



COmmunity-based Management of
EnviromenTal challenges in Latin America



D5.1: “Participatory Report on Synthesised Scenarios: summary and comparison of the scenario building processes and outcomes in the three case studies”

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- AQM: Fundación Aquamarina-CECIM (Argentina)
- CCC: Consejo comunitario de la comunidad negra de la cuenca baja del río Calima (Colombia)
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Executive summary

The COMET-LA (COmmunity based Management of EnvironmenTal challenges in Latin America) project uses a civic society-scientific partnership to identify sustainable community based governance models for the management of natural resources that can respond to global environmental change. The project focuses on developing and supporting locally owned solutions that are based on the down scaling and tailoring of global and regional change factors applied to the specific case studies. This report summarises and compares the process and findings generated from implementing the four step common scenario planning methodology for the COMET-LA project across three case studies in Argentina, Colombia and Mexico.

Building up on previous stages of the COMET-LA project (i.e. socio-ecological system characterization and structural analysis), in this part of the project we considered how the current system for governing and managing the natural resource in question can respond to potential changes in the future through the construction of plausible scenarios in an exploratory way. Using structured morphological analysis and narratives, the differing role of exogenous and endogenous factors affecting the socio-ecological systems was explored in a systematic way within each case study. Scenario development involved an interactive bottom-up process to collect local knowledge and perceptions of potential future change (within a horizon of 20 years or one generation), in which generic archetypes were locally adapted to downscale global storylines of change into community-based narrative descriptions of change. The narratives were then used to stimulate a participatory elicitation process for the recognition of response actions and to identify those strategies that might be considered more robust (i.e. useful under several scenarios). Further investigation included reflection on the operationalization of response options and their fit within local plans and local governance systems and recommendations for further development of long-term adaptation strategies.

In Colombia and Mexico the morphological matrixes were constructed with a particular focus on social and institutional variables, while in Argentina there was a more wide spread of variables. However, this does not seem to have created distinct path-dependencies between Mexico and Colombia with respect to Argentina in relation to the identification of response options. STEEP (social, technological, economic, environmental and political) drivers were applied to the main variables identified in the previous stages resulting in a matrix or the 'morphological space'. Whilst time consuming and difficult, it provided a systematic process to select the ingredients to construct the downscaled narratives describing possible future changes. In general, the scenario narratives were more inward looking than some of the ones found in the scenario literature, i.e. with less allusions to other countries, world regions and global processes, but that in any case, effects of external forces on the community were critical part of the narratives in all cases. More similarities across case studies were found in relation to the *Barbarization* and *Great Transition* world views, while the *Conventional World* scenarios presented a more divergent view across the three countries.

The community and external stakeholders could identify actions to take to prepare for these possible futures. Common actions that worked for all scenarios across all 3 case studies, included: i) the strengthening of: education and specifically, education on the local governance system and local knowledge; ii) technical capacity building to address specific weakness of the socio-ecological systems as identified as part of this process; and iii) strengthening the sense and means of community and the links between the community and external organizations. Using shocks was useful to elicit alternatives or additions to these response options. The discussion about how to operationalise response options helped made them more concrete. Also they helped the communities identify how these response options fit into multi-level governance processes and the roles and responsibilities that are involved in adaptive management of natural resources under conditions of global environmental change.

Overall, the scenario planning process carried out by COMET-LA has been intense in its use of resources and somewhat demanding for stakeholders, but in general it has been viewed as a very positive process and critical to the achievement of the project's objectives. In the cases of Mexico and Argentina, where this kind of process had never taken place before, the project illustrated to the communities that they need to think and prepare for the future. This did not occur as such in Colombia, where the communities had previously participated in scenario planning processes, but helped them revisit previously elaborated plans and reflect on implications of response options. The process also helped them compare the goals and variables that had been prioritized before and how they have changed over time. Thinking about the future in a systematic way seems to have helped participants to identify connections between issues, within their socio-ecological systems and to the outside. The process definitely helped to share knowledge across different instances (notably between community members and representatives of external organizations), which was missing in all three different cases to varying degrees. It is too early to assess to what extent the process has helped the communities prepare for the future, but communities do now have a set of relatively concrete set of response options which can be built into their governance systems and, eventually used to increase the resilience of the socio-ecological systems. Links between the team (academic partners and CSOs) and the community have also been reinforced as part of this process, contributing to COMET-LA's learning arena.

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List of abbreviations

COMET-LA	COmmunity-based Management of EnviromenTal challenges in Latin America
CSOs	Civil Society Organizations
MICMAC	<i>Matrice d'Impacts Croisés Multiplication Appliqués à un Classement</i> , or Crossed Impact Matrix Multiplication Applied to a Ranking
PSA	Prospective Structural Analysis
SES	Social-Ecological System
STEEP	Social, Technological, Environmental, Economic and Politic

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1 Introduction

The COMET-LA (COmmunity based Management of EnvironmenTal challenges in Latin America) project uses a civic society-scientific partnership to identify sustainable community based governance models for the management of natural resources that can respond to global environmental change. The project focuses on developing and supporting locally owned solutions that are based on the down scaling and tailoring of global and regional change factors applied to the specific case studies.

This report summarises and compares the findings generated from implementing the four step common scenario planning methodology for the COMET-LA project across three case studies in Argentina, Colombia and Mexico. The methodological learning arising from this stage of the project is reported in D1.3: *Locally Adapted Scenario-building: Evaluation of Methods* (Waylen et al., 2014a). Details of the application of the methodological framework to each of the case studies is reported in Deliverables 2.3, 3.3 and 4.3 [Farah et al. (2014), Escalante Semerena et al. (2014) and Rojas et al. (2014)]. The results and their implications for community based governance and management are reported in D5.2. This report is participatory to the extent that: i) the individual case study data were analysed by the local research team with the analysis validated by the communities at every stage, and ii) the final results, as presented in this report, have been shared with the local research team in each case study and updated in response to their comments, via email, video conferences and in a session specifically designed for that purpose in the last General Project meeting in Argentina in July 2014.

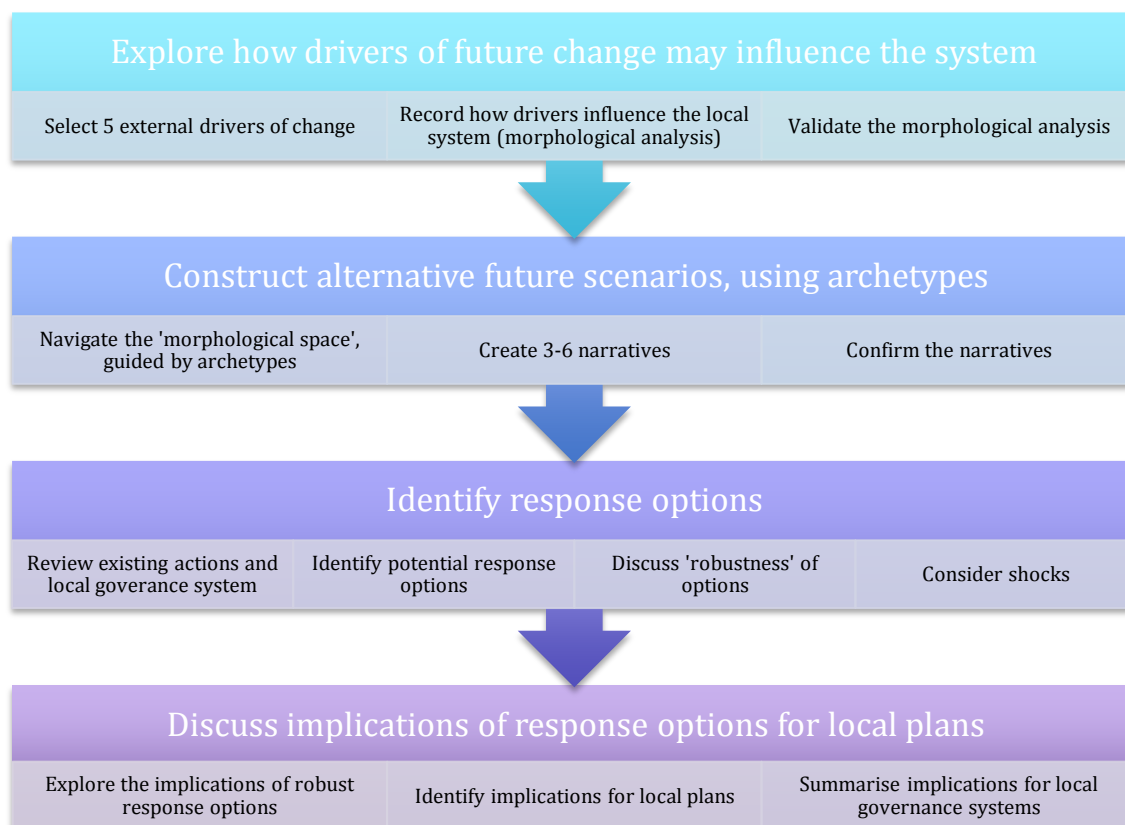
The final stage of the project built on the initial characterisation of the social-ecological systems using the Ostrom framework (Ostrom, 2009)- see deliverables 1.1, 2.1, 3.1 and 4.1 [Delgado Serrano et al. (2013), Farah et al. (2012), Escalante Semerena et al. (2012) and London et al. (2012)] - and the structural analysis of key variables defining these systems using Godet's methods (Godet, 2000, Godet, 2006) - see deliverables 1.2, 2.2, 3.2 and 4.2 [Delgado Serrano et al. (2014), Avendaño et al. (2013), Escalante Semerena et al. (2013) and London et al. (2013)] -.

We considered how the current system for governing and managing the natural resource in question can respond to potential changes in the future through the construction of plausible scenarios in an exploratory way. The idea is to help communities prepare for global environmental change and to illustrate a route from existing arrangements to robust strategies in the future. One advantage of using scenario methods is to use the creativity of several plausible visions some distance in the future to explore possible strategies as response options without becoming overly conditioned by the status quo. This is expected to allow a more inventive process that is less likely to be constrained by path-dependency and vested interests.

Using structured morphological analysis (Godet, 2000) and narratives, the differing role of exogenous and endogenous factors affecting the socio-ecological systems was explored in a systematic way within each case study. Scenario development involved an interactive bottom-up process to collect local knowledge and perceptions of potential future change (within a horizon of 20 years or one generation), in which generic archetypes (Hunt et al., 2012) were locally adapted to downscale global storylines of change into community-based narrative descriptions of change. The narratives were then used to stimulate a participatory elicitation process for the recognition of

response actions and to identify those strategies that might be considered more robust (i.e. useful under several scenarios). These strategies were further evaluated under the eventuality of different types of shocks (i.e. low probability, high Impact events) that, were they to occur, would severely impact human conditions (Saritas, 2011). Further investigation included a reflection on how to operationalise the response options and their fit within local plans and local governance systems, and hence recommendations for further development of long-term adaptation strategies. Figure 1 presents an overview of the common methodological framework (Waylen et al., 2014b), that can be downloaded from [:http://www.hutton.ac.uk/sites/default/files/files/projects/COMET-LA%20scenario%20method.pdf](http://www.hutton.ac.uk/sites/default/files/files/projects/COMET-LA%20scenario%20method.pdf).

Figure 1. Overview of the common methodological framework for scenario planning.



2 Collecting and Analysing Data

The local research teams followed the common four-stage scenario-planning methodology as agreed at the February 2014 COMET-LA Methodological Meeting held in Faro (Portugal) – see (Waylen et al., 2014b) - but adapted it where necessary to suit the needs of their case study. These adaptations and the learning generated are described in D1.3: *Locally Adapted Scenario Building: Evaluation of Methods*. The common methodology set out what data to collect at every stage; resulting for each case study in:

Stage 1: Exploring how drivers of future change may influence the system

- A list of drivers and internal variables and their definitions
- A matrix representing the morphological analysis of driver impacts on the internal variables
- Field notes on the stakeholders' views on the morphological analysis

Stage 2: constructing alternative future scenarios, using archetypes

- A set of narratives of the future derived using global archetypes as created by the local research teams (from 3 to 5 narratives depending on the case study)
- The same set of narratives of the future adapted and validated by the communities
- Field notes on the stakeholders' views of these narratives

Stage 3: Identifying response options

- A brief description of the local governance system and, appended, a list of existing plans or actions that could also be useful in the future
- A list and brief description of possible response options identified by the community
- A matrix of how response options might respond in the scenario conditions
- A description of shocks used
- A matrix of how the response options might respond to shocks
- A final list of robust response options and strategies
- Field notes on stakeholders' discussions on response options

Stage 4: Discussing implications of response options for local plans

- A list/matrix of the implications of the robust response options/strategies
- A discussion on suggestions for taking these response options/strategies forward

In all countries adaptations to the framework were expected, in order for the methodology to suit local conditions. Furthermore, some partners choose to use additional tools or activities. In this document, where these adaptations and additions to the common methodological framework have been used, this is noted together with the additional insights generated within the corresponding sections of this report. We use quotation marks (‘’) for literal quotes from community members or statements from the local research team (as translated from Spanish). The term *local research team* refers to the partnership between the scientists and the civil society organization in each of the case study areas.

The individual case study data were analysed by the local research teams with the analysis validated by the communities at every stage. This report uses the outputs of this process in each case study as

reported in Deliverables 2.3, 3.3 and 4.3 [Farah et al. (2014), Escalante Semerena et al. (2014) and Rojas et al. (2014)] and the results of in-depth interviews made by the authors of this report to representatives of the local research teams after the implementation of each of the stages. This was complemented with the outputs from the deliberative methodological workshop held in Argentina in July 2014. The final results interpretations in this deliverable were further peer-reviewed by the local research teams to ensure that nothing has been misrepresented.

3 Case studies background

As discussed in previous COMET-LA reports - see Deliverables 1.1 and 1.2 (Delgado Serrano et al., 2013, Delgado Serrano et al., 2014), the three case studies represent contrasting socio-ecological systems in relation to the configuration and self-definition of the communities and the community-based natural resource management; the environmental problems faced by the communities and their desires and goals in relation to those; as well as the configuration, experience and skill sets of the local research teams. See Table 1 for an overview of key characteristics of the three case studies. Deliverables 2.1, 3.1 and 4.1 [Farah et al. (2012), Escalante Semerena et al. (2012) and London et al. (2012)] provide more information; here we just summarise key social and environmental aspects of each case.

