that an individualized understanding of the epistemological basis of ethical values becomes a clear priority. This allows time to experiment with the land-use system as part of a social learning process. The positive conditions supporting social learning processes were a nondualistic worldview, local autonomy and self-determination in social and religious–spiritual life, territorial and productive organization, low levels of formalization of norms, deliberative rather than formal democratic decision making, and a combination of increasingly reflective attitudes and development of specific social competencies among all members of the community.

Introduction

Previous research focusing on local history, emergence of a traditional land-use system (Tapia 2000), related economic livelihood strategies (Delgado 2001), and underlying indigenous conceptions of development (Rist 2001) suggests that people perceive the evolution of their land-use system as the result of a long-term learning process. Existing data were therefore reviewed and complemented to analyze them using a social learning approach.

A social learning approach requires elucidation of the way in which people learn to get insight into, predict, and control the manner in which their actions affect natural and human life, focusing on a more sustainable future (Maarleveld and Dangbégnon 1999). For policy making this implies a clear shift from prescriptive to communicative approaches (Kaufmann-Hayoz and Gutscher 2001) meaning that social learning is understood as a society-wide process that cannot be restricted to an elite of experts, scientists, or politicians (Woodhill and Röling 2000). It is therefore important to understand the characteristics, driving forces, and internal and external conditions of social learning processes. This allows reformulation of development policies, considering that externally planned, mostly top-down policy-making processes always provoke reactions among the social groups concerned that are expressions of the specific ethical values of these groups' own development projects (Long 2001).

In natural resource management, rural communities often react by transforming policy implementation into a "battlefield" for social actors who represent different and often conflicting perceptions of human–human and human–nature relationships. Consequently, an actor-oriented approach was applied, in which the process of livelihood strategy optimization is understood as a "creative act" shaped through the interplay between action, reflection, and reaction (Wiesmann 1998). This leads to reconceptualization of natural resource management as a social learning process involving external as well as local groups of social actors.

Pestalozzi (2000) shows that the current traditional land-use system has a high level of ecological sustainability, despite a more than 4-fold increase in population since the beginning of systematic settlement in the area. This makes it possible to elucidate the main factors and conditions that enhance and hinder social learning processes, resulting in a sustainable land-use system.

Methods

The methods applied were participatory observation, 4 workshops on oral history, 16 semistructured and 13 narrative autobiographic interviews, and written documentation on the oral history of the study areas (Blanco 1992; Delgado and Rist 1998). Fieldwork was carried out between 1998 and 2001. Discourse analysis (Gee 1999) was applied to uncover the larger patterns of thought, values, and competencies through which people relate

FIGURE 1 The 3 *mallkus* are the highest authorities of the *ayllu*. The symbols they wear represent the link between present-day *ayllu* organization and organization during colonial and precolonial times. (Photo by AGRUCO)

to different periods in the evolution of their land-use system. Using a transdisciplinary approach, the study was part of a process of "accompaniment" of communities based on intercultural dialogue (Rist et al 1999).

The study area

The Majasaya Mujlli *ayllu* represents a traditional minifederation of 16 indigenous Aymara communities. This territory, with approximately 3500 inhabitants, is situated in the eastern cordillera of the Bolivian Andes and lies at an altitude of 3800–4500 m. People here depend on a complex system of collectively synchronized livelihood strategies related to agriculture, livestock, food processing, handicrafts, off-farm activities, education, and social networking (Quelca 1999).

Social organization is based on the model of the traditional *ayllu* (a group of genetically or symbolically related families living in a territory assigned to them in precolonial times by their ancestors). The *ayllu* is the de facto holder of collective land titles. The main institutions responsible for local governance are the *ayllu* and

the *sindicatos,* "peasant trade unions," the latter were introduced by the 1954 Land Reform in the hope that they would replace the great variety of indigenous forms of social organization. Since 1979, all *sindicatos* have been affiliated with the National Confederation of *Sindicatos* of Bolivia. This has permitted the expansion of community social networks, leading to gradual emancipation from the state and ending with integration into traditional forms of self-government (Flores 1988 for the study area; Ticona 2000; Figure 1).

