

SOCIAL AND CULTURAL CHANGES IN LIVELIHOOD SYSTEMS, RESULTING FROM THE IMPLEMENTATION OF BIOCULTURAL ACTIONS

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ABSTRACT

The situation of poverty of rural families and the growing demand for access to productive bases are causing socioecological transformations in livelihood systems. In recent years, public and private institutions have been implementing development actions which could have a positive or negative repercussion on the social and cultural life of rural families. The effects that development actions could cause on sociocultural aspects should be studied, to plan sustainable territorial management and thus reduce poverty and the pressure on natural resources. Sociocultural changes are seen in this case, resulting from the implementation of biocultural actions. The method used was mixed research: the qualitative variables were gathered in dialogue circles of knowledge, analyzed based on categories; the quantitative variables were collected with structured interviews, examined by comparison of two means, based on limits of confidence of an average. There are significant positive changes for qualitative indicators: organizational strength, valuation of local knowledge, and valuation of the satisfaction of food security. The quantitative indicators do not show changes: agricultural production, economic income or kilocalorie consumption. Understanding the qualitative or quantitative changes, positive or negative, will allow recovering knowledge for the integral management of livelihood systems.

Keywords: Local culture, territorial management, mixed research method, quali-quantitative indicators, social organization, food security.

INTRODUCTION

The evaluation of sociocultural changes in livelihood systems, resulting from the implementation of biocultural actions in the livelihood systems, is the result of the participation of the *Universidad Mayor de San Simón* (UMSS) through the AGRUCO University Center, in the execution of the BioCulture and Climate Change Project (*Proyecto BioCultura and Cambio Climático*³), from the year 2010 to 2018. In the first stage, participation consisted in the coordination of the monitoring unit and the evaluation of the implementation of biocultural projects in 27 municipalities of Bolivia.

In the last two years of the project (2016 to 2018), the participation of the AGRUCO University Center was extended to the management of knowledge in the elaboration of Integral Development Territorial Plans (*Planes Territoriales de Desarrollo Integral*, PTDI), which are dictated by the norms and public policy in Bolivia since 2016.

The PTDis are planning instruments for territorial management at the levels of department, municipality and indigenous autonomous regions, which govern the development

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programs and projects of subnational governments⁴. The PTDIs were framed in Bolivia's public policy of reaching a planning approach for territorial management, based on principles of integrality (productive, economic, environmental, social and cultural), of consolidation of livelihood systems⁵ as minimal units of planning inside the subnational governments, and of explicit linkage of concrete actions at the local level, with pillars, goals and results in the national level (Escobar, 2018).

The current actions or policies that are implemented in Bolivia assume the articulation of various sectorial policies and the integration of multiple institutional actions, both public and private. It is based on the agreement of initiatives generated from the territories, in function of their potentialities, problems and vision for the future of each livelihood system⁶. These actions produce changes in the daily life of territories.

Sociocultural changes are due to the execution of actions for development in the territories; in many cases they were accompanied by the imposition of modernization, industrialization and commercialization of the productive bases, which translates into a greater rural exodus (Guzmán and Montiel, 2009). Developmentalist actions have been implemented during the last 50 years directed at improving the life quality of families, specifically to reduce material poverty (Ramírez, 1990). However, presently social problems have not been overcome: extreme levels of poverty in the rural area still reach 36% of the population (Estado Plurinacional de Bolivia, 2016), and the levels of poverty will probably not suffer great changes in the medium term (Mena and Jiménez, 2013).

On the other hand, developmentalist actions have deepened the degradation of the components of Mother Earth: contamination of water sources, soil degradation, loss of forest surfaces (Müller, Pacheco and Montero, 2014; Orsag, 2009). The main origins of water contamination are those related to mining, use of agrichemicals and industrial wastes. Meanwhile, the causes of soil degradation are the rains, intensive farming, livestock grazing, among others (Instituto Nacional de Estadística, 2014; Ramírez, 1990).