Santiago Comaltepec in the South Pacific of Mexico is a small community of slightly more than a thousand people, who inhabit an area encompassing about 19,000 hectares of forest. Timber exploitation is the main source of livelihoods. A strong community-based institutional organization rules the lives of its inhabitants and maintains a distinctively conservative approach to the exploitation of the forest since the indigenous people regained (very large) control over their land in the 70s. This has led to a well preserved forest area that has resisted the expansion of agriculture and livestock activities that generally affect other areas of Mexico. High rates of emigration (mostly to the United States) strongly define the social dynamic of the community, with a high share of its youth leaving the community indefinitely. The local research team is composed of scientists (mostly economists) from the Universidad Autonoma de Mexico and the civil society organization Estudios Rurales y Asesoría Campesina (ERA). ERA was founded in 1993 as a non-profit development organization and is strongly embedded in the community, with some of his members being local inhabitants of the community. These local members are crucial by acting as facilitators of COMET-LA's work in liaison with the community. The goals for future management of the natural resources, as defined by the community itself as part of COMET-LA scenario work, is to achieve 'environmental and socio-economic sustainability, through a use of the forest that allows its current conservation status while permitting the community's youth to live and work locally, keeping the culture and traditions of their community-based governing system'. In sum, the Mexican case has: a very clear definition of community and its territorial boundaries with a longstanding and strong community-based natural resource management governance system, to which the local research team has good access through ERA and key community members and in which clear scenario planning goals can be established. In previous phases of the COMET-LA project, female members of the community had been engaged in specific workshops. Unfortunately this engagement could not be maintained for the scenario work. Women were invited to take part of the process, but did not attend, probably due to potential conflicts that may have emerged with male community members

and other female members. This is representative of a culture in which women's role in society is not considered equal to that of men.

In Colombia, COMET-LA focuses on the community councils of black communities in the Pacific coasts, specifically in the Alto y Medio Dagua, and Cuenca Baja del Río Calima (Bajo Calima onwards). Bajo Calima encompasses a much larger area, 77,724 hectares where 3,550 people live, than Alto y Medio Dagua, which covers over 12,335 hectares and hosts 2,150 inhabitants. This makes Bajo Calima a more diverse territory, with some people living closer to the road and some people living closer to the river. Also Bajo Calima is more affected by the armed conflict occurring in Colombia (with presence of guerrillas and illegal crops). Again, these are areas with a clear definition of community and territorial boundaries. The black communities are recognized by law¹ as an ethnic group with defined collective rights on the public land that they have traditionally occupied. While their control over the use of the land is somehow less strong than in the Mexican case, the Black Community Councils are fully recognized institutions that need to be consulted by the national government for interventions affecting their land. This also grants them compensation which has to be negotiated with the community in case damaging interventions do occur. This region has been internationally recognized as one of the most biologically diverse areas on the planet, containing ecosystems ranging from cloud forest to coastal mangroves (IGAC., 2000).

Communities in this territory have an economy based on the exploitation of natural resources which leads to several social-environmental conflicts: conflicts for accessing natural resources (e.g. illegal timber extraction, gold mining and hunting), overexploitation of natural resources (particularly forest and fisheries), infrastructure development affecting ecosystems and local communities, access to and use of water, presence of illicit crops and illegal armed groups. COMET-LA's local research team is formed by scientists from the Pontificia Universidad Javeriana, mostly (but not only) of a social sciences background and with a strong track record of community-based participatory research, and by members of the Community Council themselves. As part of the COMET-LA project a large group of so called 'co-investigadores' (or co-researchers) from the community's youth has been trained to act as effective facilitators, creating particularly strong links between the project and the community. The goals for the future management of the natural resources, as defined by the community itself as part of COMET-LA scenario work, is: 'to achieve a sustainable management of water and biodiversity, including the decision of the communities and allowing the improvement of the quality of life in the territory'.

The Argentinean case differs from the other two in terms of its relatively industrialised setting. The artisanal fisheries of the Bahía Blanca Estuary and the adjacent coast of Pehuén Co and Monte Hermoso in the South-East of the country involve over 1,500 families, who do not share a community identity and do not manage their natural resources in a community-based way. This is partly due to the general lack of bottom-up governance culture in Argentina as a legacy of past dictatorship, as well as the lack of territorial cohesion of the case study area (it was difficult to establish the territorial boundaries for the case study, which is very much dominated bio-physically by the Estuary and its dynamics, but that includes urban settlements of different size and type and

¹ Law 70/1993:

<http://www.convergenciagnoa.org/images/Documentospdf/legislacion/LEY%2070%201993.pdf> (In Spanish).

that are not necessarily culturally and economically connected). There are a number of different environmental problems in the area associated with the large-scale dredging (past, present and planned) of the Estuary, water pollution and overfishing. COMET-LA focuses on the conflicts arising from the displacement of artisanal fishermen from the harbour in favour of big multinational import/export corporations, and their limited access to the beach in favour of tourist use and conservation of sites of paleontological interest. Due to the lack of a participatory culture in the country, the Argentinean research team (including social and natural scientists from the Instituto Argentino de Oceanografía and the Universidad Nacional del Sur, and members of the NGO Aquamarina) faced the most challenges to initiate a dialogue across stakeholders. However, and precisely because of the lack of previous experience, this case is where the COMET-LA project has generated more enthusiasm among the local population, since it is seen as the first opportunity to start addressing longstanding complex conflicts in an innovative (for the area) participatory way. Accordingly, the general goal for COMET-LA in Argentina is to consolidate the dialogue to serve as a basis for increased participation of all stakeholders in the management of the natural resources. In this context, the vision of the futures work set up by the stakeholders is 'to progress towards a more sustainable management of the coastal and fisheries resources for the local people (and to address together the pressure of external agents)'.

Table 1. Overview of case studies characteristics.

	Mexico	Colombia	Argentina
Definition of scale and system boundaries	Officially defined boundaries of community 'Santiago de Comaltepec', consisting in three settlements: Comaltepec, La Esperanza, and Zoyolapam. They are located across the slightly more than 19,000 ha of common property.	Boundaries officially recognised as Community Councils of Bajo Calima and Alto y Medio Dagua. (77,724ha and 12,335ha respectively)	Boundaries defined by local project partner on the basis of populations adjacent to Monte Hermoso Bahía Blanca estuary, along an E-W stretch about 100 km in length. The case study area encompasses 1 large town (Monte Hermoso) and for medium/small size towns (Ingeniero White, Villa del Mar, Cerri and Pehuen co).
Ecoregion classification (based on Olson, et al. 2001), main ecosystems presents in the socio-ecological system and presence of protected area	Neotropic Ecoregion, wide range of altitudes and hence forest types (ranging from temperate forest to cloud forest). Includes Mesoamerican Pine-Oak Forests, tropical and subtropical coniferous forests (Sierra Madre de Oaxaca pine-oak forests). ~500ha designated for watershed protection, ~2750ha for wildlife protection and ~8,450ha as a protected forest reserve.	Neotropic Ecoregion. Chocó Darien biogeographical region, tropical and subtropical moist broadleaf forest. Consejo Comunitarios (Black Community Councils) prohibit certain uses of their territory (e.g. they have forbidden hunting for commercial purposes or timber extraction without licenses).	Neotropic Ecoregion. Estuary: leads to Temperate shelf and seas ecoregion (Patagonian-Southwest Atlantic). Existing protected areas: (1) The Provincial Nature Reserve Bahía Blanca, Falsa y Verde ~210,000 Ha estuarine marshlands. (2) Geological, paleontological and Archeological Provincial Reserve Pehuén Co-Monte Hermoso. (3) The Municipal Coastal Reserve Reserva Costera Municipal de Objetivos Definidos, 3km ² .
Main institutional factors operating in the socio-ecological system	Community council, and system of cargos (governance of the community and activities to benefit the community), municipality. Market for timber is very important to local livelihoods, as are remittances from emigrants. PES scheme funded by CONAFOR since 2012.	Community council, municipality, regional and national government, community non-paid activities, NGOs, guerrilla and paramilitaries, mining market.	Municipality, regional & national governments, fishery, petrochemical industry.
Main livelihoods/economic activities	Timber, Agriculture (swidden, coffee, cattle)	Mining (legal and illegal), , timber extraction and processing, artisanal freshwater fishing, illegal crops (coca plantations), agriculture and, to a lesser degree, ecotourism.	Fisheries, petrochemical industry, import/export activities linked to sea harbour and tourism.
Focus of the scenario planning as per van Notten (2005)	Issue-based. CBNRM with main focus on forest management. Forest management has been strongly focused on preservation. However, as there has been no other source of local income or jobs apart from the forest, many people migrate. The challenge is to find a balance that works for people and the environment.	Area and issue-based. CBNRM The general challenge of sustaining biodiversity and water conservation in the face of illegal activities and the presence of illegal armed groups (guerrillas) and local economies based on the exploitation of natural resources such as forests, minerals and biodiversity.	Institution-based (fishery sector). The Estuary and the adjacent coasts of Pehuén Co and Monte Hermoso are home to several artisanal fisheries. A combination of overfishing, changes in water and air temperature and drought have reduced catches, threatening these fisheries. The fishermen have little power versus industry and the focus is whether the fisheries be both socially and ecologically sustainable?
Main stakeholders of the socio-ecological system	Local people, municipal authorities (internal) External stakeholders include environmental agency, NGOs, public forest company. CONAFOR (National Forest Commission).	Local people, Consejos Comunitarios. External stakeholders include guerrillas and illegal crop cultivators/traders, the army, the environmental agency, ministry of environment, NGOs, research organizations.	Local fishermen, park rangers, local politicians, local NGO, tourists and commercial tourist stakeholders

In sum, from the rural isolated and mountainous 'community-tight' Mexican case, to the urban, coastal, territorially-spread and relatively unconnected set of stakeholders in Argentina, passing through the peri-urban cohesive black communities in Colombia's pacific coast, COMET-LA's case studies represent a diversity of starting points for investigating change in socio-ecological systems. The broad similarity between each case's goals for a future vision (sustainable management of the natural resources) reflects the goals of COMET-LA itself, which aimed to foster local thinking and capacity for sustainability. It should be noted that the work on scenarios presented here builds upon on a two year process in which the local research teams have been interacting with the communities to deliver the objectives of COMET-LA, which specifically refer to the identification of sustainable community-based governance models for the management of natural resources that can face global environmental challenges.

4 Communities' overall reaction to futures thinking

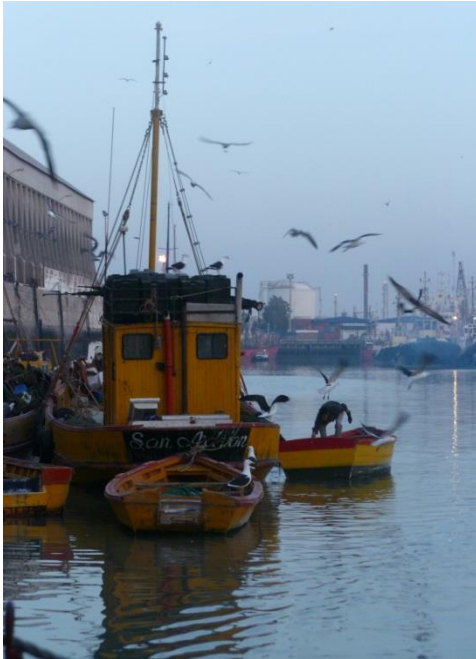
Regarding the overall reaction of the communities to the introduction of the notion of futures thinking and scenario planning as part of the COMET-LA project, differences and similarities are found. In Mexico, it was found that thinking about the future is not an easy task for the community. The local research team considered that the main reason for this difficulty relates to the strong focus that the community has on 'daily activities' and current challenges. Interestingly, during the process the community expressed their satisfaction with 'having been given the opportunity to think about the future'. Workshop participants had a clear idea of what they want for the future of their community, but recognized that this is not necessarily the product of a reflective or strategic process, and they appreciated the space given 'to attach loose ends' and to 'string together' their ideas about the future in a structured way.

Somewhat similarly, in Argentina, stakeholders expressed a very positive reaction to the discussion about the future at the beginning. Workshop participants had never been exposed before to this kind of futures thinking, and reacted eagerly. This came up as an innovative approach in a society which, according to the project participants themselves, does not have 'an agenda' and functions looking 'only at the short term'. Stakeholders 'became aware of future changes' in contrast to the 'short-term visioning that generally dominates Argentina'. Also, the process helped with the realization of stakeholders of their own responsibility over changing and managing the future. However, this interest in the future was somehow interrupted before stage 3 of the methodology was completed, due to the emergence of an acute conflict between traditional fishermen (see Text Box 1). The severity of the newly emerged conflict affected participant's capacity to focus on discussions about the future. Employing significant facilitation effort, the local research team still managed to fully implement the methodology, but the early focus on futures thinking decreased towards the end of the project.

The circumstances in Colombia were significantly different, since the communities had been previously been involved in a similar scenario thinking process in 2011. Specifically current

community leaders and some of the 'co-investigadores' had participated in similar types of workshops, in the context of the consultation process for the *Plan de Etno-desarrollo* (ethno-development plan) of the community councils. This had involved carrying out a strategic prospective analysis looking 30 years ahead (starting from a baseline in 2008 and hence roughly coinciding with the time horizon in COMET-LA). While that project took a 'normative and critical approach' - asking the communities to construct a desired vision for their community - it obviously had an effect on the way the communities approached COMET-LA's scenario thinking and the extent to which scenario-planning provoked new ideas and ways of working. The outputs of that former process were used in COMET-LA's scenario building work, and the communities remained engaged with COMET-LA's process and expressed appreciation for the systematic nature of COMET-LA's scenario methodology and also the fact that they realized that things have changed and the need to adjust to new settings. It also served to identify what had changed since that previous process took place, which of the actions identified then had been put in place and which have not. Overall, the communities were positive about the process but there were some issues with its implementation.

Text Box 1. Conflict between traditional fishermen in the Argentinean case emerged during the implementation of the scenario planning process.

	<p>In spring 2014, taking advantage of a loophole between two contradictory pieces of legislation, fishermen from the Mar del Plata region (North of the case study area in Bahia Blanca) operating middle-size boats came to an agreement with certain traditional fishermen of the Estuary. This would allow outsiders to use a local fridge so that they could fish in the area. These middle-size boats use trawler fishing techniques, which cause significant damage to the ecosystem, disrupting the trophic levels and releasing pollution into sediments. This generated a very strong opposition from other traditional fishermen, who reacted by implementing road cuts and promoting social protest. This significantly affected COMET-LA's participatory process, since representatives of the fishermen who had signed the agreement with fishermen from Mar del Plata declined invitation to the last two workshops of the project. This was done to avoid confrontation with the other fishermen, which risked reaching levels of physical violence. The local research team managed to keep good communication relationship with both sides of the conflict. At the moment of writing this report, the case has been taken to court and trawler fishing has been stopped till further judicial resolution.</p>
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5 Drivers & Variables implemented in Morphological Analysis

Corresponding to stage 1 of the common methodological framework, this section compares and contrasts the selection of internal variables key to the description of the system and the external drivers of change affecting them, the development and implementation of the morphological analysis and its outputs in each of the case studies. The aim of this stage was to

consider how key external drivers of future change may influence the current system, building on the system's understanding created in previous COMET-LA work. Morphological analysis means systematically considering the relative influence of cause-effect relationships through identifying what will happen to each internal variable if an external driver takes a particular state (e.g. what will happen to the forest condition if population increases by 20%?; or if remains the same?).