The *ayanoka* land-use system is a major pillar of social organization and management of natural resources. The territory of the *ayllu* is managed as a common property resource comprising 4 sectors of arable land, covering more than 60% of community land. Each sector contains an *ayta,* consisting of 3 smaller adjacent cultivated areas (*ayanokas*), with 3-year cycles of crop rotation, occupying between 15 and 20% of the total surface of a sector. The remaining 80–85% of the arable land is left fallow for 9–12 years, ensuring restoration of soil fertility and pasturing (San Martín 1994). Although coordination of crop rotations, fallow

FIGURE 2 Main institutions related to local government in the Majasaya Mujlli *ayllu*. (Sketch by authors)
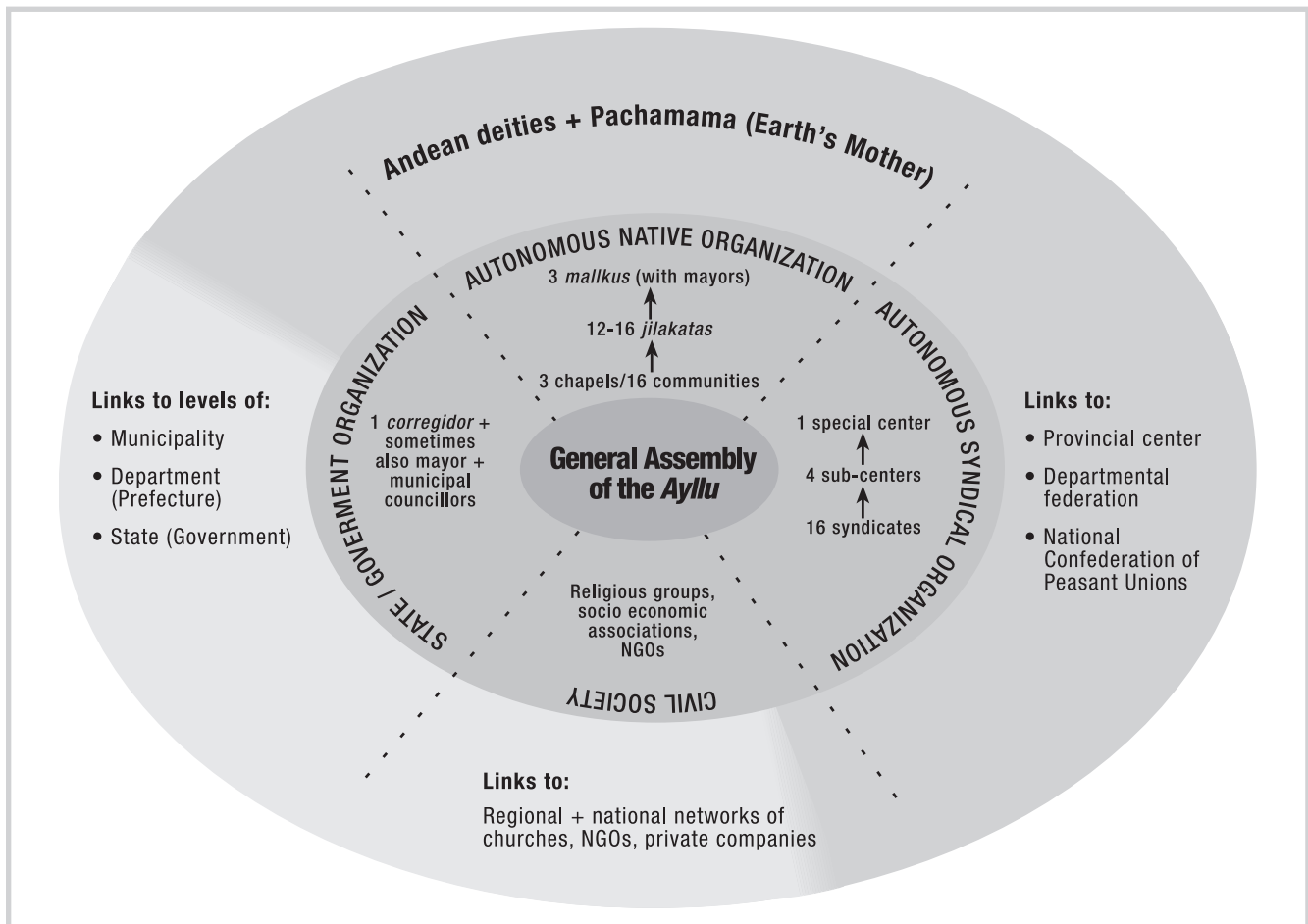
periods, and redistribution of land are organized and controlled collectively, crop management and external inputs, as well as use of production, remain the responsibility of the families.

