Infrastructure development and Local Environment Monitoring Committees in Bolivia

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Case Study

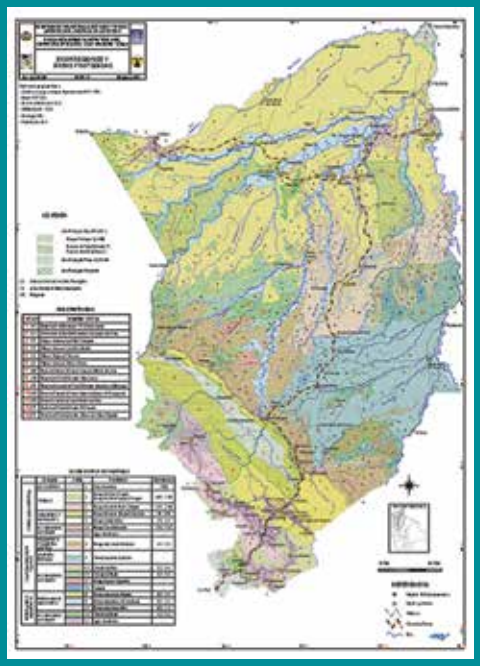
CLMA FUNDESNAP Monitoring

Brief description of FUNDESNAP

FUNDESNAP is the Bolivian Environmental Fund. It was established in 2000 to support the National System of Protected Areas (SNAP), which integrates protected areas and their buffer zones at the national, department, municipal, and community levels. Initially, FUNDESNAP was established with funds coming from the UK, Switzerland, the PL-480 and the GEF. At the same time, since the very beginning the Fund has been diversifying its financial basis with new sources of funding, through financial mechanisms, and developing extensive experience in capacity building for overall management of protected areas and their buffer zones.

Based on the general experience of supporting the Pilón Lajas (since 2002)and Madidi (since, 2005, including the Monito Lucachi Trust Fund) protected areas, FUNDESNAP has been developing a more concrete protected areas experience which geographically includes the National Protected Areas of Madidi, Pilón Lajas, and Manuripi in Northern

Chart 1: Ecoregions and Protected Areas



Source: ABC & DHV 2006: Strategic Environmental Evaluation of the North Corridor.

Bolivia, and thematically focuses on social environmental impact monitoring and mitigating mechanisms for highway construction and improvement works in the context of an initiative funded by CEPF, AVINA and other partners.

By means of a component implemented directly by FUNDESNAP to further the social, environmental, and financial management capacity of the different players involved in the three protected areas as well as by means of a set of four sub-donations to social organizations, social environmental monitoring tools have been designed and established and are currently being implemented in a joint effort by the local Environmental Monitoring Committees of two highways and their relevant protected areas: Pilón Lajas and Madidi.

Methodology to define indicators

Social environmental monitoring mechanisms have been conceived as a way to strengthen and complement institutionalized mechanisms for prevention, control, mitigation, and supervision available to Bolivian governmental authorities and in the context of safeguard policies established by the World Bank (WB), Inter-American Development Bank (IDB), and other entities funding the construction of highway infrastructure. Environmental Monitoring Committees were designed at a local level after a process of conceptual analysis of alternatives to social environmental monitoring mechanisms from the place developed by FUNDESNAP with the Deputy Minister for the Environment (VMA), the National Service of Protected Areas (SERNAP), the Bolivian Highway Administration (ABC), and other entities, and as a response to new challenges put forth by the Political Constitution of the State in 2009 about the implementation of social control mechanisms for infrastructure and development projects in the country.

Along these lines, in March 2011 two Environmental Monitoring Committees were formed locally with the participation of Madidi and Pilón Lajas residents, municipal governments, indigenous and intercultural organizations, in order to establish complementary monitoring mechanisms to generate up-to-date technical information on the social environmental situation of the protected areas under the influence of the North Corridor highway infrastructure works from the perspective of local players and thus be able to offer feedback for the prevention and mitigation measures raised for the works, as well as protection and monitoring measures offered by the protected areas.