5.1 Selection of internal variables

In all three cases, the internal variables were selected from the list of variables produced in the structural analysis² of the system carried out in COMET-LA during year 2 of the project -see Deliverable 1.2, (Delgado Serrano et al., 2014)-. The three local research teams followed in the three cases a systematic selection process in specifically designed workshops, in which the most dependant and influential internal variables as emerged from the application of the software MICMAC were retained. In the Colombian case, this process was tested beforehand with the co-investigadores, before consulting the communities. Additional visualization tools were also employed in Colombia to identify the most central variables using network analysis - see Deliverable 2.3 (Farah et al., 2014) for details on the specific methodology for this-. In all cases, the variables were defined according to Ostromian categorizations -as produced by the local research teams as part of year 1 of the project, see Deliverable 1.1 (Delgado Serrano et al., 2013)-. These systematic processes led to the selection of 7 final internal variables in Mexico and Colombia and 10 in Argentina.

The lists of variables and their definitions (as defined in a participatory way with the stakeholders) are presented in Annex I.

Most of the variables correspond to the categories Government Systems (GS), Social, Economic and Political Settings (S) and Users (U), which are represented by five variables each. However, the distribution across the case studies for these categories is different. Most of the Government Systems variables have been selected in the Mexican case study (with one only for Argentina and Colombia respectively); and most of the User variables are from the Argentinean case. Social, Economic and Political Settings variables from all countries were selected more evenly. The rest of the Ostromian categories are represented by two variables only. Related Ecosystems are only present in variables from Colombia, and only in the Argentinean case were Action situations (Interactions and Outcomes) present. Resource Systems variables from the Mexican and Argentinean cases and Resource Units variables from the Colombian and Argentinean case respectively were present. From a country perspective, Argentina is the case where a wider range of categories of variables is present (but it is also the case with larger number of variables). Mexico concentrates most of its variables under the Government Settings and Social, Economic and Political Settings.

² Structural analysis is referred here to a technique to systematically identify the relationship between variables in a system. This is one step of the Prospective Structural Analysis proposed by Godet (2000). This technique elicits stakeholder views on the influence and dependence of key variables in a system through pair wise comparisons, and was used in phase 2 of the COMET-LA project to describe the current situation of the socio-ecological systems (Delgado Serrano et al. 2014).

In sum, in Colombia and Mexico the morphological matrixes were constructed with a particular focus on social and institutional variables, while in Argentina there was a more wide spread of variables. This focus on the social and institutional aspects in the Mexican and Colombian cases is a legacy of previous phases of the COMET-LA project, where both in the socio-ecological characterization and structural analysis stakeholders placed more emphasis on social and institutional aspects, rather than nature and ecosystem's aspects.

5.2 Selection and definition of drivers

The selection of drivers of change followed the 'STEEP' template provided as part of the common methodological framework. STEEP is a generic foresight framework developed for environmental scanning purposes, as a minimal taxonomy of categories used in futures research, and it stands for Social, Technological, Environmental, Economic and Political. The STEEP framework has been used by the foresight community at least since the 1960's (Fowles, 1978) and was used by the Millennium Project (Millennium Project 2010) for the development of scenarios for Latin America. The selection of drivers followed a similar approach to the selection of internal variables explained above, i.e. it was done collaboratively between the researchers and the civic society organizations, based on the material previously collected in the project. Notably, key external variables that emerged in the structural analysis of year 2 of the project were selected according to their influence on the system. For those categories for which no external variable had been previously identified, the local research teams used the examples provided in the common methodological framework as guidance for the identification of appropriate drivers.

Table 2 shows the drivers used in each of the case studies, with definitions and details presented in Annex II. Some coincidences are found. Both Argentina and Colombia considered changes in population, but while in Argentina this was referred to the region's population, in Colombia it was referred to changes in the national Colombian population. In Mexico, eventual changes in the immigration rules in the United States (i.e. loosening or tightening) was selected as the primary social driver, consistently with their goal of reducing youth emigration. Both Argentina and Mexico considered technological change in the form of increased technological capacity (for weather forecasting and navigation in Argentina and for timber extraction in Mexico). The local research team in Colombia initially proposed changes in the speed of development of harbour infrastructure as the technological drivers, but this was further changed to more general 'mega-projects' by the community in the validation process (see section 5.4). All three cases used climatic changes as their environmental driver (this was to be expected since climate change is within the specific remit of the overall COMET-LA set up). Mexico and Colombia used changes in market prices of commodities (timber and gold) as their primary economic driver. Argentina considered the amount of new entries to the petrochemical industry in the harbour (i.e. number of new companies operating in the area) as well as the intensification of dredging in the Estuary (this is relevant to the extent that it allows the entry of heavier larger ships to the harbour). Political drivers are the most diverse across case studies. Changes to relevant legal frameworks in Argentina (through the further development of an environmental legal framework and changes in the legislation concerning commercial fishing) and in Mexico (changes in the national legislation on the

property rights systems) were considered. In Colombia, the driver was the focus (environmental versus development) of public policies. Mexico also considered changes in the political stability (as affected by drug production cartels and self-defence forces).

Table 2. Drivers of change used in each of the case studies.

	Social	Technological	Environmental	Economic	Political
Mexico	Tightening/loosening migration controls in the US	Technological change in timber harvesting machinery	Climate change	Changes in global market prices for timber products	Political stability and changes in the property right system
Colombia	Changes in the size of human population (national)	Infrastructure megaprojects*	Climate change	Changes in commodities markets	Changes in public policy (env. vs. develop)
Argentina	Changes in the size of human population (regional)	Weather Forecast and navigation technology	Climate change	New entries of companies in the harbour and intensification of dredging in Estuary	Changes in legislation of economic activities and development of environmental legislation

**Changed by the communities from the changes in the speed of development of the harbour proposed by the local research team.*

5.3 Elaboration of the morphological matrix

While the process for selecting the internal variables and the external drivers of changes was similar in all case studies, the way the morphological analysis was implemented differed in each case. Both in Mexico and Colombia the morphological matrix was elaborated beforehand by the local research teams and was validated with the communities in a workshop. In Argentina, the research teams only selected the variables and identified and defined the drivers beforehand, but developed the matrix jointly with the stakeholders in a workshop. The reason for this difference is that both in Mexico and Colombia there is a tradition of participatory research, and hence a risk of stakeholder fatigue, while in Argentina the opposite is the case: there is hardly any previous experience on stakeholder dialogue of this kind, so more discussions are needed to sustain the process, plus a desire to participate has awoken in stakeholders, so it made sense to make this phase as participatory as possible. Furthermore and again to prevent stakeholder fatigue, in Colombia the workshop included the discussion of elements of stage 2 (see section 6 of this report).

In Mexico the validation workshop took place with internal stakeholders, i.e. community members. In Argentina, due to the lack of a fully defined community boundary, different kinds of stakeholders were mixed together³. In Colombia participants were divided in three groups:

³It should be noted that this was not specific of the scenario building work but applies to the implementation of COMET-LA in Argentina generally. Also, in Argentina a broad range of stakeholders was engaged in the process but a key category is missing: representatives of the big petrochemical corporations operating in the harbour.

members of the two different communities considered in this case (Alto y Medio Dagua and Bajo Calima) formed two groups, and a third group formed by officials and representatives of private organizations (external stakeholders), who provided inputs in relation to the two catchments. Members of the two communities were brought together in one workshop only because a violent uprising occurred in the area in spring 2014 which made it advisable for the local research team not to enter the area, and rather have community members traveling to the regional capital Buenaventura, where they all met. In all cases, workshop participants included a mix of men and women, but no separate analysis of gender views was undertaken. It should be noted that due to leadership tensions in Bajo Calima (increased recently in connection with the violent uprising), a small group of newly emerging leaders (opposed to the current ones) did not engage in the process. Some implications of this are discussed further in this document.

Annex III includes the morphological matrices for each of the cases.

5.4 Validation of the morphological matrix by the communities

In Mexico and Colombia, all effects of the contrasting states of drivers upon internal variables previously described by the local research team were accepted and validated by the communities. In Colombia, clarification and details were added to the definition of the variables and some slight changes were made to the drivers. For example, the technological driver was understood more broadly than just harbour development, but referred to as 'mega-projects' (including several large infrastructures like road development and aqueduct construction). Also the variable *Deforestation* was relabelled to 'state of the forest' by the communities to dissociate it from any 'a priori negative connotations'.

In general, the process of validating (in the case of Mexico and Colombia) and creating (in Argentina) the morphological matrix was very time consuming. For example, in Mexico the workshop time did not allow to fully cover all possible combinations (researchers consider that roughly only 60% of the morphological space was discussed), and in Colombia, the local research team felt that the process became 'boring' and somewhat cumbersome. In spite of this, it was seen as a useful exercise. In Mexico, the systematic nature of the exercise was appreciated, since it facilitated the strategic reflexive process. In Colombia, the process allowed clarification and discussion over the 'behaviour' of the different variables, the 'experience of the stakeholders' was added to the understanding of the possible effects of the different states of the drivers into the system. It was useful for the local research team to confirm and elaborate the understanding of the system. Also, the differences between the two sites (Alto y Medio Dagua and Bajo Calima) became more apparent. The process for building up the matrix did not make community members change their vision of the system, but that workshop participants gained ownership of the idea of these external forces being actual drivers influencing the dynamics of the system. Interestingly, in Argentina the difficulty

and usefulness of the construction of the morphological matrix varied across two break-out groups, for no apparent reason⁴.

Figure 2. Validation of the morphological matrix with stakeholders in Colombia.



5.5 Community perspectives on Morphological Analysis

In Mexico in general, perspectives across different community members seemed to be quite homogeneous and no differentiated perspectives from different stakeholder groups were detected. However, researchers noted the dominant effect of community leaders' opinion in the rest of participants, which may partly explain this apparent homogeneity.

In Colombia, two different perspectives were generated, but that was just part of the setup of the workshop, which included representatives of the two communities (Alto y Medio Dagua and Bajo Calima) who discussed two different morphological matrices (one per site). An interesting outcome of the workshop was precisely that the difference between the two sites became more apparent. The group of external stakeholders (which was small) did not elaborate a different perspective, but their presence was judged to be useful, because they prompted the community members to discuss some of the issues in the context of public policies (which links with stage 3 of the methodology).

The most differentiated perspectives emerged in Argentina. Interestingly the most marked division between stakeholders was not that of occupation or of interest group, but of political ideologies, i.e. members with similar roles in the community (e.g. fishermen) did not necessary have shared views, but rather people of similar political ideology, regardless of their role in the community, had aligned views over the effects of the drivers based upon their similar norms. For example, all workshop participants coincided that the resource (fish) is

⁴ Incidentally, the two break-out groups differed in term of their socio-economic profile. The facilitator of the group with a higher socio-economic and education level considered that the group did not find the exercise difficult and that they found it useful, while the facilitator of the other group felt the participants found it difficult and less interesting.

declining, but one group was pessimistic about the effect that this decline would have in income, while the others simply said it was not possible to predict, and these two groups distinguished by their different political ideologies. Also some geographical differences were identified, between those living closer and depending on the Estuary and those living further away, in urban areas. The former had a more pessimistic future vision.

Finally, in Argentina, different views between stakeholders and the scientists themselves also became apparent. Drivers' states that had been considered to be 'negative' or 'positive' for the system by the local research team, were actually viewed differently by the workshop participants. For example, researchers had a-priori anticipated that a stable population was to be considered a 'positive' state for the driver population growth, while workshop participants considered it 'negative', a sign of slowed development. It should be noted, though, that the states were not presented to the workshop participants as good or bad, but the researchers noted these differences with respect to their own a-priori expectations. The discussion over the positive and negative nature of the states of the drivers is to be considered as an output of the process itself: stakeholders' realization that drivers about which they may not have thought about before can take positive or negative forms in the future.

5.6 New knowledge emerged from the discussions

In Mexico, stakeholders considered that modifications to the legal framework were not the only driver potentially threatening their current property rights system. The community considered that accepting external funds (for example from private firms) represents a real threat over property and resource management rights. It was viewed as the first step for privatization of land and losing territorial management rights (as has happened in other areas in Mexico).

Regarding migration patterns in Mexico, an interesting finding emerged. It was suggested that if migration diminishes, pressure over the resources would increase. Likewise, energy, services, infrastructure, housing and food demand would increase. Community members did not necessarily want migrants who have already left to come back, but for them to remain involved in community issues (and keep on sending remittances).

Regarding climate change, the discussion in Mexico anticipated the consideration of shocks (see section 7). It was acknowledged that temperature is increasing and rainfall patterns are changing, which has negative consequences for sanitation, and also increases the risk of forest fires. This was linked to the issue of emigration: as emigration grows the lack of people available to fight the fire increases the vulnerability of the community to these extreme events.

An interesting output in Argentina regards the relevance assigned to the increase of collective action. Changes in several drivers were considered to produce an increase in collective action (i.e. community participation in coordinated responses). Interestingly, contrasting states of the same driver were thought both to lead to an increase in collective action, but for different reasons. For example, an increase in the number of new companies in the harbour and expansion of the estuary dredging were considered to lead to an increase in collective action as a form of resistance to the harbour expansion. However, a decrease of the number of new

companies in the harbour was also seen as leading to an increase in collective action, not as a form of resistance, but as a form of control. This emphasis on collective action is attributed by the researchers to the recent development of environmental education and the increase in democratic participation during recent years. The investment in environmental education is increasing environmental awareness, at the same time as the (until recently authoritarian) governing system is starting to open up to more bottom-up participatory approaches. The effect of both elements together is increasing the importance of collective action to the population. The COMET-LA project has arrived at a moment of change and opening up in Argentina society that reinforces this process.

In Colombia, not much new knowledge emerged from the discussion, but the process was useful for the local research team to confirm and elaborate the understanding of the system. Also, as mentioned, the difference between the two sites (Alto y Medio Dagua and Bajo Calima) became more apparent (see section 7).