Totora is not exempt of this national problem, and unfortunately the families do not have minimal services for life. Approximately 56.5% of the population do not have access to safe water, 49% do not have electric energy service, 78% do not have basic sanitation, and 58.2% of the population over 19 years old indicate that they have a level of education that only reaches primary school (Gobierno Autónomo Municipal de Totora, 2016).

Facing the unfavorable sociocultural changes produced by developmentalist commitments, in recent years public and private institutions have been conducting biocultural or sustainable actions, understood as a set of integral interventions, based on a strategic sector, that take into account institutional (normative, management instruments, higher public budgets), ecological (regeneration of ecosystems, conservation of water sources, sustainable use of non-timber resources from the forest), economic (community enterprises, added value, "captive" markets such as school lunches), and sociocultural aspects (reevaluation of local knowledge, strengthening of capabilities, strengthening of practices for social cohesion) (Agroecología Universidad Cochabamba, 2017; Weyer, 2017), which could affect positively or negatively the social and cultural life of rural families in a specific livelihood system.

In the livelihood system of Valles in Totora, the Bioculture and Climate Change Project developed activities such as: adjustment and implementation of norms, strengthening of the capacities of public entities, physical and biological conservation of soils, protection of water sources, water harvest, forest protection, crop rotation, implementation of poly crops, beekeeping, and promotion of reciprocity practices (*ayni, minka, faenas*)⁷, with the strategic sector being community undertaking for the transformation and commercialization of agroecological products (Cuajera, 2018; Fundación Agrecol Andes, 2015). However, although there are reports of fulfilling goals and objectives of the project, there is a lack of knowledge of the changes or effects that the actions could cause on sociocultural aspects. This should be studied in order to make sustainable plans for territorial management, thus reducing poverty and the pressure on natural resources of the livelihood system.

The main causes of the lack of knowledge of sociocultural changes that are produced by biocultural actions are multiple: low self-evaluation culture on the effects and impacts of the interventions by public or private institutions, weak follow-up and monitoring process, and absence of data both of the processes and of the results and effects reached by an integral intervention.

The low attention to this predicament can worsen the degradation of the components of Mother Earth and deepen the social vulnerability of the population with highest poverty, migration, loss of agricultural and livestock products and, naturally, infringe on the food security of families in the livelihood system of Valles de Totora.

Based on what has been exposed, the following research question emerges: What were the social and cultural changes in the livelihood system of Valles de Totora, resulting from the implementation of biocultural actions during the administrations of 2015 to 2018? This question will be answered throughout this article.

METHODOLOGY

The study was conducted in the Valles livelihood system (SDV-V), municipality of Totora, located south of the department of Cochabamba, Bolivia. Geographically, it is located between meridians 65° 44' and 64° 42' of longitude West, and parallels 17° 12' and 18° 03' of latitude South, with an altitude that ranges from 850 to 4100 masl (Gobierno Autónomo Municipal de Totora, 2016).

The research methodology was participative with a dialogue of knowledge centered on the daily life of peasant families and communities (San Martín and Delgado, 1997; Tapia, 2018), in their interrelation with the components of Mother Earth (CME). Because it is a valuation of integral nature, it had a mixed approach, where qualitative and quantitative data were analyzed.

Under the integral approach, four components are considered: 1) economic-productive; 2) ecological-environmental; 3) political-institutional; and 4) sociocultural (Escobar and Cuajera, 2014), and for the current study of social and cultural change analysis, three specificities of the components mentioned were considered: dynamics of social organization, food security and local culture. Nevertheless, the fourth component as the

environmental was not considered in this study because there was not sufficient technical consistency found in the data collected, both at the base line level and in the successive monitoring and evaluation of the project's actions.

Based on these components, the quali-quantitative indicators were defined (Figure 1) that are recognizable and manageable by social actors, which in addition can be: representative, verifiable, comparable in time, sensitive to local action, and useful to measure social and cultural changes in the livelihood system (Escobar, 2018; Escobar and Cuajera, 2014).