Results

The coevolution of social organization and the land-use system

A general feature of discourse related to the different periods of local history is that people perceive the present land-use system as the result of coevolution between society and nature. In collective memory, coevolution is an open, long-term social process that ranges from prehistoric periods to the present (Table 1).

Distinctions between chronologically separate periods are not identical with a diachronic perception of time. They merely express the temporal distance between different periods and the present, not excluding the possibility that spiritual entities belonging to the past can intervene in the present. This synchronic perception of time is closely related to the nondualistic Andean worldview and plays an important part in the long-term learning process about evolution of the *ayllu* and *ayanokas*. A major practical effect of this synchronic perception of time is a high level of permeability, exchange capacity, synergy, and contradiction or competition between values and principles attributed to the different stages of the coevolutionary process. At the level of social organization this particular feature is expressed in the coexistence of and interaction between institutions originating in different historical periods (Figure 2).

A common pattern of interpretation underlying discourses related to the different stages of the coevolutionary process is an interdependent dialogue, where nature mirrors the state—or "health," as local people express it—of the society. Meanwhile, the society mirrors the health of the natural environment.

Historical evidence in discourse

The following description of the study area's history and development is based on interviews and written documents.

TABLE 1 Local institutions and their correlation with different historical periods.

Institution	Historical period	Approximate dates
Rituals for *Pachamama*, *achachilas*	Pre-Inca	As of ±30,000 BC
Ayllu	Pre-Inca	As of AD 1400
2 *tambos* and 3 sacred places	Inca	1400–1534
3 chapels; *pasantes*; *ayta* and *ayanoka*	Early colony	1534–1781
Corregidores	Late colony	1782–1826
School	Independence	As of 1934
Sindicato	Land reform	As of 1954
Municipal councilor	Decentralization	As of 1994

Pre-Inca period: Although the study area was not settled until the beginning of the colonial period, the pre-Inca period (from 30,000 BC to AD 1438, according to the oral history) is of special importance for collective memory. Respect for and subordination to native authorities and Nature's spiritual entities and are fundamental values expressed in discourse about this period. Social competencies such as obedience and duty toward spiritual entities (eg, *Pachamama* or "Earth's mother," *achachilas* or "ancestors," and *Mustrama* or "ancient Sun") are attributed to these ancestral times. Cognitive competencies are described as impersonated by relatively few *yatiris* (shamans), who represent the "ordinary people" in direct dialogue with ancestors.

Inca period: During this period the practically unpopulated area of the *ayllu* was incorporated into the governance system of the Incas by construction of 3 *tambos* (lodging houses for travelers) on the *camino del Inca* (Inca trail). The *tambos* (2 of which are in the Majasaya Mujlli *ayllu*) were built in places known as sacred long before the Incas arrived. They were administered by representatives of an Aymara group that had established an alliance with the center of the Inca administration in Cuzco. Discourse on this period expresses the notion that Inca representatives in the *tambos* determined the sacred places where 3 chapels were built later in the colonial period. These chapels became symbolic centers for establishment of the traditional land-use system.