6 Final down-scaled Narratives of the Future

The aim of this stage was to use the validated morphological matrixes to derive a set of alternative scenarios described in the form of written narratives. For logistical reasons, the narratives were elaborated by the researchers and then validated by the communities in a workshop. In Mexico, this took place in a separate workshop, while in Colombia this was done as part of the same workshop as stage one, which took place over two days. In Argentina, the second workshop was postponed due to the escalation of the conflict emerged between artisanal fishermen (see Text Box 1). Because of this delay the workshop finally covered stages two and three. In Colombia, the elaboration of the narratives following up the morphological matrix was accompanied with the application of a complementary tool referred to by the local research team as 'cross-roads' (see Text box 2 for brief explanation on this tool).

6.1 **Elaboration of narratives of alternative futures**

The morphological space produced in stage one provides a wide spectrum of things that might happen in the future. The combination of all those possible states creates multiple potential futures, so the first step for the local research team was to select a combination of these variables states to use as the basis of future scenarios. This was done using (some of) the six archetypes suggested by Hunt et al. (2012). In Mexico, five different scenarios were finally created, while in Argentina and Colombia⁵ three narratives were developed. Table 3 includes the correlation between the different scenarios developed, as labelled by the local research teams, and the three world views and scenario archetypes from Hunt et al. (2012). In the case of Colombia, the reference to 'desirable' and 'undesirable' futures was advised against in the proposed methodology, but was used after all in the case study application because the alternative was found to be difficult. This creates a mixture between exploratory and normative approaches that is discussed in-depth in Deliverable 3.1 (Waylen et al., 2014a).

⁵ Three narratives per community, hence 6 narratives in total.

Annex IV includes a summary of the different narratives, translated from Spanish.

Table 3. Labels of the scenarios developed by the local research teams in relation world views and archetypes.

	Conventional worlds		Great Transitions		Barbarization	
	Market forces	Policy reform	New sustainability paradigm	Eco-communalism	Fortress-world	Breakdown
Mexico	Resources reallocation	Policy dominates	Sustainable socio-ecological system	Social entrepreneurialism		Chaotic world
Colombia	Stable future		Desirable future		Undesirable future	
Argentina	Conventional world		A new paradigm of sustainability	-	Barbarization	

The process of elaborating the narratives through the ‘navigation’ of the morphological spaces was not an easy task. More details on the methodological adjustments and learning are discussed in Deliverable 1.3 (Waylen et al., 2014a). Here, it is worth noticing that the navigation was less straightforward than the common methodological framework would suggest, and rather than being a linear (from top of the morphological space down), it is a more complex and multidirectional process. This made it somehow difficult for the researchers but, at the same time, it reflected the reality of the complexity of the multiple interactions between drivers and variables (i.e. two drivers acting over one same variable can have opposing effects).

6.2 Validation and discussion of the narratives with the communities

In Mexico and Argentina, the narratives were presented to the stakeholders with the use of visual support. In the case of Mexico, this included photographic compositions prepared in advanced by the local research team (see Figure 3 for some examples), and in Argentina large sticky notes with keywords. Additionally, in Argentina the process of constructing the narratives from the morphological matrix was shown to the workshop participants. They were given a copy of the matrix with coloured circles (different colours for each of the scenarios) encircling the drivers’ states making up for the storylines while three workshop participants read aloud the three narratives.

Colombia implemented a different process. As mentioned, the workshop took place over two days. On the first day, the groups discussed the matrix. On the second day, workshop participants came together to confirm the morphological analysis done on the previous day. Right after that discussion, the stakeholders constructed the narratives themselves, prompted by the researchers. They were first asked to draw the three possible futures. This was done in two break-out groups, each of them looking at one of the two sites (Alto y Medio Dagua and Bajo Calima). Workshop participants were asked to consider, while drawing, the morphological analysis previously done. The drawings were then used to elaborate an oral narrative for each of the scenarios, using a story telling technique. Figure 4 shows one of the drawings and caption of the story-telling (video recordings also exist).

Interestingly, in Mexico, the process of validation of the narratives resulted on the addition of an extra new scenario. Researchers had initially prepared four scenarios (‘Resources

reallocation', 'Policy dominates', 'Sustainable socio-ecological system' and 'Chaotic world'). When presented with these, workshop participants felt that 'there was something missing' and, collectively developed a new scenario: the *Social entrepreneurialism* scenario. The local research team only prepared four scenarios in advance. The fifth one, referred to as *Social entrepreneurialism* was created by the stakeholders in the validation workshop. Because this was not created by the researchers using the archetypes, the categorization into an *Eco-communalism* scenario in Table 3 has been done a posteriori. This was done on the basis of elements of 'sustainability with high equity, low economic growth with a bio-regional focus and small-scale technology' [...] 'a world with conservative values, regional/national governance, locally-based financial and other services, and small-scale intensive agriculture and manufacturing' [...], 'a world of local regional co-management; common property institutions; integrations of local rules regulating trade; local equity and cooperative', included in the *Eco-communalism* archetype by Hunt et al. (2012, pp.755). Regarding the other narratives, some adjustments were made, but these were generally accepted as plausible futures by participants. The team was slightly worried that participants would find it difficult to understand the narratives and to perceive differences across them, but that was not actually the case. Although they accepted that all scenarios were somewhat plausible, workshop participants considered that the *Market Forces* scenario *in full* was considered 'unreal' for their community, but they did recognize the plausibility of *some* elements of it. The *Chaotic world* was perceived as 'far away' and somewhat less plausible. The one perceived as more plausible, and also most desirable, was the *Sustainable socio-ecological system*⁶. It should be noted that this distinction between *degrees of plausibility* were not part of the methodology (the visions generated *should be* plausible). It is possible that plausibility was here confused with probability, or that participants were thinking at a shorter time frame than the twenty years proposed. Also the question on what scenario is more desirable was not planned in the methodology, which was designed to be exploratory. This relates to a mixture between normative and exploratory approaches that is discussed in depth in Deliverable 3.1 (Waylen et al., 2014a).

In Argentina, the process was also easily understood by the workshop participants, who could clearly see the differences between the three scenarios. However, the discussion of the narratives was very heavily influenced by the effects of the current conflict between the fishermen. Some additions were made to the morphological matrix and the narratives themselves were generally validated by workshop participants. However, they considered that the *Barbarization* scenario was actually happening in the present time. This is interpreted by the researchers as a direct consequence of the current conflict between the fishermen. They feel that the pressure has become so great as a consequence of the conflict that the current situation is associated with a 'barbarian' situation. We would interpret this as an illustration of how the current situation was interfering with the capacity of the community to think about the future. Something similar occurred when discussing the effects of shocks in the system (see section 7). From the other two scenarios, the *New sustainable paradigm* was partially perceived as 'utopic'.

⁶ The 'Social entrepreneurialism' scenario was also perceived as desirable, while all the others were not.

In Colombia, workshop participants showed great interest in the creation of the oral narratives, and the session was very vivid. The drawing exercise was also judged to be useful, because it allowed to express things that may have been difficult to emerge otherwise. Since the narratives were created by the communities in the workshops, there was no actual validation of the narratives. The *Stable* scenario was difficult for the communities to discuss. It was difficult for them to distinguish to what extent it does present a future vision, rather just than a description of the present situation, i.e. the notion of business as usual into the future was not easily perceived. This relates to the above mentioned problem of mixing a normative with an exploratory approach, which is discussed in detail in Deliverable 1.3 (Waylen et al., 2014a).

Figure 3. Example of photographic compositions accompanying narratives in Mexico.

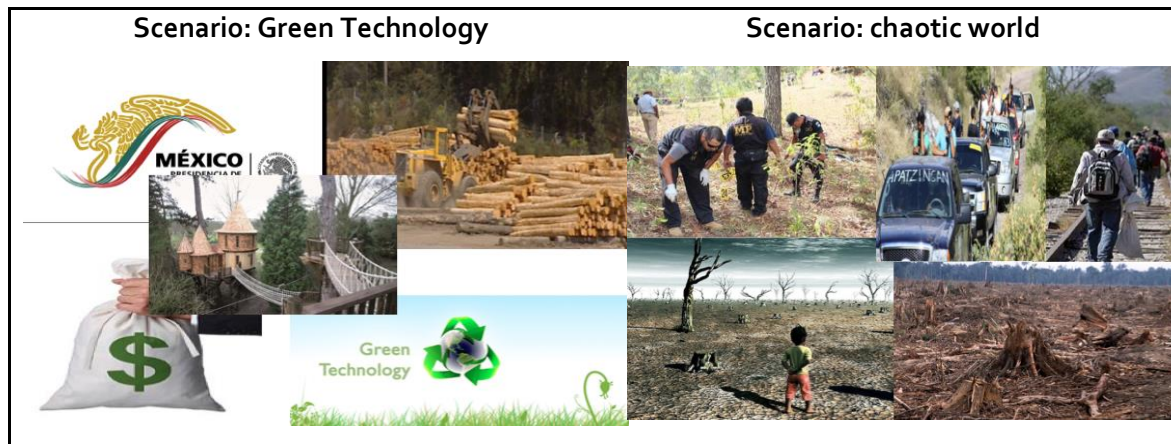


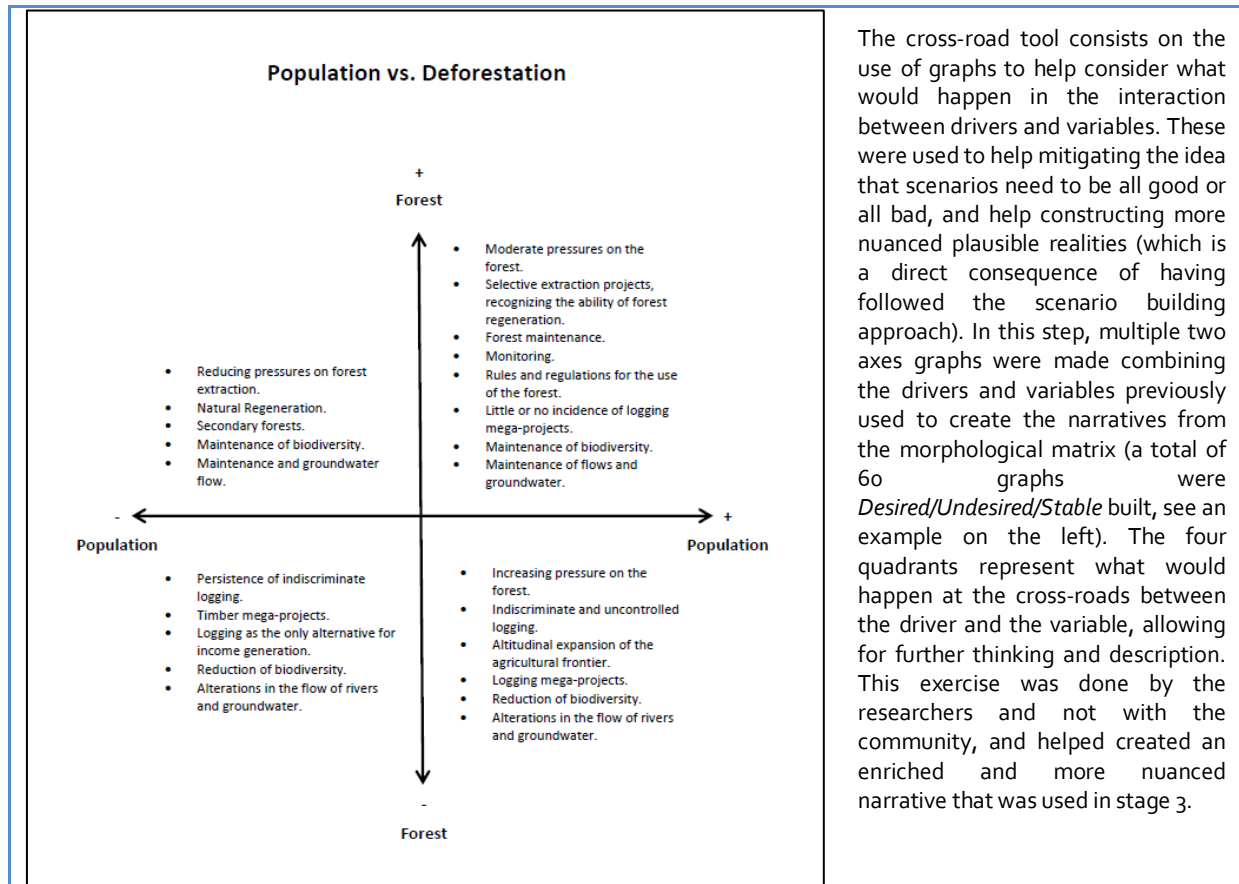
Figure 4. Drawing of one of the scenarios and story-telling in Colombia.



The use of the morphological analysis to construct the narratives varied slightly across the three case studies. In Argentina, the link between the two was maximum, since workshop participants could see how the narratives had been created from the morphological spaces by looking at the coloured circles around the driver's state while listening to the storylines read aloud. In Colombia, the matrix was discussed in the same day and workshop participants were asked to take into consideration that discussion while drawing their scenarios. In Mexico, the link was the least strong (from the perspective of the communities) since the morphological matrix and the presentations of the narratives took place in two separate workshops. Although workshop participants were reminded about the morphological analysis in the workshop about the narratives, not all participants attended both workshops. However, from the perspective of the research team, the Mexican case is the one which holds stronger links between the way the narratives were generated and the morphological space.

In Colombia, this exercise was complemented with an additional task carried out by the researchers. After the workshop, the researchers wrote up the narratives, based on the record of the workshop discussion, but also on the implementation of the cross-roads tool (see Text Box 2).

Text Box 2. Application of the cross-road tool in Colombia



The cross-road tool consists on the use of graphs to help consider what would happen in the interaction between drivers and variables. These were used to help mitigating the idea that scenarios need to be all good or all bad, and help constructing more nuanced plausible realities (which is a direct consequence of having followed the scenario building approach). In this step, multiple two axes graphs were made combining the drivers and variables previously used to create the narratives from the morphological matrix (a total of 60 graphs were *Desired/Undesired/Stable* built, see an example on the left). The four quadrants represent what would happen at the cross-roads between the driver and the variable, allowing for further thinking and description. This exercise was done by the researchers and not with the community, and helped created an enriched and more nuanced narrative that was used in stage 3.

6.3 Comparative summary of the scenario narratives according to archetypes

As mentioned, both Argentinean and Mexican cases used scenario archetypes as described by Hunt et al. (2012) to elaborate the future narratives, while in Colombia these were used as 'inspiring guidance'. In any case, because they were constructed with variables and drivers chosen specifically in each case study, it is worth discussing whether there are common themes or strong dissimilarities across the different scenarios. In general, it is worth noting that the COMET-LA scenarios are more inward looking that some of the references discussed by Hunt et al. (2012), i.e. with less allusions to other countries, world regions and global processes, but that effects of external forces on the community are critical part of the narratives in all cases.