Figure 1. Components and indicators that describe the social and cultural changes in the livelihood system of Valles, Totorá.

Based on the livelihood system of Valles de Totorá and its components, three sampling

Components	Quali-quantitative indicators	Indicator brief description
Dynamics of social organization	1. Percentage of families complying with local standards for the sustainable management of Mother Earth's components	Compliance with local regulations
	2. Households' perception of the contribution of public policies to deal with natural and anthropic extreme events	Contribution of public policy
	3. Family assessment of the local organizational strength to confront possible natural events and anthropic extreme	Organizational strength
Nutritional safety	1. Annual net economic income of the family from major productive activities	Annual net income
	2. Households' perception of their satisfaction with the income they obtain from important productive activities	Satisfaction of income
	3. Kilocalorie consumption daily per person	Kilocalorie consumption
	4. Households' perception of satisfaction with the food consumed by the family	Nutritional satisfaction
Local culture	1. Valorization of local knowledge related to life systems management	Local knowledge
	2. Social cohesion to manage life systems	Social cohesion
	3. Men's value of women's role in the management of Mother Earth's components and productive systems	Valuation of women's role
	4. Women's participation in social spaces related to the implementation of biocultural actions	Women's participation

Figure 1. Components and indicators which describe the social and cultural changes in the Life Systems in Valleys, Totorá.

units were considered in this study: (i) the subcentral, (ii) the sociocultural unit within the subcentral, and (iii) peasant producers within the sociocultural unit. The observation units corresponded to families (Table 1), leaders of social organizations, and public managers who participated directly in the research process.

For the determination of the sample size an error of the order of 4% was considered. The sample size has been estimated using the PASS software. In general, it should be noted that the sampling intensity exceeded 10% (Table 1).

The field study was carried out in two moments: March-April of 2015, base line with the beginning of the implementation of the biocultural actions; and March-April of 2018, at the end of the implementation of the actions. Semi-structured interviews were conducted with peasant producers, supported by interviews with key informants such as local leaders, public managers (Director of productive development and Honorable Municipal Mayor), and the representative of the Association of Agroecological Producers from Totorá (*Asociación de Productores Agroecológicos de Totorá*, APRAE).

The analysis of qualitative data was performed through a self-reflection process with the families in work groups, where the most important changes that were produced in their social organizations and their living zones were made visible, as result of the implementation of biocultural actions. Together with this, iterative conversations were carried out with municipal authorities and families, to make visible with more objectivity the changes that took place in the capacity for response, to extract lessons learned, and to identify strengths and weaknesses in the implementation process of biocultural actions.

This process was supported by an analysis in Minitab Statistical Software, version 2019, making a comparison based on quali-quantitative indicators in the two moments mentioned: 2015 and 2018. For the qualitative variables, a comparison of two proportions was carried out, using the limits of confidence of a proportion. Meanwhile, for the quantitative variables the comparison of two means was conducted, using the confidence limits of an average.

Table 1. Units of analysis, sampling frame and sample for assessing changes in the response capacity of the sociocultural units in the Life Systems in Valleys, Totorá.

Subcentrales ^a	Number of families	Sample ^b
Uyaci Punta	62	7
Potrero	75	8
Laguna	75	8
Antaqhawa	83	9
T'ika Pampa	77	8
Total	372	40

Note: based on “Reporte de la evaluación parcial subproyecto de Biocultura & cambio climático en el sistema de vida Totorá, análisis cuali-cuantitativo”, from Biocultura y Cambio Climático, 2016, Informe de Evaluación, p. 3.

^aThe five subcentrales belong to ecological zones of valleys and high lands, which configure the Life System in Valleys, and represent the unit of analysis for the research.

^bThe sampling at the five subcentrales ensures a sampling intensity of 10.75%.

RESULTS AND DISCUSSION

Given that families and social organizations are in a permanent sociocultural transformation process, the analysis is explained from three components: dynamics of the organization, food security, and local culture.