Table 1: Composition of Environmental Monitoring Committees at the local level

Highway section	Composition of the local Environment Monitoring Committee
Yucumo – Rurrenabaque	Regional Council of Tsimane Mosetene (CRTM) Indigenous Peoples Center of La Paz (CPILAP) Federation of Yucumo Agroecological Producers (FEPAY) Federation of Yucumo Agroecological Women Producers (FEMAY) Federation of Rurrenabaque Agroecological Peasants (FECAR) Autonomous Municipal Government of Rurrenabaque Autonomous Municipal Government of San Borja Municipal District of Yucumo Protected Areas of Pilón Lajas
San Buenaventura – Ixiamas	Indigenous Council of the Takana People (CIPTA) Indigenous Council of the Takana Women (CIMTA) Federation of Indigenous Peoples of La Paz (CPILAP) Federation of Agroecological Producers of Abel Iturralde (FESPAI) Federation of Agroecological Women Producers of Abel Iturralde (FESMAI) Autonomous Municipal Government of San Buenaventura Autonomous Municipal Government of Ixiamas Protected Areas of Madidi

Source: CEPF FUNDESNAP, 2011.

Monitoring indicators have been identified in a knowledge exchange process between the local Environmental Monitoring Committee and the academy (Ecology Institute of the Universidad Mayor de San Andrés, La Paz). Technically speaking, we started from an analysis of documents such as Management Plans for the protected areas (particularly the Protection and Management Programs) and the environmental management tools for the highway infrastructure in the Pilón Lajas and Madidi area of influence (EEIA, EAE, PPM-PASA,

and so on). In a series of knowledge exchange workshops, in combination with back office and field work support (reconnoitering, baseline assessment, and highway monitoring), the potential environmental, social, and economic impacts from the highway construction work were assessed. In response to those impacts, the most important aspects were prioritized, and indicators and tools for data collection, processing and analysis were identified.

Table 2: Monitoring Indicators for Highway construction and operation phases

Construction Phase	Indicators
Construction / Improvement until 2013	1. Families reporting changes to water quality. 2. Families reporting difficulties to access water sources for their daily activities (domestic and productive). 3. Families reporting difficulties with changes to the natural course of rivers and water streams. 4. Families reporting changes to their daily activities. 5. Families reporting changes to their customs, traditional activities and/or deep rooted beliefs. 6. Families reporting increasing timber and lumber activities along the highway. 7. Accidents. 8. Respiratory infections and cases of diarrhea.
Operation since 2013	1. Families reporting changes to their customs, traditional activities and/or deep rooted beliefs. 2. Families reporting changes to their traditional economic and/or productive activities. 3. Families reporting major difficulties to obtain species from the flora and faunda for use and/or consumption. 4. Families reporting increasing timber and lumber activities along the highway. 5. Families reporting cases o new community settlements and/or community centers in the vicinities of the highway. 6. A number of invasion or subdue cases in Original Community Land or protected areas. 7. Deforested areas per year and advancement of the agricultural frontier.

Source: Ecology Institute / UMSA & local Environmental Monitoring Committees, 2012.

This is the moment to make records of effects perceived at the onset of highway construction/improvement works by both protected area personnel and nearby communities. Patrols and rounds with protected area personnel and local Environmental Monitoring Committees enable the recording of visits to the protected areas (resource allocation activities, new settlements, pockets of heat, felled timber, water and air contamination, etc.).

Biodiversity indicators are designed for the highway operation phase when construction work impacts will be

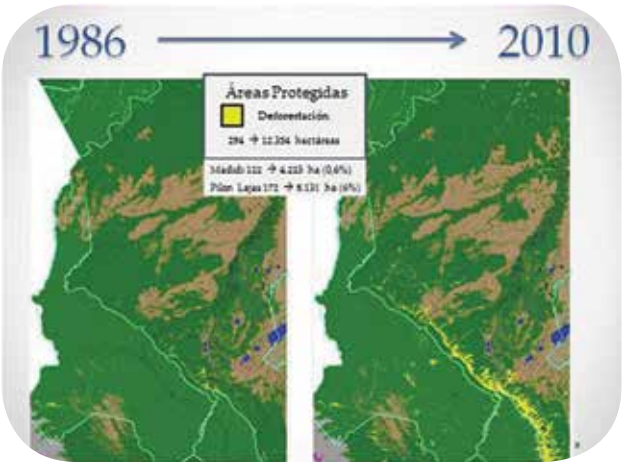
felt. The focus of indicators, nevertheless, is still on monitoring the situation of threats or critical themes for biodiversity integrity, including issues such as deforestation. This monitoring will be complemented as protected areas protection and monitoring programs are put in place as the most concrete biodiversity control and surveillance tool for the protected areas and their buffer zones. In the framework of conservation monitoring programs handled by the National Service of Protected Areas (SERNAP), the main threats identified for the protected areas are: new human settlements; illegal exploitation of timber; poaching; agriculture (stock included); and fires ((Lilienfeld et al., 2004). Indicators managed for the protected areas are related with: crop surface, fallow land and secondary orchards (agricultural frontier); types of crops; production technologies; domestic species used; and stocking rate (Ibid.).