Regarding the *Barbarization* world view, although this archetype has been so far less adopted in the literature (Hunt et al. 2012), it was fully developed in all three COMET-LA cases. Hunt et al. (2012) argue that this lesser adoption in the literature maybe caused because is the world we would least like to consider possible. It is true that, as mentioned before for the Mexican case, this scenario was seen as somewhat less plausible, but in Argentina it was perceived as 'very real' and to some extent 'already happening'. Of the two *Barbarization* world views, the *Chaotic World*, rather than the *Fortress World*, was the one adopted in the three cases. Even in Colombia, where the follow-up of the archetypes was least strong, the *Undesirable* scenario

can be assimilated more to the *Chaotic world* than to the *Fortress World*. Despite the differences, there common themes can be found. In all three cases, an increase in violence and conflict is foreseen, which in the case of Mexico and Colombia are armed conflicts. In Mexico and Colombia, there is an increase of external private actors over the socio-ecological system which derives in higher (unsustainable) exploitation of the resources. In all three cases, the loss of resources derives into a loss of livelihoods for the communities.

The scenarios under the *Conventional World* view are more diverse across the sites than in the case of the *Barbarization*. For example, in Mexico the intensification of the resource exploitation and privatization leads to an increase of private businesses and the weakening of the community, while in Argentina the number of business decreases at the same time that networks and associations within the community increase. In Colombia there is also an expectation of increased economic activity (notably ecotourism), but the effects in terms of community strength vary across the two sites (community practices are still threaten in Bajo Calima, where the armed conflict persists, but are somewhat strengthen in Alto y Medio Dagua). Interestingly, there is similarity in Mexico and Argentina in the consideration that tighter control from the central government would help mitigate negative environmental impacts on the socio-ecological system and produce better management of the resources (in the Mexican case this is conditional to the alignment of community interest with federal government interests).

An obvious common theme across the three case studies under the *Great Transitions* world view is the increased environmental sustainability and the strengthening of the community. In Mexico this is very much related to increased collective and individual welfare and better distribution of income. In the *Social entrepreneurship* scenario this relates to the promotion of small private business, which reminds to the promotion of eco-tourism businesses developed by the communities present in Colombian's *Desired* scenario. In a way, this *Desired* scenario includes elements of the *Eco-communalism* world view, such as the fact that food would come from subsistence farming and local animals and the water supply is independent of the city (i.e. self-reliance). In all three cases, sustainable resources exploitation and diversification of economic activities is present. Distinct of Colombia is the decrease or disappearance of the armed conflict.

6.4 Different perspectives on the narratives from different groups

In Mexico, certain subtle differences between members of the community were identified. The local research team associates these differences with the different roles, responsibilities and experiences of the workshop participants. In the community there is a system by which all members⁷ of the community take turns to be part of the governing bodies. Those who had already been part of the community's authorities showed a more 'pragmatic' view, less 'dreamy'. They also seemed more aware of potential difficulties. Members of the community

⁷In theory, women are also allowed to take management responsibilities within the community, but it does not happen in practice.

who have not yet had managerial responsibilities presented themselves a bit more 'idealistic' and more defensive over the current community-based management system.

In Colombia, as occurred in stage 2 since it took part in the same set of workshops, two different perspectives were generated, one for each of the two communities (Alto y Medio Dagua and Bajo Calima) who discussed two sets of three narratives (three per site). An interesting outcome of the workshop was precisely that the difference between the two sites became more apparent. The visions for the future are not extremely different but stakeholders perceive that the goals are now more nuanced and that the routes to get to these goals are different across the two sites (see section 7). Moreover, in Bajo Calima new leaders are emerging with diverging views.

The potentially different views in Argentina were also heavily influenced by a conflict between fishermen (see Text Box 1). The fishermen who had signed the agreement with the Mar del Plata boat did not attend this workshop, because the tension with the others was so high (they were invited but they declined the invitation to, literally, prevent physical confrontation). This meant that the workshop attendees were mostly aligned (against the absentees). However, some of the divergences between the fishermen and those with conservation interests in the areas that had emerged in previous workshops were brought in to the discussion over the future visions.

In general, there was a feeling that the exercise had helped to reach consensus. In Mexico, despite the above mentioned differences, community members agreed about the future vision that they prefer for their community (primarily the *Sustainable socio-ecological system* scenario, but also the *Eco-communalism* one). In Colombia it was felt that the drawing exercise allowed consensus building since it allowed for some collective reflection that in some occasions brought divergent views together. It was agreed that the process 'gives the time' for people to discuss and reach consensus. In Argentina, the consensus between the most divergent views was not possible because of the absence of some stakeholders, but it was felt that the process helped with the above mentioned divergences between fishermen and conservationists. Differences remained, but workshop participants agreed that they needed to come to a solution together. Actually, the most relevant output of this part of the process was, rather than the actual discussion over the future (which, as said, was hampered by the pressure exerted by the current conflict), the consensus of the community over the need to keep on working together for a collective solution of problems. Moreover, a new space for dialogue and agreement has been created.

6.5 New knowledge emerged from the discussions

In general it was felt that this particular stage of the methodology did not generate much new knowledge, but it contributed to increase awareness over the need to look into the future. In Mexico, for example, the community became aware that their current governance system, which they keenly want to maintain, has problems and it is not able to address future challenges. The community became aware of the need to change things today, to be able to keep their system in the future. For example, subsidies from the government and remittance from emigrants are key source of income for the community, but emigrants also exert pressure over the collective choice rules process, and community members fear that they might promote individualistic ideas over communal ideas. They found out that this is the consequence of the fact that the socio-ecological system is not creating individual benefits, putting at risks community-based management. They also became aware of the need to look at the system in a broad way (in its complexity, i.e. system thinking). In words of a member of the Mexican team: 'the community had the scenes, now they are seeing the movie'. This was an output of this particular exercise, i.e. of the creation of the narratives. Community members came to the realization that there is not a predestined future and that each of the scenarios discussed contained elements that are relevant and that they would like to take forward for discussion. Moreover, and anticipating stage 3, the discussion about the future scenarios made community members agree on the need to develop their *own* development plan (versus existing created by others outside the community, i.e. top-down).

In Argentina, for the reasons explained above, this particular stage of the process did not throw much light on the future, but helped to highlight the severity of the current conflict (e.g. the association of the current situation with a scenario of *Barbarization*). An exception, though, were the discussions about the future role that social media can have in the organization of collective action in the future. Workshop participants considered that social media is a powerful driver that can play a particularly relevant role under a scenario of *New environmental sustainability*. Another interesting result was the recognition by the community members of the need to liaise with scientists. Particularly the fishermen found that liaising with the research team could be a communication channel for their problems to be heard and acted upon by the government. In Colombia, it was felt that the process enabled the discussion of key elements of the future vision and allowed for an update of the knowledge and information on the territory.

7 Robust Response Options and Strategies

The aim of this stage was to focus on action: what communities can do that may help them to address problems and achieve their goals in the context of future change?. This stage uses the outputs of stage 2 to help the communities identify useful responses.

7.1 Identification of possible response options for future changes

This first step aims to capture ideas about actions or response options that can help to meet future goals, and that are subsequently evaluated for robustness. The exercise began by reviewing the future scenarios produced in stage 2 and by reminding the community of their goal for managing the system in the face of these changes (see section 4). Members of the community were asked, in a workshop, to brainstorm about any possible actions or responses that they believed might help to tackle problems and achieve goals. The common methodological framework proposed to use the 7Ps (policies, programmes, plans, procedures, processes, products and people, (Low Choy et al., 2012)) to ensure a wide spread in the type of response options considered. Workshop facilitators were instructed not to automatically discard unusual ideas, to allow for *blue sky* thinking. Also, workshop participants were encouraged to first focus on local-level actions to make sure they reflected on actions that the community itself could carry out. The possibility of also discussing actions that others (e.g. national governments) should or could take was left open to case study partners. Response options could also relate to amendments or further development of existing programmes or plans.

The implementation of this stage varied across the three case studies in several aspects. Firstly, in relation to the involvement of stakeholders external to the community. As mentioned, in Argentina the discussion on response options took place on the same workshop in which the scenarios narratives were generated and, similarly to other phases of the COMET-LA project, it did not include any separation between internal (community) and external stakeholders (representatives of organizations outside the community). Workshop participants were, though, prompted to first suggest actions that they could carry out, and subsequently, they were asked to think of actions that the national government could undertake. In Colombia, the workshop on response options was initially conceived both for internal and external stakeholders, but only one external stakeholder attended (this was a representative of the Environmental Technical Agency of Buenaventura). The lack of attendance by external stakeholders was interpreted by the local research team as a lack of interest and familiarity with the idea of scenario planning, further hampered by the recent increase of violence in the city of Buenaventura, which has captured the attention of public authorities. To overcome this limitation in-depth interviews with external stakeholders was carried out by the co-investigadores after the workshop with community members⁸. Finally, in Mexico, during stage 2, the research team decided that it would be beneficial to the process to include external stakeholders in the scenario process (until this point the scenario building methodology had focused on the participation of the community only). That is why stage 3 was implemented in two workshops, one with external stakeholders, held in Oaxaca, and one for the community, which took place in Santiago de Comaltepec. External stakeholders included a representative of the University of Sierra Juarez, one representative of the NGO Servicios Ambientales de Oaxaca, the National Forestry Commission and the local forest company. Several representatives of these organizations have direct links with the

⁸ Three district level officials in the region of Buenaventura and one of a representative of WWF were interviewed.

community (e.g. some of them were born in the area or have family there). Two representatives of the community attended the workshop of external stakeholders.

The development of the task during workshops also varied slightly across the three case studies. Colombia and Argentina both began the sessions with a general brainstorm of actions and interventions which could be useful to achieving the goal, i.e. without reflecting on whether they would be appropriate to the scenarios as defined by the narratives. In Mexico, the approach differed slightly in that the response options were explicitly linked to the scenarios from the beginning. Stakeholders were asked to discuss: i) if the desired scenarios⁹ were to happen, what actions and interventions would help maintain that situation and ii) how could the undesired scenarios be reversed. External stakeholders were introduced to the idea of scenario planning and shown the five future narratives that had been created in stage 2 by the community and were asked to suggest response options that their organizations could carry out to help achieving the goal set up by the community under the different scenarios. Internal stakeholders were asked to reflect on strategies that could be carried out within the community. Visual support in the form of photo-montages representing the 5 scenarios was used also during this task.

The 7Ps were conceived in the methodological framework as facilitation tools and the research teams applied them differently. In Colombia, they were merely used for 'inspiration' for the research team, and the different types of response options was more strongly guided by the previous scenario planning process that had occurred in the case study areas. These included the following categories of interventions (used as examples provided by the facilitators in the workshops): a) strengthening and evolution of the internal organization of the community; b) use and management of the territory: declaration of protected areas; c) Outreach and consultation between the Community Councils and external organizations; d) an approach to natural resources management concerted between the communities (via the community councils) and the relevant national organizations (similar to a co-management approach). Community members from Alto y Medio Dagua focused on these four examples as clustering categories of response options, while those of Bajo Calima used slightly different categories. These different categories were: establishment of their own educational programme and 'ethno-education'¹⁰, improved forest management, increase the influence on public policies affecting their territory, and promoting a productive land management¹¹. In Mexico the 7Ps were used as prompts by the facilitation team. This means that the labels of the categories themselves were not communicated to workshop participants, but used by the facilitators to ensure a wide range of different types of response options were discussed.

⁹ From Table 3, the desired scenarios correspond to *Sustainable socio-ecological system* and *Social entrepreneurialism*. All the other scenarios were considered not desirable by the community.

¹⁰ This means to develop an educational programme for children and young people to learn about the issues and problems of specific importance to the community, plus traditional knowledge and culture (e.g. local medicinal plants). The distinction of education as a separate category of response options (rather than its inclusion as part of the strengthening of the internal organization category as occurred in Alto y Medio Dagua) was due to one very influential workshop participant, who was a teacher and that insisted on the importance of education.

¹¹ Some land is currently being abandoned and not put into productive use because there are 'easier' ways to generate income, e.g. drug smuggling and reliance on subsidies.

Finally, in Argentina, workshop participants were explicitly asked to cluster response options in the 7Ps categories. This proved to be a distraction and it is advised against in future applications of the methodology. A significant part of the discussion ended up focusing on whether the different measures should be considered within one or another category or P, stealing precious time from further discussing each of the individual measures.

7.2 Summary of response options

Annex V presents the set of response options emerged in the workshops for each of the case studies. In Mexico, most response actions proposed by external stakeholders were quite generic, and revolve around the idea of increasing and strengthening the relation between external organizations and the communities. Almost all representatives of the organizations present in the discussion felt they could contribute to achieve the community's goal by developing training courses, contribution to capacity building and human capital formation and providing advice to community members. This is a positive outcome of this part of COMET-LA's project: the strengthening of the relationships between these organizations and the community as result of this process. Internal stakeholders came up with a wide range of options, and were able to suggest between from nine to eleven response options per scenario. These included some generic responses, like improvements in income distribution within the community and diversification of income sources, to more concrete actions like the development of a reforestation programme or the establishment of a performance monitoring program for forest companies. There was a general consensus that the community's culture of collectivism should be promoted through the basic education system and that there is a need for increasing the community's human capital. Stakeholders suggested that individual or family agricultural activities could be supported with communal funds.

The list of potential measures that the Argentinean stakeholders came up with was also quite broad (e.g. social protests, capacity building programmes, education, etc.); although a few more concrete were also suggested (e.g. promotion of a coastal management plan). Government level actions were generally somewhat more concrete (e.g. elaboration of a law regulating artisanal fishing, construction of a road between two specific cities, etc.). In general, it was found that it was difficult to disentangle different response options from each other, perhaps because some plans are multi-level and because the response options identified by the stakeholders were indeed generally quite broad.

In Colombia, workshop participants focused mostly on response options that can be carried out by the community. This is probably partly the effect of the facilitation but also a cultural effect, since these communities in particular are used to think and reflect in terms of what they can do, which is a distinct characteristic of the Colombian case. This is a consequence of the social movement in the 70s by which the black communities gained control over their territory and this infused on them a way of thinking in terms of 'what can we do?' rather than 'blaming others or expecting others to solve their problems'. Several of the response options within the categories are quite similar across the two Colombian communities, but they are categorized differently (e.g. *Outreach and consultation between the Community Councils and external organizations* in Alto y Medio Dagua shares some elements with *Increase impact on*

sustainable public policies in Bajo Calima). In relation to the category *Strengthening the internal organization of the community* in Alto y Medio Dagua, workshop participants mentioned the transfer of knowledge and leadership skills to younger generations. The traditional oral transmission of community rules was seen as a problem and they proposed to reconstruct, in writing, the history of the community and its rules to be passed on to the future generations. In Bajo Calima, the strengthening of the internal organization of the community included issues such as the reinforcement of the role of the Junta Directiva (the governing body of the Consejo) as an authority figure in relation to the negotiation with external organizations. Apparently, most of these negotiations currently take place between the legal representatives and the 'voice' of the rest of the Junta is not always heard. For more examples of concrete response options, consult Annex V.