Changes in the dynamics of the social organization

Significant changes were found in the study in the social organization dynamics in two aspects: compliance of local norms for the sustainable management of the components of Mother Earth, and in the family valuation about the local organizational strength to face natural and extreme anthropogenic events. No changes were found in the perception of the families, on the contribution of the public policies to face occasional natural and anthropogenic events.

The results from Table 2 show that the percentage of families that apply local norms increased by 30% ($p=0.048$), and this means that the local norms that regulate the care of water sources, forests and soils, show positive changes from social behavior for the harmonious coexistence between society and nature. This positive change is due to a strong participative process of revaluation and adjustment of local norms to the current social context of the livelihood system. The results found agree with those reported by Bismar Juárez and Mariscal (2009) who mention that the families and the authorities are co-responsible for the application of local norms, even more when they revalue and adjust them in a participatory way. A difficulty that could come up is that the application of norms is contingent on social values such as reciprocity and life in community, which can be weakened by particular and communal conflict of interests about access to soils, water sources and forests (Pinedo and Summers, 2003).

Additionally, the implementation of revaluation actions of uses and customs that refer to the territory, the development of basic technical courses, and the creation of spaces of analysis in the communities, makes a larger number of families and social organizations fulfill the social agreements of community coexistence, which strengthens the capacities of local institutionality. This will somehow contribute to a better management of the components of Mother Earth.

The indicator that shows a negative change by 2.5% (non-significant $p>0.05$), from 2015 to 2018 (Table 2), was the one that referred to the perception of families regarding the

Table 2. Comparison and signficancy of changes in social organization dynamics, years 2015 and 2018.

Quali-quantitative indicators ^a	2015 (%)	2018 (%)	Difference (%)	p-value (Bilateral)
1. Compliance with local regulations	50.00	80.00	30.00 S ^b	0.048
2. Contribution of public policy	37.50	40.00	2.50 NS ^c	0.819
3. Organizational strength	27.78	66.67	38.89 S	0.038

^aIndicator brief description (Figure 1).

^bSignificant difference at 95% confidence; S: significant.

^cNon-significant difference at 95 % confidence; NS: Non-significant.

contribution of public policies to face possible extreme events, even when counseling about the management of livelihood systems and climate change was carried out, as well as the formulation of community projects and national public policies, which contribute in the improvement of the families' safety, such as agrarian insurance. In this last point, the results found in this study are different from those reported by Bernal, Fernández and Aparicio (2019) where they mention that, at the national level, the evaluation and compensation of plots of crops affected has allowed injecting important amounts of resources to thousands of agricultural families, fulfilling the objectives for which the insurance mechanism has been created, presenting significant advances in its implementation (Gutierrez, Calderón and Palenque, 2019). Contrary to what is seen in Totorá, where, according to the families, they received insufficient help from public agencies when natural disasters took place, leaving the most vulnerable families to face extreme events.

Consequently, it implies that despite developing capacities in the local social organization (SO) as part of the biocultural actions, if there is not a representative (in this case the state) with sufficient institutionality to respond to emergencies in a timely, effective and efficient manner, the SO on its own could not respond to the requirements of local actors, who will identify an intrinsic weakness of the SO in this (mistakenly).

Nevertheless, a difficulty in the processes of technical counseling is that there is the risk of benefitting few families. In the case of most of the training programs, these are directed towards local authorities or simply give coverage to business leaders, leaving aside most of the families, even more when such leaders do not socialize or share the information to members of the SO. This has consequences: there are few families that understand the benefits of public policies, among them those of agrarian insurance in Bolivia. This can have negative repercussions, as mentioned by Crespeigne, Olivera, Ccanto and Scurrah (2010): not having state policies for sustained backing in face of occasional natural or social disasters will have as consequence the impoverishment of peasant families in the short term, "since they will have to use their liquid assets to face the climatic event, with the risk of becoming impoverished in the long term, when they have to sell their productive assets".