As a complement to the experience coordinated between protected area personnel and the local Environmental Monitoring Committees, through a partner in the portfolio of the Critical Ecosystem Partnership Fund (CEPF), annual information is being generated on deforestation until 2011.

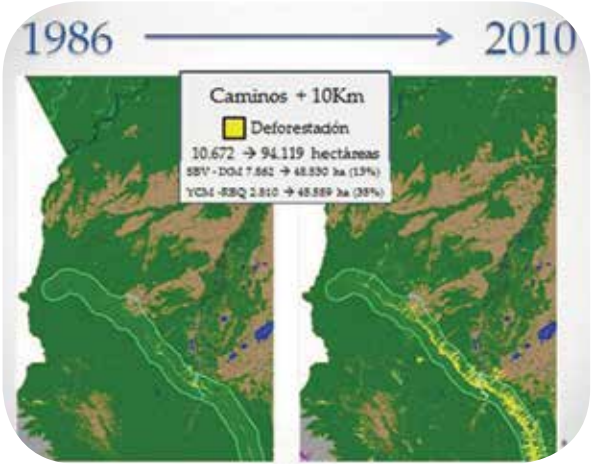
Chart 2: Deforestation of Pilón Lajas and Madidi Protected Areas

The way local Environmental Assessment Committees and protected area personnel work in our case is

Chart 3: Deforestation in highway surroundings



Source: CI Bolivia 2011.



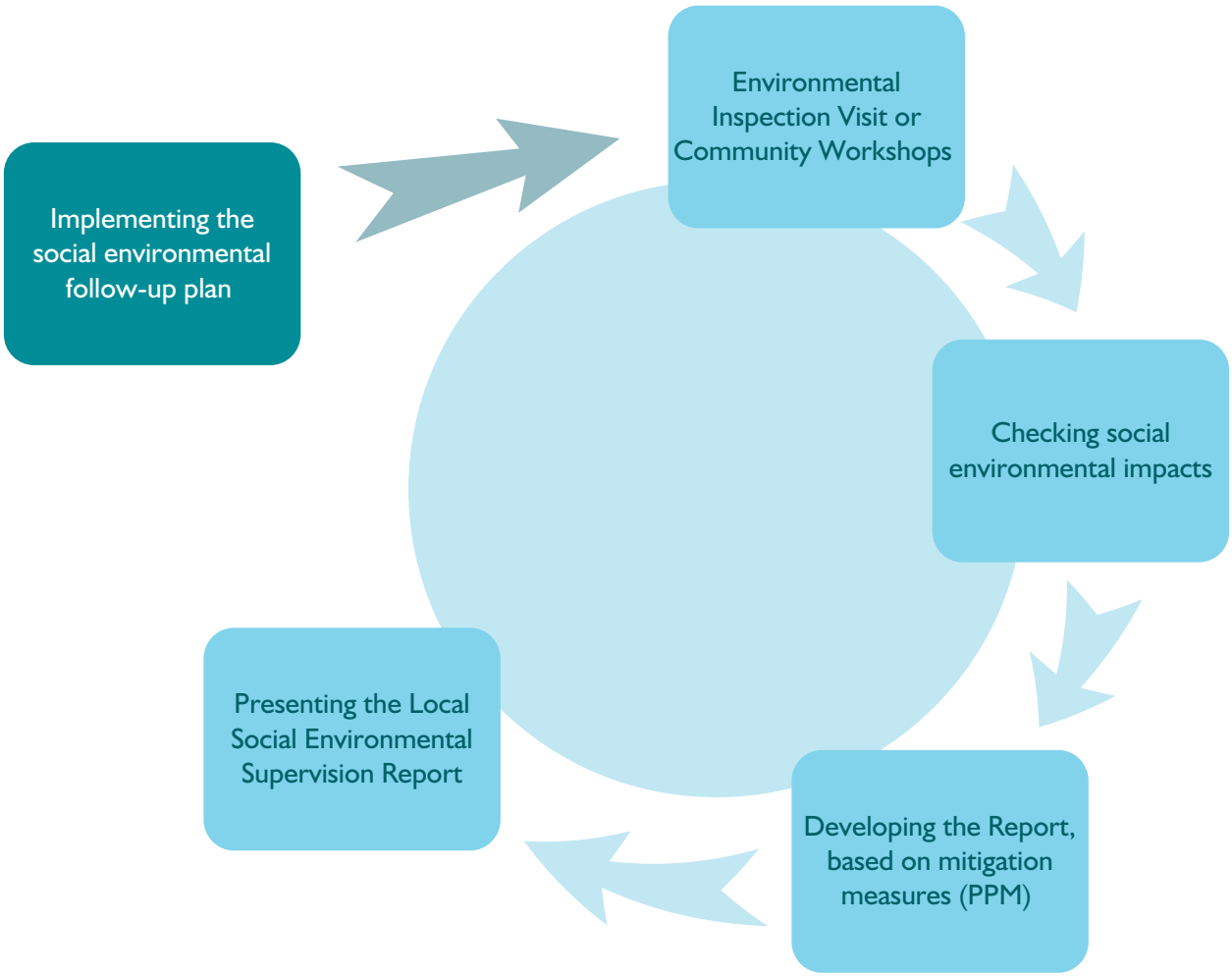
Source: CI Bolivia 2011.