In sum, in the three case studies:

- Generally, the communities could identify response options to be taken by the community and also by organizations outside the communities.
- A certain level of concreteness in the response options was possible and generally no wacky or crazy ideas were suggested.
- Response options common across the three cases included:
 - The importance given to education, and specifically education on local knowledge; and communities' own governance system;
 - capacity building;
 - strengthening the sense and means of community;
 - and strengthening links between the community and external organizations

7.3 Analysis of the robustness of response options

In this project, robust options are those that may be relatively useful regardless of what the future holds. Community members were asked to reflect on whether the response options identified would be useful (to achieve the goal) under the different future scenarios elaborated in stage 2. Robust strategies, i.e. combination of measures, were also searched for.

Again, slight variations in the way this task was implemented occurred across the case studies. In both Argentina and Mexico, the analysis of the robustness of the response options was done in a systematic way, i.e. asking workshop participants to consider each of the measures one by one and to reflect on whether they would be relevant in each of the scenarios. In Argentina, the process was also systematic but repeated in two sessions (in the same workshop where scenario narratives were elaborated, and in the last workshop, before discussing implications). This was done because the local research team considered that, due to the difficulties of focusing on the future in stage 3, the first round of discussions had not been deep enough. In the first round, when considered relevant for a particular scenario, the measures were marked using the colour coding employed in stage 2 to differentiate the different scenarios. In the second round, the matrix of *smiley faces* suggested in the

methodology was used¹², as it was also used in Colombia. The Colombians were the only ones to use the smiley faces in a quantitative way. This is: workshop participants were provided with red sticky dots and were asked to vote for the most appropriate measure for each of the scenarios. Votes were counted and the measures raising higher scores were represented by two smiley faces, the measures that received some votes but not all, were identified with one smiley face, the number of smiley faces working as a sort of indicator of *magnitude of usefulness*. The measures that did not receive any votes, were marked with a ? and considered not useful at this stage. However, this does not mean that workshop participants ruled out these options completely and acknowledged that they might become relevant if circumstances changed (for example, as a result of the implementation of other responses options identified as useful).

In Mexico the analysis of robustness was undertaken after the workshops by the research team only (using the matrix of *smiley faces*). This was possible because the response options had been elicited scenario by scenario, and it was possible for researchers to identify which response option had been mentioned for more than one or all of the scenarios. This was further validated with external stakeholders in a subsequent workshop but not with the internal stakeholders (see Section 8).

Figure 5. Analysis of robustness of responses options using the matrix of smiley faces in Argentina.



Annex VI presents the results of the analysis of robustness of response options for the three cases. In Mexico, three individual response options were identified as robust (i.e. useful under

¹² This consists on a matrix in which the response options are matched against the different scenarios. When a response option is considered to be relevant to a particular scenario, this is signalled with a *smiley face*: ☺. See WAYLEN, K. A., MARTIN ORTEGA, J., BLACKSTOCK, K. L. & BROWN, I. 2014b. The COMET-LA scenario-planning methodology. Aberdeen, Scotland: The James Hutton Institute. for more details.

all scenarios) both by the internal and external stakeholders: training and advice, strengthening of links between the community and the local organizations, and review and improvement of the development and forest management plans. There were also other responses that were identified as robust by the two different groups: strengthening customary practices and collective memory were thought to be the 'backbone' of the system in 'any situation' by the community, while the formation of human capital was seen as useful for all scenarios by the external stakeholders. The team also reflected on robust strategies (i.e. combination of measures). For example, a robust strategy would be based on the 1) Creation of local financial organizations; 2) New sustainable investment projects based on individual and collective schemes; 3) Economic activities diversification and modernization; and 4) Strengthening of customary practices and collective memory.

In Colombia, the use of the matrix of *smiley faces* was initially found difficult. However, at the end, it proved to be a useful tool for systematically considering all measures and scenarios. According to the local team, it allowed the 'grounding' of the response options (e.g. by making them more concrete) and it stimulated in-depth discussions. In both community councils the response identified as most robust was the strengthening of the internal organization. This is the starting point of all the other response options. In the case of Bajo Calima, the development of the community's own education and ethno-education was also considered to be a robust response option under all scenarios. Education was also found to be a robust response option in Alto y Medio Dagua, in which case, the emphasis was in the formal education of the community leaders. The other response options were considered to be appropriate for the *Desirable* and *Stable* scenarios¹³, but not for the *Undesirable* scenario, where minimum requirements for implementing those measures were judged not to be present.

In Argentina, the process of identifying robust response options seemed somewhat more difficult and confusing. In the first round of discussions (during the second workshop), stakeholders initially concluded that, to some extent, all measures were relevant to all scenarios, and hence, robust. This might have been influenced by the fact that response options were quite generic, and therefore somewhat valid across the board. In general, there was consensus that 'social protest' is a key response option to address problems. Social protest in this context is related to promote collective action (e.g. to sign popular petitions). Dissemination, communication through media and organization through NGOs were also seen as useful response options for the future in general. In the second round of discussions (during the third and last workshop), robustness was revisited. In this workshop, the previously created scenarios (now illustrated with photographic support), were presented again to participants, which suggested one scenario was a fairly desirable and ideal state of affairs, another was bad, and a further was business-as-usual (again mixing an exploratory approach with a normative one). It is also possible that some of the detail previously agreed as part of the scenario narrative was not remembered by all participants. As a result, because

¹³ An exception is the strengthening of the links of the community with external organizations in Alto y Medio Dagua for the *Stable* scenario, due to the current leadership problems that the community is experimenting, plus the lack of current intervention of the external organizations in the community.

one scenario became seen as ideal, it was considered that many response options would be irrelevant to it (or would anyhow already being carried out within the scenario), since nothing needed to change. Since only response options seen as relevant in all scenarios could be scored as robust, this resulted in several response options being discarded (e.g. 'social protest' was no longer seen as necessary in the *New paradigm of sustainability scenario* because if 'the scenario was already sustainable there will be no need for social protest') while others were adjusted (e.g. 'development of a natural resources management plan' was adjusted to 'maintenance of a natural resources management plan' in *New paradigm of sustainability scenario*, assuming that the plan would have already been developed under that scenario). In summary, the *outputs* of the analysis of robustness in Argentina must be interpreted with care. The challenges of discussing response options were exacerbated by the aforementioned difficulties in getting stakeholders to think about the future (aggravated by the fishermen's conflict). Handling this conflict would be difficult for any facilitators. However, it is fair to say that the actual *process* of discussing robustness proved to be particularly valuable in terms of stimulating a collective reflexion about future and the need to adopt response options.

7.4 Response options' resistance to shocks

This task extended the idea of checking the robustness of different response options by introducing the idea of shocks. Shocks are defined here as unlikely but very influential events that can radically disrupt the systems. They are usually negative, but they can be positive. The purpose of this exercise was to check how well (or not) the measures identified as robust in the previous phase would resist certain shocks. In all three cases, the initial idea was to use two shocks: (1) a natural disaster and (2) a human-made event (see Table 4); but the study of the effects of shocks took different paths in each case.

Table 4. Summary of shocks used in the three case studies.

Country	Shock of natural origin		Shock of anthropogenic origin	
Mexico	Massive forest fire*		Massive forest fire*	
Colombia	Tsunami involving massive floods	Vertiginous increase of tropical diseases	Derogation of Law 70/1993	Civil war
Argentina	Tropical storm		Explosion of big gasification vessel in the harbour	Massive decrease in corruption levels**

**This was associated with both a long period of drought as well as anthropogenic origin.*

***this was presented as a positive shock.*

In Mexico, workshop participants were asked to imagine a massive forest fire affecting between 5,000 to 10,000 hectares of the forest under productive use. The community had faced a forest fire affecting more than 2,000 hectares two decades ago and considered the shock as a plausible event. Internal stakeholders considered that some of the response options previously identified would be relevant also in case the shock occurred (e.g. capacity building and formation of human capital), but suggested other measures that should be implemented, like: improvement of forest infrastructure e.g. a firewall system. External stakeholders also suggested a number of additional measures that could be implemented in

preparation for the shock. These included ecosystem restoration processes and implementation of long-term monitoring. In sum, in Mexico, the discussion about the forest fires did not modify the measures suggested previously as robust, but served to add a number of others that could help reducing vulnerability in the event of the shock.

In Argentina, the discussion of the shocks suffered from the same problem than the discussion of the scenarios narratives and the effects of the fishing conflict in participants' state of mind. Workshop participants did not engage in the discussion, the fishermen arguing that they are currently 'living a shock' (similarly to what they had said about the *Barbarization* scenario: that they are currently living in a 'barbarian' situation). Stakeholders did not discard any of the measures in the event of the three shocks and agreed that the measures regarding legislation would be even more necessary, but it was not possible for workshop facilitators to further develop the discussion on how the measures would be affected by the shocks¹⁴.

Differently to the other two cases, the matrix of robust measures (matrix of *smiley faces*) was used in Colombia to discuss the shocks. This allowed a much more structured and systematic discussion of the response options face to these shocks. Workshop participants reflected on the incidence of the shocks in each of the response options and on their viability. They also suggested ways in which the response options could be modified or adjusted to address the shocks. For example, they considered that in preparation for an eventual civil war, the community should have collected information about where people live, so they could know who had been killed, who was still alive and where could they go¹⁵. The team considered this part of the methodology as greatly enriching, as it helped grounding the visions about the future and how it might change. Interestingly, in general the communities had so far showed a tendency to only focus on the things that they could do themselves, but the discussion about the shocks allowed them to also start discussing what could be done or would have to be done from outside. For example, the pandemic would be something for which the government would have to intervene.

7.5 Different perspectives on response options from different groups

Since external stakeholders were engaged in Mexico in the later stages of the scenario planning work, it was possible to observe interesting differences in the views of external stakeholders in relation to those of the community members regarding the response options. In general, external stakeholders seem to favour response options that could be seen as 'individualistic' or promoting individual benefits (e.g. payments for *cargos*) and introducing principles which do not currently have a strong presence in the community, such as accountability of efficiency and productivity. Internal stakeholders clearly show resistance to change and they advocate for strengthening collectivism, for example, they suggested that

¹⁴ It should not be ruled out that by this time in the workshop, fatigue might have played a role. Also, people living closer to the harbour, and who would have been most affected by the explosion of the gasification vessel were among those who did not attend the workshop due to the fishing conflict, which may have also played a role in the lack of engagement in relation to that specific shock.

¹⁵ This was an addition made to the *Strengthening the internal organization of the community* response option.

the remittances of all migrants to be placed in a joint bank account for the use of the community. Having generated two matrixes of *smiley faces* one per each of the stakeholder groups, the research team was able to easily identify similarities regarding perceptions about robustness. Response options that were identified by both internal and external stakeholders as robust are: training and advice, strengthening the links between the community and the organizations, and reviewing and improving the development and forest management plans. The research team felt that this exercise has helped with strengthening the communication channels between the community and the external stakeholders.

As in stage 2, the potentially different views in Argentina were also heavily influenced by the fishermen conflict. Some participants to the previous workshop did not attend the workshops on response options because the tension with the other fishermen was so high. This meant that the workshop attendees were mostly aligned (against the absentees, i.e. the fishermen who had signed the agreement with the Mar del Plata boats). However, some of the divergences between the fishermen and those with conservation interests in the areas that had emerged in previous workshops were brought into this discussion (in brief, fishermen would like to increase access to the sea through the beach, but this puts at risk the sites of paleontological interest that scientists, park rangers and conservation groups want to protect).

The discussion on response options, their robustness and the effects of shocks in Colombia is considered by the local research team to have helped consensus building and cross-fertilizing of ideas. Some of the ideas that one of the groups (from one of the communities) had not considered, were brought up to the plenary by the other group from the other community. Because of the way the interviews were set up, the views of external stakeholders were used to explore their perceptions in relation to what had been previously discussed by the communities. In general, there seems to be a consensus among external and internal stakeholders on the need to: i) strengthen the active participation of the communities in public institutions and policies; ii) promote and support local capacity building; iii) promote social cohesion between rural and urban areas; iv) generate new opportunities to overcome problems related to violence and the armed conflict (for example, in the form of job opportunities).

7.6 New knowledge that emerged from the discussions

This part of the methodology did shed new light on the Colombian case. On the one hand, it helped grounding the future visions, and made them appear more plausible to the community, helping develop a more realistic and pragmatic vision about the future and how to deal with it. During the discussion of the response options and their robustness, community members became aware of the need to revisit the existing plans, since things have changed since the previous scenario process, recognizing the need for planning to be a dynamic process. In that sense, no radically new solutions were identified as part of COMET-LA's scenario work, but those previously identified were tweaked, adapted to new settings and developed in further depth and level of concreteness. The exercise certainly helped the local research team to learn certain key aspects of the communities, which can help with the analysis of the governance systems. Two issues emerged strongly in this respect. Firstly, the research team discovered that the community had already thought about the possibility of

the law 70/1993, that gives the community the ownership and the control of the land, being repealed (one of the shocks introduced by the research team). Community leaders were trying to communicate the idea that, even if the law is repealed and they lose the control of the land, they should 'stick together' and remain a community. The strengthening of the internal organization of the community came across, once again, as the most robust response option when shocks occur. This discussion also reinforced the idea that this measure is a necessary requirement for the other response options, i.e. a pre-condition for the others. The rest of the response options were seen as 'debilitated' by the shocks and the strengthening of the internal organization was seen as the option which could help maintain the other measures. Secondly, the discussion on robustness of response options and shocks, made more apparent the differences between the two territories, particularly in relation to how do they perceive their governance system. Bajo Calima is a larger and more occupies a larger territory, which poses difficulties for the leaders, who have to attend to very different needs and views (for example, of those living closer and being more affected by the road, and those living further apart and depending primarily on the river). This also affects the way the communities perceive the role of their leaders in Bajo Calima and the dissemination of information and knowledge across the community. In this respect, the community council in Alto y Medio Dagua is stronger and generally perceived as defending the interest of the community, whilst in Bajo Calima a potential split in leadership may be emerging, with two subgroups reflecting different views about the best way to develop the community (e.g. whether or not to promote an expansion of the harbour). During the scenario planning process some of the differences in views were not immediately obvious, because one subgroup was less well represented, but eventually became apparent. This is reflected in the scenarios developed: the stable or business as usual scenario in Bajo Calima was closer to the *Undesired* scenario while in Alto y Medio Dagua was closer to the *Desired* scenario.