The third indicator referred that the SOs increased their organizational strength: approximately 39% ($p > 0.05$) more families mention that the SOs have greater capacity to face extreme events of natural or human origin (Table 2). This is because the SOs promoted spaces of analysis about the ecological or social quandary in the communal assemblies; in addition, learning programs at the basic technical level were implemented, directed at local leaders. Consensual knowledge and possible solutions were extracted from this, related to current problems. However, the knowledge and solution alternatives have the risk of not being implemented in most cases due to the low economic resources available, both of families and of the Municipal Autonomous Government, or the scarce capacity for negotiation of local authorities in face of external institutions, to procure additional fresh resources.

In this regard, Damonte (2014) mentions that in order to stimulate public investment and to achieve for local needs and interests to be incorporated at the time of planning the

intervention, democratic forms of territorial management must be established to achieve for local actors to negotiate external intervention in order to reach a greater social change of the population, translated into higher involvement and commitment of local actors in the development of their community (Earls, 2009). This was what happened in the case studied, where the SOs with participatory tradition and broad internal communal democracy directed the social capital towards the scope of municipal planning, which was rewarded in higher public investment in economic-productive themes.

Changes in food security

Significant changes were found in the study regarding food security in three indicators: annual net income, satisfaction of income, and food satisfaction. No change was found for the indicator kilocalorie consumption per person in the family unit (Table 3).

The net annual income of producers from the sale of agriculture and livestock products presented a positive change for the year 2015 compared to 2018 (Table 3). This is due to the implementation of “biocultural actions” such as the support to community economic entrepreneurship, honey production, fruit production, among the most important ones (Fundación Agrecol Andes, 2015); this has diversified the family options to generate family economic income, although they are still insufficient. Luna Valencia (2019) mentions that if the income from agriculture and livestock activities does not increase, other economic activities outside their plot will continue taking over space, which could lead to the reduction of food production and a greater rural exodus.

Perhaps it is not relevant to conduct an analysis of the changes in economic terms in the short term, 2015-2018, since they are indicators that are attained or modified in the medium or long term. One of the limitations in the analysis of economic data in this study was the lack of integration of the economic benefits from community enterprises, with those that were obtained from family agriculture and livestock activities.

A negative change was found for the indicator “valuation of satisfaction with the higher income”, with a decrease of 9% (Table 3). According to the producers, the dissatisfaction over the economic income that they receive from the sale of agriculture and livestock products such as potato, wheat, corn, honey and some fruit trees, is because the profit

Table 3. Comparison and significancy of changes in food security, years 2015 and 2018.

Quali-quantitative indicators ^a	Unit	2015	2018	Difference	p-value (Bilateral)
1. Annual net income ^b	US\$	1015.37	1444.25	428.87 S ^c	0.000
2. Satisfaction of income	%	50.00	41.00	-9.00 S	0.370
3. Kilocalorie consumption	Kcal	2331.00	2429.00	98.00 NS ^d	0.872
4. Nutritional satisfaction	%	13.00	40.00	28.00 S	0.020

^aIndicator brief description (Figure 1).

^bFor 2015, the net income was calculated based on two factors: corn and wheat; for 2018, it was calculated based on three factors: corn, wheat and beekeeping.

^cSignificant difference at 95% confidence; S: significant.

^dNon-significant difference at 95 % confidence; NS: Non-significant.

generated in an agricultural season does not respond to the expectations of the families. They maintain that this income is insufficient to provide a better education for their children or good health care, and limits the purchase of foods that are not produced in the zone, among others.

Then, the consumption of kilocalories per person did not present significant changes ($p>0.05$) (Table 3), with it being around 2380 kcal/day/person in the two moments of evaluation (2015-2018). This level of consumption of kilocalories is found within the limits recommended by FAO for Andean countries.