The period is characterized by a weakening of unconditional acceptance of the ethical principles of respect and obedience toward ethnic authorities. These principles were recognized only to the extent that local representatives succeeded in transmitting the wisdom of the Incas to local authorities and their "vassals." The first element of ethical self-determination arises at this time, expressed through interest in learning, understanding, and disseminating the wisdom of the Incas. In this way, forbearance and foresight—values considered to be at the source of the Incas' wisdom—also become individual aspirations of "common" people. A further degree of ethical differentiation and self-determination is recalled in the Inca greeting "do not steal, do not lie, don't be lazy, do not flatter,"

expressing norms still present today. Other ethical principles associated with this period are peaceful coexistence between different ethnic groups based on mutual respect and reciprocity.

In terms of cognitive competencies, a reflexive and more personalized element was introduced in social and spiritual organization. The reflexive aspect is perceived as emerging from the "heart," representing reflection as a latent rather than intellectual quality. In terms of social competencies, cooperation and interaction between authorities and "ordinary people" are perceived as becoming gradually less vertical.

Colonial period: The first phase of permanent settlement took place at the beginning of the colonial period, which was organized around the 2 *tambos* located inside the territory of the Majasaya Mujlli *ayllu*. The *tambos* were nodes in the main communication network between the centers of colonial—and later republican—administration. The territory around the *tambos* belonged to the "original community" assigned by the Spanish Crown in 1643 (Blanco 1992), implying legal recognition of relative internal autonomy in socioterritorial organization in exchange for taxes and forced labor in the mines of Potosi. Pasturing and incipient agriculture were practiced only occasionally. By 1786, the population increased by 80 *forasteros* (families without relationships to original settlers) who no longer lived in the *tambos*. They organized themselves around 3 chapels, built beside the ancient *huacas* or towers (special places for communicating with ancestors). Each chapel was organized according to an Andean adaptation of the Christian brotherhood in which, in earlier times, all inhabitants of the *ayllu* had to participate as part of the duties imposed by the religious colonial administration.

The growing population made it necessary to create an alternative to the spontaneous and informal land-use system. The 3 brotherhoods constituted the social and spiritual centers for organization of 3 *ayanoka* systems, structured according to models copied from other "original communities." Crop cultivation was practiced for 2 years, followed by 8–14 years of fallow.

The ethical principles underlying discourse on the creation of the *ayanokas* are autonomy, self-sufficiency, reciprocity, openness, cooperation, and synergy

between individuals, communities, and other ethnic groups (eg, Quechua Indians) living in the warmer valleys of Independencia. Families in the study area have intense interrelations with "spiritual relatives" of the Quechua living in these valleys. Regular visits still take place, allowing barter and reciprocal cooperation between families in different ecological zones. People also participated in a series of indigenous rebellions, where the struggle for recognition as citizens was a major objective.

Growing complexity and extension of networks of social relations paralleled the creation of new forms of access to land, which was beginning to be understood as the result of a process leading to the development of social competence that would benefit the whole community. The main structural innovation of this phase of the learning process was the creation of a system of communal duties based on a yearly renovation of all charges. Discourse stressed that this so far represented an ongoing personalized effort to overcome selfish behavior, meaning that social competencies, such as the ability to communicate, empathy, social mobility, personal autonomy, and self-esteem, were becoming important.

In terms of cognitive competencies, there is evidence in local discourse of increasing general reflexivity, motivated by confrontation with newly imposed models for organizing social and religious life. Instrumental and strategic reasonings prevail.

Republican period: At the onset of independence in 1828, the population increased to 190 families. After several years of experimentation, a third year of cultivation was introduced into the rotation cycle. The use of barley and oats allowed intensified fodder production and livestock keeping. In 1867, the liberal state proposed privatization of all communal land. In 1882, the whole *ayllu* rejected this measure, even though the government official, Dr Delfin Arce, personally explained the benefits. In a large assembly, hundreds of peasants declared that they did not want division of their lands and preferred to continue the system of communal property existing from time immemorial. In addition, according to notes taken by the public administrator, they "confessed" that community inhabitants had ceased to identify themselves according to the "original" and "foreign" peasant categories imposed during the colonial period. Hence, they all complied with internal and external duties (Blanco 1992).