The analysis of robustness of response options in Mexico revealed two important facts. On the one hand, a notion that a sequential process was needed for the development of the community: i.e. in order to diversify economic activities, new investments must be done, and for these new investments to be done, a financial organization must be acting as a cheap credit supplier. Secondly, the realization that development cannot be achieved without considering the customary practices and the strengthening of collective memory. However, probably the most interesting output of this phase of the project in Mexico that community members, somewhat anticipating stage 4, decided on the need to produce their own community development plan. Currently, there exist a *Municipal Development Plan* (from 2010) and *Forest Management Plan* (from 2004, to be re-visited in 2014), but none of these plans have been made by or with the community. This is further discussed in stage 4.

In Argentina, and similarly that reported for stage 2 (which took place in the same workshop that the discussion on response options), the process did not shed much light in relation to the future, although relevant pieces of information did come to light. For examples, that new legislation is currently being prepared: a law to regulate the artisanal fishing and a regulatory framework for the close seasons. The most remarkable result of this stage though, relate to the fact that it helped highlighting the severity of the current fishing conflict and that it

stimulated a collective realization that 'we need to do something'. This is also further discussed next in section 8.

8 Operationalising Robust Response Options

The aim of this stage was to confirm the list of robust response options, and reflect on what would need to be done for operationalizing them and developing future strategies that will support local communities in adaptive management of their systems. This phase also contemplated discussing the response options that emerged from the scenario planning process in the context of existing plans and programmes. In all three cases, workshop participants were asked systematically for each of the response options to respond to the three questions below, but the depth and the extent of these discussions varied significantly across case studies:

- What would need to be done (specifically) to implement this response option?
- Who would need to do (what)?
- How would this need to be done?

Unfortunately, in Mexico stage four was not implemented with community members, but only with external stakeholders. This was the result of the confluence of several factors. First, the workshop coincided with a football match involving the Mexican team in the World Cup, which imposed a restricted schedule for the workshop (from 8am to 10am, right before the start of the match)¹⁶. The second factor related to the fact that new members of the community attended this last workshop, so the facilitating team had to dedicate a significant amount of time to bring the new attendees up to date with the previous phases of the process and the presentation of the scenarios and response options. Finally, the local research team has secured additional funds to carry on the project beyond the end of COMET-LA, so that the discussion of the implications of the response options can be carried out in depth as part of a longer process. This obviously effects the write up of COMET-LA's deliverables, but it was more important to set priorities according to the interests of the community (e.g. to have more time to discuss the response options in more depth) than to the project's formalities. As a consequence, the last workshop with representatives of the communities became an information session in which the results of the scenario process were presented and the commitment to further discuss the implications of response options was made. Attendees were given the chance to give their impressions on the project. However, sometime after the workshop, a number of interviews were carried out by the team to community members (9 men and 2 women), which allowed gathering some views on the implications of response options from the community. In the workshop with external stakeholders, from the 11

¹⁶ It was not possible to prevent such a situation because the workshop, which had to take place on a Sunday, had to coincide with the visit of COMET-LA's international research team to Santiago de Comaltepec (this was part of the agreement made with the community when they agreed to take part of the project) and it would have been impossible to predict the dates of the matches of each of three countries and the visit of the international research team to the three countries.

response options that had been identified as robust, only 6 were discussed for their implications, due to time constraints. These were the same that were then used to discuss with internal stakeholders in the follow-up interviews.

Stage four in Colombia was implemented first in a workshop with the community, followed up by a workshop involving external stakeholders. The workshop with the internal stakeholders involved representatives of both communities, Alto y Medio Dagua and Bajo Calima, including men and women. The design of the workshop allowed for a very systematic in-depth collective reflection on the implications of the response options, plus a discussion on how they fit with the outcomes of the previous scenario planning processes that have taken place in the region. This was preceded by the re-validation of the response options, and discussion to ensure that all workshop participants (organized in two break-out groups, one per community council) understood and agreed on the meaning of each of the response options. In Colombia, workshop participants were interrogated about when the relevant actors would have to take action; how would the response option affect the community councils and the territory; what is the relationship of each of the response options with the rest of options and which one should be implemented first. Collective responses were recorded in the form of a matrix. Despite the difficulties in involving external stakeholders in previous activities of the project and notably in the scenario work, stage 4's workshop with external stakeholders in Colombia was a success in terms of attendance. Representatives of a number of organizations including the environmental agency, the Ministry of Environment, different environmental NGOs, the Humboldt research institute and several capacity building and training organizations, attended half a day session. A comprehensive presentation of the COMET-LA project and its outputs so far was made. The scenario work was explained and the external stakeholders were invited to read the scenario narratives in a poster session during the coffee break to familiarize themselves with the future visions devised by the communities. After that, the matrix of response options and implications produced by internal stakeholders were presented to the external and they were invited, in a plenary session, to express their views looking systematically at each of the response options of the two communities.

Figure 6. External stakeholders observe scenario narratives developed by the communities of the two Colombian cases.

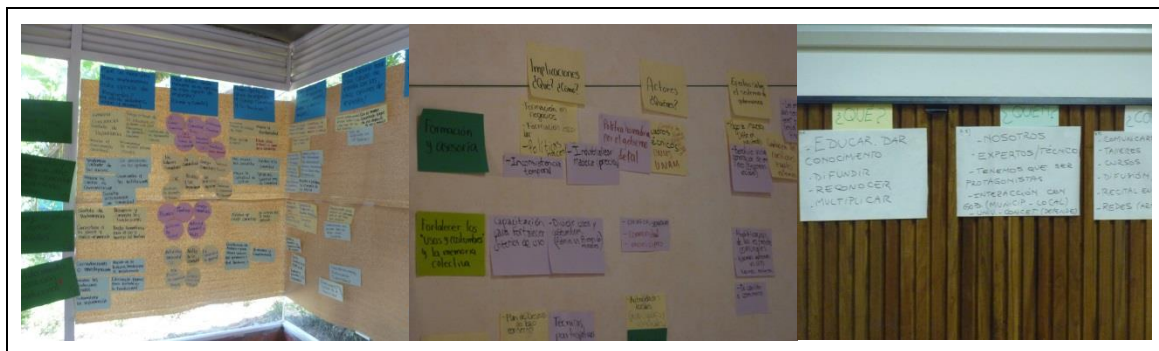


As mentioned, in Argentina the validation of robust response options resulted in the modification of the matrix of *smiley faces*, with some measures been removed as robust and some others being modified in some scenarios (see section 7). Implications of response options were discussed by both internal and external stakeholders in a plenary.

8.1 Main outcomes regarding the operationalization of response options

Annex VII presents the detailed answers to the operationalization questions (what?, who? and how?), which were compiled in the form of a matrix in the workshops (see Figure 7). Here we only summarize the main outcomes emerged from the discussions. Before going in the details of each case study, it should be noted that in all three cases important facilitation efforts were made to get as concrete as possible in the discussions. For example, in Argentina, when workshop attendants suggested 'capacity building in organizations', they were prompted to say what does capacity building mean and what organizations would those be. Another example: when the answer to who was 'the universities', facilitators asked them 'which faculties? Which departments?'. All this helped to get relatively concrete response options. For example, in relation to 'environmental education', workshop participants suggested that fishermen should be invited to speak in schools and that 'local issues' should be included in formal curricula. In relation to 'increased surveillance in the harbour', they suggested that all people involved in breaking fishing quotas should get a fine, including lorry drivers. Similarly, in Colombia, in relation to 'what social actors' need to participate, responses included a number of specific organizations, including reference to specific departments within them (e.g. the education secretariat of the municipality).

Figure 7. Matrices used for collating discussions on implications of response options Colombia (left), Mexico (centre) and Argentina (right).



The discussion on the operationalization of response options in Mexico revolved around the issue of paying the *cargos* (see Text Box 3 for details). This is a major change in the governance system of the community and it is seen as the most surprising outcome. This is not to say that this was an output of the project itself, i.e. it is not because of COMET-LA project and the discussion on scenario that the community decided to move from an un-paid *cargos* system to a paid one, but there is a feeling that the process has opened up an arena for discussion in which issues that were previously considered as ‘unthinkable’, are open-up for discussion. External stakeholders see the potential for this measure to increase the performance of the local authorities, leading to more sustainable use of the forest, but they acknowledge that the extent to which this response option can have implications for the community and the environment, depends on the flexibility with which the local authorities take it forward (considering the considerable reluctance that there is within the community to this). It would be extremely interesting to put in place a system to monitor how does this critical change in the governance system evolves and what are its medium and longer term implications. This does not mean that other response options will have no impact on the governance system, but the local research team considers that monitoring and further analysis of this measure will be very helpful to understand future changes in the governance system.

Another response option considered to be particularly important in Mexico in terms of its implications for the governance system is the creation of individual and familiar projects. To date, the benefit from the exploitation of the forest are mostly re-invested in community projects, and there are now suggestions that, to make the system more socially resilient, part of this investment should be allocated to individuals or families who could carry out projects under their own initiative (e.g. eco-tourism). This was thought, by the external stakeholders and the younger generations of the community members, to help modernizing the governance system. A critical outcome of this process was indeed the realization that the community finds itself at a cross-roads between the need to modernize the system and the desire to keep its core community-based values.

Text Box 3. Changes in the system of cargos in Santiago de Comaltepec, Mexico.



The governance system in the community of Santiago de Comaltepec in Mexico is characterized by the contribution of its members to a system of *cargos*. This means that each member of the community assumes several governing responsibilities throughout its adulthood. This is not voluntary and implies full time unpaid jobs for long period of times, making subsistence of the families of the *cargos* challenging for that period. The community has been opposed to remunerating the *cargos* for a long time. The remuneration of *cargos* was proposed by external stakeholders as one of the response options during stage 3 of COMET-LA's scenario work, but this measure was rejected by internal stakeholders during the same workshop. However, surprisingly, shortly after, on the community assembly of the 15th of June (shortly before COMELA's stage 4 workshop), upon the insistence of current *cargos* and municipal authorities, the community approved the remuneration of *cargos* for a monthly amount of 3,000 Mexican pesos (~180€), but made it conditional on the *cargo's* performance, measured through their capacity to bring projects (and presumably funds) to the community. This represents a major change in the governance system of this community, firstly because it eliminates one of its trademarks, i.e. the unpaid contribution to the community by its members*, and secondly because introduces criteria of efficiency and productivity to the community's management, which were not previously present. This also affects the consideration of the remuneration of *cargos* as a measure for addressing future change in COMET-LA's process (see stage 4).

*This is true for the *cargos*, which involve management responsibilities. Unpaid work continues in the form of *tequios*: unpaid labour (e.g. for building roads, repairing the church, etc.)

Perhaps the most interesting output from this process in Argentina relates to the build-up of a collective identity. When asked about who should take action, the workshop participants kept on referring to 'ourselves' or 'us', meaning all of them. This notion of 'us' is really new for this particular group of people, since, prior to COMET-LA, no sense of collective identity existed. Another interesting output of this discussion was that by focusing on the implications of response options, the problem of identifying the current situation with the barbarization scenario that occurred in previous phases, was mitigated. The local research team felt that only in this phase the previous difficulties that the community had in thinking about the future were (at least in part) overcome.

In Colombia, one of the most relevant outcomes of this task was that workshop participants agreed on the importance of developing what they call a 'school of governance', where community members could be trained on their governance system and traditional knowledge,

as a way of strengthening of their own internal organization. Community members concluded that they would be more empowered and representativeness would be improved since more members of the community would be able to take leadership roles and be able to defend the community's interests. A concrete action in relation to this measure would be to request the Ministry of Education to include this kind of knowledge in the formal curriculum of primary schools. It should be noted that, in stage 3, the community had focused on response options that they could take forward internally. However, in stage 4 and as part of the discussion on who would need to participate, they mentioned also external organizations that could/should support and enable their development (e.g. Ministry, environmental agency, etc.).

Workshop participants in Colombia were also asked to reflect on the interaction between the different response options. As emerged from stage three, these measures do not operate in isolation and their synergies and interactions need to be considered. As result of this process, representatives of the two communities agreed that the strengthening of the internal organization is the key 'platform' for any other measures to be enabled. Clearly the work in stage 4 helped the communities develop more concrete and specific actions, that could be then discussed with the external organizations.. The local research team is in discussion with the community on how to implement a monitoring system to follow-up the implementation of the response options identified during the project.

8.2 Response options in the context of existing plans and programmes

In Colombia, response options were discussed in the context of the outputs of the previous scenario building process. That process ended with the agreement on a number of plans and workshop participants were interrogated about whether any of the response options suggested in COMET-LA's scenario process coincided with those previous plans and whether there were miss-matches and complementarities. This exercised served, in the case of Bajo Calima, to make some adjustment to the matrix of response options, adding a few issues, like for example the need for financial resources to strengthening the internal organization. This also served to identify anchoring points between the existing plans and the new response options emerged as part of COMET-LA's scenario building process. In general, the plans and programmes that had been previously established could accommodate much of what had emerged from COMET-LA's scenario process. However, COMET-LA methodology illustrated that progress in all fronts had not been particularly strong since the development of that scenario process, and hence that more was needed. A critical outcome in this respect is that, according to the local research team, community members came to the realization that 'planning doesn't finish when you elaborate the plans'. The discussion of the implications of response options, and particularly, on who has to do what when, helped 'taking the plans to reality'. As mentioned, the team is exploring with the community how to take this forward, involving external stakeholders and putting in place a follow-up monitoring system.

Another important outcome in Colombia was the recognition that better links are needed between internal and external stakeholders. Communication between the community and the municipality is not as fluid as it should be. For example, the four year *Land Use Plan*, which the municipality of Buenaventura develops, typically has little input from the community and is mainly focused on urban areas. Generally, community participation in the development and

implementation of municipal policies needs to be increased and it was suggested, as an example, that the *Land Use Plan* should take account of the visions generated by the communities in COMET-LA. This was also related to the access to financial resources. At present, municipal plans and activities, and resulting new developments, do not necessarily match the needs of the communities.

In Mexico, response options were discussed in the context of two existing plans: the above mentioned *Municipal Development Plan 2010* and the *Forest Management Plan* from 2004. These plans include a number of actions regarding environmental, social, cultural, economic and institutional issues. As mentioned, these plans have been elaborated without the involvement of the community in a top-down process. However, a number of these issues coincide with the response options emerged from the scenario discussions and could serve as anchoring points for strengthening the connexions between community-led development plans and municipal and forest plans. Notably, these anchoring points are:

- improvement on the basic education system;
- preservation of customary practices and promotion of traditions;
- training and advice for inhabitants, promotion of agro-forestry activities
- and investments on small firms and creation of more local employment.

As mentioned, the Mexican team has secured funds to take this idea forward and work with the communities and the municipalities on this process.