One of the methodological weaknesses in the calculation of kcal consumption in this study represents the seasons of evaluation, since it was done solely in the period of highest food production. This can change in the seasons when there is lower food production, specifically in the months of August to December, so it is recommended to carry out a dietary evaluation in two moments: between January and March, and between August and December.

Finally, in the fourth indicator, the perception regarding the dietary satisfaction of the family presented an increase to 28% in the three years when biocultural actions were implemented (Table 3). According to opinions by the interview respondents, the foods that families consume are healthy, varied and available for most of the year. As mentioned by García-Flores, Gutiérrez-Cedillo, Balderas-Plata and Araújo-Santana (2016), the traditional peasant practices contribute to conserving biodiversity, favoring family food security and providing environmental services and social benefits.

Most of the families have the dietary basis of products obtained in their plots: potato, wheat, *papaliza*, *oca* (yam), corn, legumes, honey, and fruit trees, among others. Dietary diversification cannot be attributed directly to the implementation of biocultural actions, since they respond to local ancestral dynamics of food security: diversification of products, exchange of foods, local transformation of foods, and food collection (Gobierno Autónomo Municipal de Totorá, 2016).

Changes in local culture

Significant changes in local culture were found in the study in three indicators: local knowledge, social cohesion and participation of women. A change was not found in the valuation of the role of women (Table 4).

The indicators of local knowledge, degree of social cohesion and degree of participation of women changed positively ($p<0.05$), between the administrations of 2015 and 2018. The increments were 26, 37 and 47%, respectively (Table 4). It can be assumed that social organizations, together with the families, consider that local knowledge in territorial management and social cohesion have as a basis the following: self-evaluation of the role of local authorities, individual and community awareness of current problems, recognition and greater involvement of women in the decision making processes, and strengthening of the productive, social and spiritual relationship that is manifested in cultural and religious spaces and festivities (Fundación Agrecol Andes, 2015).

In this regard, Marinangeli and Páez (2019) conclude that “it is possible to identify the strategies maintained of the ways of traditional exchange such as *tornas* in some cases,

Table 4. Comparison and significancy of cultural changes, years 2015 and 2018.

Quali-quantitative indicators ^a	2015 (%)	2018 (%)	Difference (%)	p-value (Bilateral)
1. Local knowledge	15.63	41.67	26.04 S ^b	0.019
2. Social cohesion	47.00	84.00	37.00 S	0.001
3. Valuation of women's role	17.00	19.00	2.00 NS ^c	0.840
4. Women's participation	27.00	73.00	46.00 S	0.000

^aIndicator brief description (Figure 1).

^bSignificant difference at 95% confidence; S: Significant.

^cNon-significant difference at 95 % confidence; NS: Non-significant.

loans, *convidos* and barter, although in these cases the ways of exchanging do not respond to the principles of need, but rather to the value in money of each product exchanged, or indeed, to the self-management of cultural resources that become tourism goods”.

Concerning the indicator that refers to the valuation of men towards the role of women in the management of the components of Mother Earth and productive systems, there was a slight non-significant increase of 2% ($p > 0.05$) (Table 4). This assumes that there is still low visibility from men on the important role that women carry out in different activities, although mainly in themes linked to soil management, water management, livestock and crop production, activities that are mainly performed by men. There is still the need for more accompaniment, empathy and training to build social enterprises that foster a true social transformation, where women are a fundamental contribution to local development (Robinson, Díaz-Carrión and Cruz Hernández, 2019), and for this contribution to be socially recognized.

The results found in this study are contrary to those reported by Guerrero, Darraz and Arcos (2019), where they conclude that the participation of women in programs or projects is highly valued, and that its main changes are linked to processes in the strengthening of self-esteem and economic autonomy. This is doubly important if it is considered that women continue to reissue their traditional roles, in addition to the new roles they have assumed.

The work of strengthening the cultural practices of community coexistence (rituality, reciprocity) and the self-valuation of local knowledge help a higher number of families to strengthen their self-esteem, communities to be better organized, and women's work to be more valued. These cultural changes will help to achieve a greater territorial self-management, with identity.