more focused on detecting immediate effects of highway construction works, in order to be able to intervene and suggest complementary prevention and mitigation measures to environmental authorities and reinforce park ranger protection activities in protected areas.

In that regard, local Environmental Assessment Committees have presented three complementary environmental follow-up reports to date concerning compliance with prevention and mitigation measures to the Deputy Minister of the Environment, SERNAP, the Bolivian Highway Administration, and the General Public Attorney.

Chart 4: Yucumo – Rurrenabaque Highway Complementary Social Environmental Follow-up Report

Steps to apply the Social Environmental Follow-up Plan



Source: CLMA Yucumo – Rurrenabaque with support from the Ecology Institute / UMSA and FUNDESNAP, 2012.

As a complement, two observation flights were made during the course of the project, one in early October 2010 and another one in late September 2012. We are currently systematizing the data generated this far, but a brief review of some types of indicators is under way for which we have data and that have generated relevant information for more robust environmental management of the Pilón Lajas and Madidi protected areas.

Table 3: Comparing the results of observation flights over the RB TCO Pilón Lajas

First Flight (05.10.2010)	Second Flight (29.09.2012)
Results	
Activity between SERNAP and CRTM. A total of 17 active pockets of heat have been identified within the RB TCO, as a result of burning Gran Chaco areas for planting, 10 of which are in the East sector between Yucumo and Rurrenabaque, and 7, in the South zone (Cascada and Sillar). A new pathway has been identified, apparently for forestry extraction, stretching from the Michel buildings along the line of the Pelado Mountains towards the West, branching off into the RB TCO. There has been evidence that, in the East/Southeast sector of the RB TCO, the impacts of agricultural activities performed by intercultural peoples are bigger, with 15 pockets of heat against none in the Central zone of the reservation in indigenous communities of the Quiquibey River banks, apart from extensive deforested zones in the highway sector versus minimum surfaces in the indigenous communities of the Quiquibey River.	Activity between SERNAP and CRTM. The Michel buildings pathway has not been changed, nor has it been further extended, since the intervention in the protected area after the first observation flight. The telephone aerials pathway on the Pilón range, equally paralyzed to comply with the administrative process brought by the protected area against the Municipal Government of San Borja. Three pockets of heat in the South zone (Villa Tunari, Boquerón, and Michel buildings). In the Central and Western zones of the RB TCO, no problem has been identified. In the Yucumo – Rurrenabaque road, pockets of heat have been identified by the Río Hondo and San José communities.

Source: CEPF FUNDESNAP CRTM sub-project Final Report (prepared by Juan Carlos Miranda, 2012).