During this period internalization of ethical values correlated with reciprocity, autonomy, equity, and personal responsibility, becoming an axis of cultural identity. This put community members in sharp opposition to the reigning political structures. This development was concurrent with a significant

broadening of social competencies required for innovation and coordination of the land-use system and for overcoming the social differentiation imposed by the former colonial administration. Rejection of land privatization is testimony to an increasing ability to negotiate with external actors. Internally, it points to a broader capacity for deliberative reasoning about the limits and potentials of the present form of natural resource management. Cognitive competencies and reflexivity are increasingly considered a major resource for local development. In this context, the first school in the area was founded in 1934. It was private because the state had not yet given indigenous people access to public schools.

The modern nation-state: This period is marked by the Land Reform of 1954, leading to the creation of 5 agrarian *sindicatos* run by a democratically elected council; hence, the *ayllu* witnessed a new form of sociopolitical organization. However, this did not mean that traditional duties were abandoned. In 1962, public administrators granted full recognition to the *ayllu*, consisting of 5 *sindicatos*. In the meantime, the 3-part division of biophysical space evolved into a 4-part division, very characteristic of other original communities. The number of *sindicatos* increased from 5 to the present-day 16, mainly driven by population growth and conflicts over land use in the *ayanokas* (Figure 1).

The return of Pachamama: In the 1970s, the Catholic Church launched a new form of Christian instruction aimed at "soft" reformation of native beliefs, leading to a selective disappearance of feasts and rites. Consequently, personal choices in religious and spiritual matters became possible. A few years later, evangelical sects arrived and led to even more reflection on religiosity by radically rejecting all types of symbols, whether Catholic or Andean. In a short time the majority of the communities belonged to one of the many evangelical confessions, leading to a massive abandonment of rituals, feasts, and other Andean customs.

Between l982 and 1992, a series of natural disasters such as droughts, hail, storms, and heavy frost related to the "El Niño" phenomenon occurred. In addition, social organization was increasingly weakened as a result of confrontations between different religious confessions refusing to fulfill communal duties. According to evangelical ideology, climatic and social catastrophes were interpreted as "God's punishment," which people tried to counterbalance with increased faith.

Creation of a fourth system of *ayanokas* showed the limits of expansion of the "agricultural frontier." Some *sindicatos* began to analyze signs of overexploitation of existing natural resources. Intensification of land use,

FIGURE 3 The revitalization of rituals dedicated to *Pachamama* (Earth's mother) was an important element in reintegrating separate groups within the communities. (Photo by Stephan Rist)

for example, through increased use of organic fertilizers or shortening of the fallow period on the *ayanokas*, was perceived as a potential alternative. Meanwhile, other *sindicatos* advocated privatization of land as a precondition for intensification of land use.

This proposal met with resistance within the traditional organization of the *ayllu*, resulting in its participation in the process of reflection initiated by the *sindicatos*. As the body responsible for territorial management, the traditional organization created a deadlock among 4 different positions as a result of its

participation. This represented the beginning of a search for social and productive alternatives.

All these elements converged into a catastrophic situation, labeled the "times of endless suffering." In response, doubts about the relevance of the current religious life arose. People began to ask themselves whether the difficult situation could be a sign from *Pachamama,* who was "angry" because she had been forgotten. According to people's discourse, *Pachamama* makes Nature act in response to the degree of understanding (cognition) and fulfillment of Andean ethical values in communities. This led to a dialogue between the different and contradictory Christian confessions, resulting in an agreement to return to the practices of some of the lost collective rites expressing gratitude and respect for *Pachamama.*

Consequently, the reflective process on religion, which has been significantly enhanced in the past 25 years, now focuses on existing relations between spiritual life and current social, economic, and ecological conditions. This has restored a pattern of interpretation that is eminently Andean. According to discourses, the main difference with the past is that "today we want to *understand* about *Pachamama* and religion. Just believing is not enough." This facilitated integration of the *sindicatos* into the existing structure of traditional organization, resulting in an increase in duties from 6 to 12–15 nowadays (Figure 3). Hence, the number of people involved in the development of the social competencies required to maintain the self-determination of communities increased concurrently with population growth and the complexity of social organization and its corresponding tasks.