CONCLUSIONS AND PERSPECTIVES

Based on the information reported, contrasted and analyzed from each of the three components developed, the following is concluded:

The positive changes in the dynamics of social organization are perceptible to local actors, when actions anchored in the organizational and cultural tradition of peasant communities become more dynamic. This happens when it concerns the organization

under its local forms such as customary regulations, spaces for learning, revaluation of ancestral knowledge and understandings, reciprocity practices and local rituality, and their actualization within the contemporary context, always based on social dynamics and spaces, which can guarantee important effects in the short and medium term.

In contrast, when dynamics are assumed that are foreign to the collective social practice of peasant communities, as is the training of leaders or the attempts to apply the national normative through state institutional mechanisms, without the corresponding feedback from perspectives of the social whole (elders, women, youth), the information tends to remain in individuals, and the changes are indiscernible or can be produced only in the medium term.

With regards to the component of food security, the execution of a diversity of economic options, some of short and some of long term, produce a significant increase in the net family income. However, this does not have an impact on a higher satisfaction of families due to their net income received in the year. This means that although income increases, it is not enough to satisfy materially or in expectations the basic needs of the family: health, education, basic services and food.

Although the actions improve the net income, but do not satisfy the expectations around them, there are other effects that do have a clear perception of positive change: diversification of the family diet, the consequent reduction of risks of food insecurity, as well as the maintenance of the consumption of kcal/day/person, which are found under parameters established by FAO for Andean zones. This is much like in the organizational theme: the fact that the economic and productive dynamics are sustained on local food and production patterns is clearly a successful strategy to catalyze biocultural actions, with positive effects in the short and medium term.

Finally, in relation to the local cultural component, if we consider that adapting the actions to cultural practices is a factor for success, then consequently local culture is strengthened at the level of knowledge, self-esteem and social cohesion. Therefore, we conclude that it is not possible to identify a direct and linear cause-effect relation between actions-positive changes, but rather to understand the positive effects before a process assumed by local actors, of social and cultural recycling or reinterpretation of those actions. From this, the denomination of “biocultural actions” and their relevance to implement actions directed at the integral and sustainable territorial management.

Despite the set of experiences of their own and foreign related first to the visibility and then to the valuation of the participation and roles (historical and recent) of women in the productive and social dynamics, the methodological keys for these processes to be successful in the short term have not been found. The local cultural practices tend to be male chauvinist and patriarchal, so that not every cultural practice is intrinsically positive or favorable for social change. This allows concluding that the connection of biocultural actions with the local sociocultural dynamics ought to be implemented in a critical and contextualized way.

NOTES

³Project executed by the Ministry of the Environment and Water of the Bolivia's government, through the PRORURAL Foundation, financed by the Swiss Cooperation in Bolivia (COSUDE).

⁴Subnational governments in Bolivia are four: Department government, municipal government, native peasant indigenous government, regional government.

⁵A livelihood system includes "organized and dynamic communities of the components of Mother Earth, where human communities and nature interact with a functional unit, influenced by climate, physiographic, geological factors, productive practices, cultural diversity, which also considers the worldviews of the native peasant indigenous nations and peoples, and the intercultural and Afro-Bolivian communities" (Estado Plurinacional de Bolivia, 2012; Pacheco, 2017).

⁶Bolivia presents a diversity of livelihood systems where living zones and sociocultural units interact (Pacheco, 2017). The living zones are represented by the components of Mother Earth: vegetation, soils, wetlands, all in similar conditions of bioclimate, ombrotype and altitude (Estado Plurinacional de Bolivia, 2012; Holdridge, 1987). They are territories where social groups reproduce integral living forms of human being-cosmos, influenced by the implementation of development actions or policies (Cardona, 2006).

⁷Names in the Quechua language that refer to collaborative practices mediated by the time devoted to a specific activity, the willingness to collaborate in the right moment, and the ethics of a study devoid of immediate commercial interest.

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