A specific theme for a more robust coordination of highway construction monitoring activities of the Pilón Lajas protected area that needs to be monitored is flow rate assessment, particularly considering the importance of conserving this protected area for the provision of water to the municipalities of San Borja, Rurrenabaque, and Reyes.

Table 4: Assessment and Monitoring RB TCO Pilón Lajas Flow Rates

			Coordinates		Date		Date	Date		
	Name of River	Time	X	Y	11/06/12	Time	08/08/12	09/08/12	DIFF Flow Rate	DIFF %
1	Arroyo la Herradura	11:45	675246	8394610	0.277	16:30	0.023		0.254	91.70
2	Arroyo la Asunta	12:15	679407	8393939	0.623	17:30	0.261		0.362	58.11
3	Rio Colorado	15:30	696512	8349666	0.632	08:00		0.417	0.215	34.02
4	Arroyo Siquili afluente Yacumita	17:25	704082	8334738	0.233	10:10		0.118	0.115	49.36
5	Rio Caripo	18:00	708355	8329591	0.407	10:45		0.201	0.206	50.61
6	Arroyo Aguas Claras	18:35	710944	8322828	0.665	11:25		0.623	0.042	6.32
7	Rio Yucumo	19:00	710987	8322892	0.606	11:40		0.343	0.263	43.40
8	Rio Piedras blancas	11:40				14:45		0.266		
9	Rio Cauchal	15:45				15:45		0.992		
					3.443		0.28	2.96		

Source: CEPF FUNDESNAP (prepared by Jaime Villanueva, 2012).

For activities like these, an exchange of knowledge has been established between the Ecology Institute / UMSA and the local Environmental Assessment Committees with more focused capacities, i.e., with the Hydraulics and Hydrology Institute of the same UMSA for the issue of assessing flow rates and the management of loan banks that, in one case, significantly affected one of the rivers in that zone. Based on this experience and on this constellation of players, we considered that a highly effective way to generate capacities, even more than workshops or other formal capacity building efforts, is hands-on practice together with monitoring visits with input from the different priority themes.

Finally, in the framework of the same project in early 2011, FUNDESNAP implemented the Management Effectiveness Tracking Tool (METT) in three national and two municipal protected areas. Designed by Stolton et al. (2007) for the WWF and the World Bank, this tool is part of the WB's monitoring kit to measure the Catalyzing of Protected Area System Sustainability and enables identification and valuation of themes such as threats to and management tools for protected areas. It is located along the lines of other macro tools, applied by the National Service of Protected Areas at different moments of their mandate, such as Measuring the Effectiveness of Managing the National System of Protected Areas (MEMS) being implemented until 2007/2008, and Measuring the Effectiveness of Performance (MED), which is under way now. In late 2012, the following measurement of the METT for the three national protected areas and the three municipal ones will be made.

In short, if we place the various components of this monitoring system between the local Environmental Assessment Committees and the protected area personnel among the effect (threat reduction) and impact (condition of focal conservation objects) indicators, FUNDESNAP is focusing and steering the task of monitoring the impacts of their contribution to the protected areas in Bolivia with effect indicators to enable development of new or complementary activities in an attempt to reduce the threats detected by the monitoring effort.

Monitoring periodicity and Investment Costs

The first visits of the local Environmental Assessment Committees in the highway sections, whenever in the area of influence of the protected areas, were carried out in mid 2011. Since then, various follow-up activities have taken place virtually every quarter, and the second measurement of all indicators offered through knowledge exchange in the highway construction/improvement phase is currently being prepared.

Chart 5: METT tool application for the RB TCO Pilón Lajas in 2011

RB TCO Pilón Lajas (16.03.2011)

Protected Areas Threats: Data Sheet 2

Please tick all relevant existing threats as either of high, medium or low significance. Threats ranked as of high significance are those which are seriously degrading values; medium are those threats having some negative impact and those characterised as low are threats which are present but not seriously impacting values or N/A where the threat is not present or not applicable in the protected area.