Rather than a certain set of values, the epistemological background of values was at the center of the social learning process. This in turn made it possible to overcome the divisions between conflicting Christian confessions, creating new room for a common epistemological ground linked to the Andean worldview and helping to find a way out of conflicts over the future of the land-use system. A series of experiments conducted in the 4 sectors was launched to explore the best alternatives for intensification of land use while bearing in mind an agreement to respect collective land tenure in the entire area.

Concluding discussion

The main stages through which the members of the Majasaya Mujlli *ayllu* learned to get insight into, predict, and control the manner in which their actions affect natural and human life were systematized. Along with this social learning process, cognitive competence evolved to deeper levels of reflexivity, leading people to recognize them as part of the unity of humans and

Nature, which in turn allowed a reinterpretation of the ecological situation in relation to social and religious–spiritual life. The connecting element between Nature and society is a morally correct action, but in this particular case, acting "correctly" not only means fulfilling a set of defined moral values; it also implies that the community must understand the world according to Andean concepts of life, Nature, and society. This represents a shift from single- to double-loop processes of social learning. Thus, solutions to current problems are essentially perceived as a social and cognitive issue that requires combining deep reflection with an ongoing effort to decode, differentiate, and internalize ethical principles in everyday actions, resulting in an increase of social competencies that permits internally driven transformations of social organization.

The integration of the duties of the *sindicatos* into the traditional organization of the *ayllu* has not only created new levels of coordination but also increased options for the development of social competencies among the growing number of community members (Figure 4). This suggests that the duties inherent in the organization of the *sindicatos* are playing a significant role in helping to maintain a critical mass of social competencies. They aim at lifelong learning that focuses on the creation of social competencies according to the community ethical principles and the underlying Andean worldview. This enables the group to counterbalance the tendencies of individualization that accompany the increasing development of reflexivity. The balance between the development of cognitive and social competencies determines the degree of coherence of the social group. The resulting high levels of coherence have proved to be a major factor in enduring moments of tension and conflict, such as those that emerged when the ecological limits of the diverse forms of traditional land use practiced in different historical periods were discussed. This, in turn, made it possible to overcome periods of crisis, allowing time to experiment and introduce innovations in the land-use system as part of a social learning process.

The traditional land-use system is the result of coevolution of society and Nature, which can be understood as the successive embodiment of ethical principles corresponding to different periods of local history. Main constituting ethical principles emerge and are transformed by the dialogue between the local worldview and external historical influences. Analysis of historical discourse has shown that ethical principles are transformed step by step from tacit to more explicit levels. However, the degree of formalization of norms remains very low, even in the case of highly persistent values and rules.

Several crises have been overcome by relating the social learning process to the enhancement of a common epistemological basis, allowing the creation of space for alternatives that go beyond the possibilities of mere social negotiation driven by self-interest.

The increasing development of social competencies was also an essential element in the creation of highly diversified and extended livelihood systems, making them less dependent on local ecosystems. This allowed room for maneuvering to promote more sustainable resource management.

Increased local autonomy and self-determination in social and religious–spiritual life was a decisive factor in successful collective learning and was concurrent with increased complexity in social organization. Nevertheless, autonomy does not necessarily contradict forced or voluntary interrelation with external knowledge systems. When internal cognitive competencies are well established, the resulting reflexive reasoning of communities allows for incorporation of external elements to create new options for innovation or reinterpretation of the natural, social, or cultural phenomenon. The communities have gradually incorporated external elements into existing social and productive organizations while attempting to avoid irreversible changes that would diminish the options available in the social learning process.

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