1. Residential and commercial development within a protected area

Threats from human settlements or other non-agricultural land uses with a substantial footprint

High	Medium	Low	N/A	
		X		1.1 Housing and settlement
			X	1.2 Commercial and industrial areas
	X			1.3 Tourism and recreation infrastructure

2. Agriculture and aquaculture within a protected area

Threats from farming and grazing as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture

High	Medium	Low	N/A	
	X			2.1 Annual and perennial non-timber crop cultivation
			X	2.1.1 Drug cultivation
			X	2.2 Wood and pulp plantations
			X	2.3 Livestock farming and grazing
			X	2.4 Marine and freshwater aquaculture

3. Energy production and mining within a protected area

Threats from production of non-biological resources

High	Medium	Low	N/A	
		X		3.1 Oil and gas drilling
		X		3.2 Mining and quarrying
			X	3.3 Energy generation, including from hydropower dams

4. Transportation and service corridors within a protected area

Threats from long narrow transport corridors and the vehicles that use them including associated wildlife mortality

High	Medium	Low	N/A	
X				4.1 Roads and railroads (include road-killed animals)
		X		4.2 Utility and service lines (e.g. electricity cables, telephone lines,)
		X		4.3 Shipping lanes and canals
			X	4.4 Flight paths

5. Biological resource use and harm within a protected area

Threats from consumptive use of "wild" biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species (note this includes hunting and killing of animals)

High	Medium	Low	N/A	
	X			5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict)
		X		5.2 Gathering terrestrial plants or plant products (non-timber)
	X			5.3 Logging and wood harvesting
	X			5.4 Fishing, killing and harvesting aquatic resources

6. Human intrusions and disturbance within a protected area

Threats from human activities that alter, destroy or disturb habitats and species associated with non-consumptive uses of biological resources

High	Medium	Low	N/A	
	X			6.1 Recreational activities and tourism
			X	6.2 War, civil unrest and military exercises
		X		6.3 Research, education and other work-related activities in protected areas
			X	6.4 Activities of protected area managers (e.g. construction or vehicle use, artificial watering points and dams)
			X	6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors

Source: CRTM 2012.

The knowledge exchange process between the local Environmental Assessment Committees and the Ecology Institute of the Universidad Mayor de San Andrés has implied a 75,000 USD investment. Each monitoring visit or work meeting of the local Environmental Assessment Committee requires investments between 250 and 400 USD. These amounts are further increased by the coordination and follow-up expenditures from FUNDESNAP just like a complementary process of generating capacity of nearly 40,000 USD and the other sub-donations that have partly contributed to this process.

Results Achieved

To date, the local Committees for Environmental Monitoring have presented three complementary social environmental follow-up reports to the Deputy Minister for the Environment, SERNAP, and ABC. This information is enhanced by monitoring reports and personnel patrols of the protected areas, just as with specific reports about the different priority themes, p.e. assessment of flow rates, third parties loans bank for management.

Main challenges and success factors

The monitoring activities held this far keep up with the implementation phase of the highway construction works as they provide follow-up to the threats that have prompted the works (i.e., changes to water flow rates, loans bank management, etc.). Once the works have been finished and the highways start to operate, the impacts are soon to be felt upon biodiversity as well as upon the social, cultural and economic situation (i.e. deforestation, degradation of ecosystems, new settlements, new production patterns). In the same exchange of knowledge, the tools to proceed with the highway operation phase have already been developed.

Since both the environmental standard in Bolivia and the safeguard policies do not provide specific and concrete environmental management measures for the specific monitoring of effects, such as highways after construction/ improvement works are finished, the main challenge is to ensure the conditions for proper and effective social environmental management on the part of protected areas and municipal governments in coordination with local Environmental Assessment Committees.

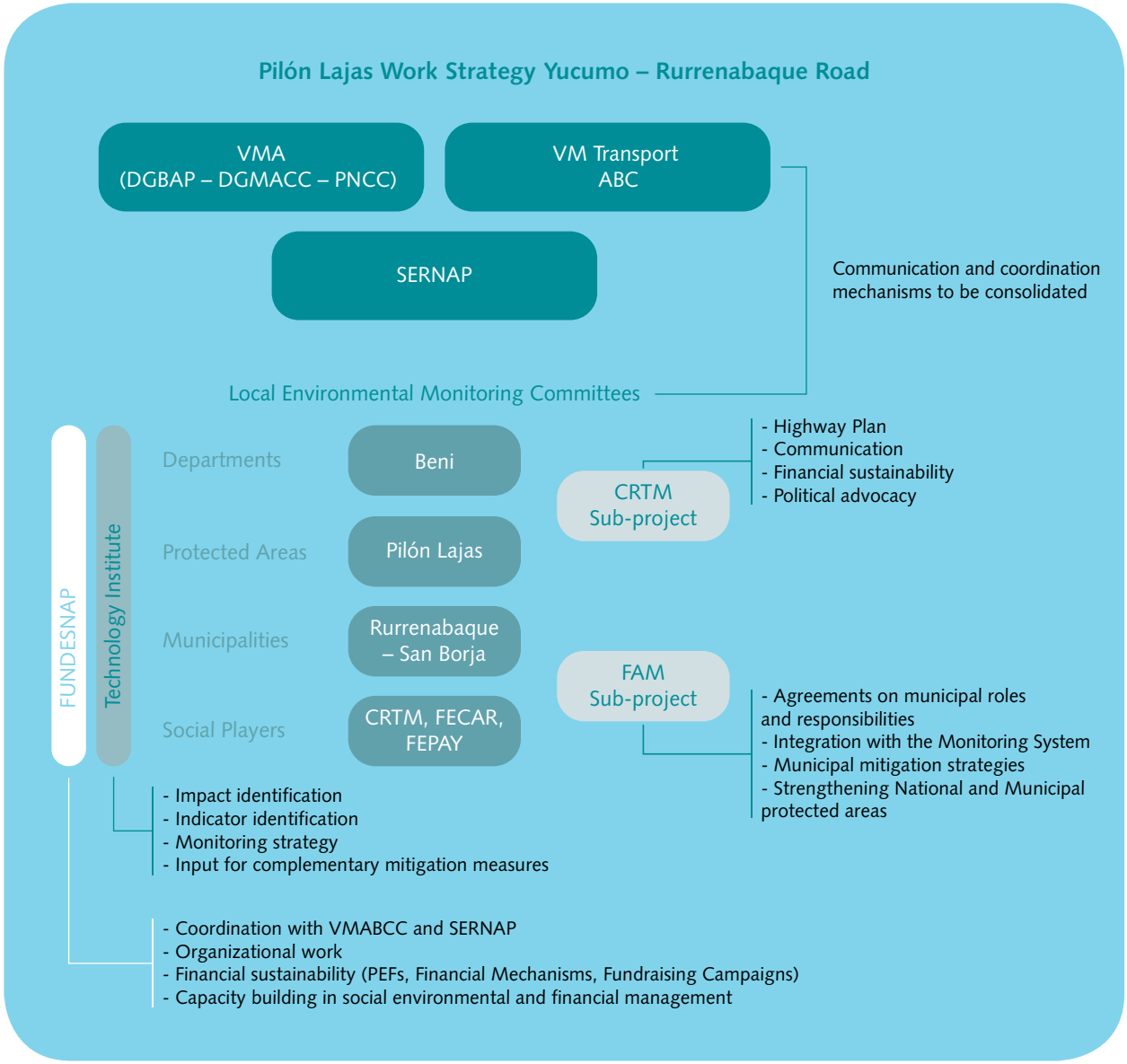
“The knowledge exchange process between the local Environmental Assessment Committees and the Ecology Institute of the Universidad Mayor de San Andrés has implied a 75,000 USD investment.”

Financial sustainability conditions ought to be generated in order to maintain the attention and response capacity with continuous monitoring of induced impacts. One opportunity to consolidate it is the recent re-instatement of Management Committees for the Pilón Lajas and Madidi protected areas. They include the participation of the same players as in the local Environmental Assessment Committees and this will facilitate the continuous integration of the information dealt with in issue of monitoring the very management of protected areas. Still, a most important challenge for the implementation of monitoring systems at the level both of individual protected areas and the Bolivian National System of Protected Areas has been to continuously generate relevant information for the management of protected areas and the focus of conservation actions and investments. The effort of generating information is often exhausted in the phase of learning about the initial situation. And though this information helps to better steer conservation actions and investments, this far there are few continuous series of information to ensure mid and long term trends that may require conservation actions and investments suggested in further detail and level of specificity.

Graphic representation of the system

The set of monitoring components in current implementation for the concrete case supported by FUNDESNAP is graphically presented below:

Chart 6: Working strategy for the monitoring effort in different instances for the RB TCO Pilón Lajas



Source: CEPF FUNDESNAP, 2011.

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