Implications of response options in existing programmes and plans in Argentina were addressed as part of the general discussion (e.g. measures in relation to existing fishing regulation) but no specific task was developed to specifically address this issue.

8.3 Different perspectives on operationalizing response options

Contrasting the results of the workshop with external stakeholders and the interviews of some of the community members in the Mexican case suggests that the previously identified divergences between external and internal stakeholders also apply to stage four. This is: external stakeholders promoting a move towards individual benefits and opportunities, versus the reluctance of the community to alter the strong community based system. However, as pointed out before, this stage revealed some changes among the community, for example, indeed in relation to the issue of paying the cargos, the (timid) realization of the need for involving women and younger members of the community in decision-making and some incipient ideas about re-distributing benefits from forest among the individual families so they can start developing their own family projects (rather than just re-investing all benefits in community projects). Both internal and external stakeholders coincide in thinking that the strengthening of customary practice and collective memory would have a positive effect on the conservation of the forest.

In Colombia, due to the way stage four was carried out, the views of external stakeholders did not reveal different perspectives from those of the community, but rather, they were used to

add on to the information on what other social actors can contribute to enabling and developing the response options. For example, workshop participants were particularly active in proposing additional social actors (besides those that had been identified by the communities) who could enable and contribute to the implementation of the response option. For example, there was a consensus about the role that the Ministry of Home Affairs, as responsible for the organization of community councils, had to play in all response options. The potential role of the local University (Universidad del Pacifico¹⁷), that had not been mentioned by the communities, was added here. Still, from the joint discussion between external and internal stakeholders a stronger alignment between the perspectives of the community and that of the surrounding external organizations was perceived. There seemed to be consensus over the fact that the communities have to be proactive in influencing public policies at the same time that the organizations recognized the need for incorporating the views of the community in their planning processes. For instance, the possibility of developing university curricula in traditional knowledge was suggested as an enabling factor for the implementation of the 'school of local governance' suggested by the community. The representative of the Ministry of Environment informed about the different programmes that they have in place and that could help developing and enabling some of the specific response options. The poor interaction with and involvement of the local municipal authorities (*alcaldias*) was also discussed, and representatives of the external organizations prompted the *consejos comunitarios* to persist on trying to get them involved in community issues. There was an agreement over the fact that the 'schools of governance' would help in that interaction, since they would empower communities on their knowledge of the governance processes and systems and in the different roles played by the different actors. Probably the most relevant output of the discussion of external stakeholders in relation to this stage was the consensus on the need for incorporating the perspectives expressed by the communities in the form of the three scenarios into the different planning processes of the different organizations affecting the communities. Notably, it was mentioned that the fitness of the land planning strategies and the forest management plan (elaborated without the communities) should be analysed in the light of the scenarios elaborated in COMET-LA. Interestingly, representatives of the newly emerging leadership in the community of Bajo Calima attended the last workshop in Colombia.

Due to the set-up of the process in Argentina, no differentiated views between stakeholders could be detected in this phase although the local research team did detect that some participants had started to find it easier to situate themselves in the future than others, who still got 'hang-up' on the present. In any case, there is a strong feeling among the local research team that the scenario building process has helped to promote consensus building among stakeholders in this area. As said, the most remarkable outcome of this process in Argentina is the emergence of a collective identity ('us'), previously inexistent in the area.

¹⁷ Note that this is not the University involved in the project in Colombia, which is the Pontificia Universidad Javeriana of Bogota.

9 Reflections on the use of scenarios for Community Based Natural Resource Management in the three case studies

The scenario planning process carried out by the COMET-LA project has been intense in its use of resources and somewhat demanding for stakeholders. Some of the tasks have been perceived as complex and burdensome, but in the overall it has been viewed as a very positive process and critical to the achievement of COMET-LA's objectives. In the cases in Mexico and Argentina, where this kind of process has never taken place before, the project illustrated to the communities that they need to think and prepare for the future. This did not occur as such in Colombia, where the communities had previously participated in scenario planning processes, but it helped them revisit previously elaborated plans and reflect on implications of response options. The deliberative methodological discussion that took place in the General Project Meeting in Argentina in July 2014 concluded that the scenario planning process of COMET-LA was relatively difficult to apply but that had served the purposes of the project in the three case studies and contributed to the project's legacy (i.e. beyond the formal life of COMET-LA). Although in general the common methodological framework was applied without major variations, a mix between the intended exploratory approach and a normative approach occurred in all three cases to varying degrees. The implications of this are discussed in-depth in Deliverable 1.3. (Waylen et al., 2014a).

In all three cases, it was clear that the scenario building methodology has helped communities practice system thinking. Thinking about the future in a systematic way seems to have helped participants to identify connections between issues, within their socio-ecological systems and to the outside. The process definitely helped to share knowledge across different instances. This was notably the case between community members and representatives of external organizations having an influence in the community, which was missing in all three different cases to varying degrees. In relation to this it is a common outcome across the three case studies that for communities to achieved their desired goals there needs to be stronger interaction between the community and external organizations.

It is too early to assess to what extent the process has helped the communities prepare for the future and provided suitable ways of mitigating the original socio-ecological goals for the case studies, but scenarios helped the participants, both community residents and external stakeholders, relate current events to possible future changes and consider how they might adapt to these global and national drivers through strengthening their institutions. Although the narratives created were relatively inward looking, the process of 'down-scaling' from global and national drivers to their individual context helped participants recognise their place in wider processes and networks, and identify how they could become more effective actors in multi-level governance processes. Common themes regarding response options have emerged across the three case studies:

- the role of education and specifically, education on the local governance system and local knowledge;
- technical capacity building on specific issues identified as weakness within the socio-ecological systems;
- strengthening the sense and means of community and

- strengthening links between the community and external organizations.

In Colombia and Mexico the morphological matrixes were constructed with a particular focus on social and institutional variables (as defined in the Ostrom framework), while in Argentina there was a more wide spread of variables. This focus on the social and institutional aspects in the Mexican and Colombian cases is a legacy of previous phases of the COMET-LA project, where both in the socio-ecological characterization and structural analysis stakeholders placed more emphasis on social and institutional aspects, rather than nature and ecosystem's aspect. However, this does not seem to have generated distinct path-dependencies between Mexico and Colombia with respect to Argentina. In all cases, response options included specific actions in relation management of nature and ecosystem's aspects (e.g. forest management in Mexico and Colombia and fishing regulations in Argentina). Interestingly and despite the prominent role of climate change as the environmental external driver in all cases, mitigation or specifically climate change adaptation actions did not appear explicitly among the response options (although obviously some of the environmental management actions might involve adaptation implicitly).

The discussion on the operationalization of response options (in terms of what? who and how?) helped grounding these response options, allowing stakeholders to reach significant levels of detail. These response options can be built into their governance systems and, eventually used to increase the resilience of the socio-ecological system -see 5.2 (Blackstock et al., 2014) for implications of COMET-LA's work in terms of governance of the socio-ecological systems-.

The most relevant outcome in Argentina relates to the newly emerged collective identity of the group of individuals and organizations participating in COMET-LA. Atypically for Argentina, which is characterized by a clearly top-down governance approach, stakeholders from very different backgrounds and divergent interests have come to the realization that 'they (as a collective entity) need to do something' about current and future problems. Future thinking in Mexico has made visible that the community finds itself at a critical cross-roads between the need of modernising their governance system to allow for social sustainability (beyond strictly environmental sustainability associated with the protection of the forest) and the desire for the core values of their community-based governance system to prevail. This has revealed tensions between views oriented towards more individualist and performance-based management of the forest and collective and traditional views. In Colombia, probably the most relevant outcome has been the realization by the community that planning is not enough to produce relevant changes in the governance system that can help adapting to the future, and that links with external organizations and action monitoring is critical.

To some extent the scenario planning process has also helped consensus building across different actors, but it has also helped made differences more apparent. However, there are not sufficient grounds to conclude whether this process has helped conflict resolution. Both the Colombian and Argentinean cases are affected by serious conflicts that influenced to different degrees the implementation of the scenario methodology, and although they have not been resolved, this process has provided some room for discussion of the underlying

issues. In Mexico, there is no apparent conflict, but the scenario planning process did reveal *hidden* issues regarding the participation of women and younger members of the community.

Throughout this report, and in the COMET-LA project generally, we have been referring to *the community* as an entity to which statements, discussions and reflections were attributed to. However, while being as participatory and encompassing as possible, this research has been based on the outputs of workshops (and a few interviews), and hence participation in those workshops critically determined those outputs. In Mexico, participation varied greatly across workshop, i.e. not all participants have been engaged in all stages of the process, notably women hardly participated. In Argentina, all stakeholders invited to the process have shown great commitment and attended all workshops, with the exception of some fishermen, who left mid-way because of the fishing conflict. However, key stakeholders have been missing throughout this process, i.e. the representatives of the big multinational companies operating in the harbour. In Colombia, the engagement of the community has very been strong and sustained throughout the process, but external stakeholders have been inconsistently engaged, partly because of the violent uprising in Buenaventura, and partly because of lack of interest. In Argentina and Colombia, workshop attendees have been very active in all discussions, but in Mexico, interventions were often dominated by a few male charismatic figures.

Since one of COMET-LA's pillars is the *learning arena*, i.e. a space for scientists, local, national and international stakeholders to exchange knowledge and views on governance systems for community-based natural resources management, it is worth reflecting on what has the scenario process brought to it. In Colombia, where there was already a quite close relationship between the local research team and the community, the process has helped the local research team gain further insights in the governance systems and the differences across the two communities. The role of the co-investigadores has been particularly important, both as a support of the implementation of COMET-LA and as a legacy instrument. In Argentina and Mexico, the project has served to establish a partnership between scientist and stakeholders. In all three cases, it has been agreed that the project should carry on beyond the life of COMET-LA. In Mexico, for example, funds for the continuation of the discussion on response options and how they can build up on existing plans and programmes has been secured for the next three years. Besides the relationship with the researchers, this process has served to generate a positive interaction between external stakeholders and local authorities. It is seen as a positive outcome of this process the fact that the two (internal and external) have strengthen their relations.

Text Box 4 summarizes key messages from the application of the scenario planning methodology to community-based natural resources management to the three COMET-LA case studies.

Text Box 4. Key messages from the application of the scenario planning method for community-based natural resources management in the three case studies

- The applied methodology was judged to be difficult but useful for the communities
- Developing a purely exploratory approach to scenario building proved challenging and the end result has been more a mix of exploratory and normative approaches to varying degrees

- Scenario planning has helped the community develop systems thinking and realize about the need to adapt to the future to pursue its goals as a community
- It has also helped certain degree of consensus building in the communities but it also made differences among groups more apparent
- Scenario planning has allowed communities to come up with a relatively large range of response options to adapt to future changes
- These became more concrete and developed when discussing their operationalization (i.e. what, who, how?)
- Common themes in response options across the three cases are: the role of education (particularly on local governance system and local knowledge), technical capacity building, strengthening the sense and means of community and strengthening links between the community and external organizations.
- Links between the team (academic partners and CSO) and the community have been reinforced as part of this process (contribution to the learning arena).

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Annex I. Internal variables included in the morphological analysis in each case study

<i>Variable name</i>	<i>Definition</i>	<i>Ostromian code*</i>
MEXICO		
Collective-choice rules	The Collective-choice rules of the community consist mainly of assembly agreements regarding changes in the operational rules.	GS6
Extraction and exclusion rights of natural resources	This variable refers to the rights to define who has access to the resources and to its management. The assembly of commoners defines who can use the resources and how and intervenes in the decision making process related to exclusion and extraction rights. It makes a lot of difference when these rules are clear or not.	RS6b
Monitoring and sanctioning processes	These processes allow the strengthening of operational rules within the system. The commoners monitor the correct use of the system resources and verify compliance with the established rules. When compliance with the rules is not effective or the resources are used inappropriately, the authority imposes sanctions (monetary, community labour, imprisonment).	GS8
Livelihoods	The variable Livelihoods, according to the framework for analysing an SES is originally labelled as Subsistence Activities. The name was changed to Livelihoods due to the fact that the research team considered this concept more consistent with the study unit. Livelihoods are the day-to-day activities performed by all inhabitants for the subsistence of the families and the community regardless of whether or not they generate monetary income.	S1d
Economic activities (forestry and agriculture)	are those that represent a source of income for the community members.	S1a
History of use	It is the history of the community, regarding land use and natural resource management. It also comprises how the interactions among the resource units have changed over the years.	U3
Government Organizations	Refers to the multilevel organisations affecting the system, its performance and its structure; for instance, the Commoners' Assembly, the Citizens Assembly, the municipal authorities, the Communal Property Commissioner, and the Surveillance Council.	GS1

<i>Variable name</i>	<i>Definition</i>	<i>Ostromian code*</i>
COLOMBIA		
Agriculture	Agriculture carried out in the socio-ecological system is for subsistence and has a low level of technology. This type of agriculture is carried out in small plots (no more than 5 ha), in which poly-crops are established, looking for associations between different species of plants and animals and a better crop development. Crops are planted associated with various species of timber trees, fruit trees and palms. A guiding principle to create the crop mix is to ensure diversity and permanence of a balanced diet throughout the year. Similarly, this combination of species responds to other aspects such as pest and disease control, source of income throughout the year, and efficient use of the available labour force. The participants recognize that although agriculture is guided by traditional ecological knowledge, agrochemicals are used, in particular for the control of pests and diseases, which affect biodiversity, soil, water and ecosystems near crops. The use of agrochemicals is growing as new generations do not adopt and appropriate cultural and traditional customs linked to agriculture, which allows increased use of chemical pesticides and fertilizers.	RU ₃
Deforestation (relabelled to 'state of the forest' by the communities as part of the workshop, to disembody it of 'a priori negative connotations')	Timber extraction affects biodiversity because, among other things, the ecological niches are destroyed, some species become endangered species and erosion processes are generated. Similarly, deforestation is considered one of the main causes of global warming. This is a human activity that has affected local ecosystems and members of community councils report that deforestation generates significant negative impacts on agriculture and soil. The timber extraction in the nineties increased with activities carried out by a private enterprise (Cartón de Colombia), which destroyed significant forest areas in Bajo Calima. In both councils, timber extraction continues nowadays, since it represents an important income source for communities and it is very relevant for their livelihoods.	ECO _{3a}
Water management	In Bajo Calima, water management has been focused on construction of aqueducts, which allow rain water storage and subsequent distribution by pipe to each of the houses. In Alto y Medio Alto y Medio Dagua, inhabitants have also tried to build this type of infrastructure. Currently, the communities of both councils are facing a crisis that has a political dimension on water. Water is a common resource that is involved in most of the economic activities and livelihoods of the community councils (agriculture, mining, river material extraction and tourism). In this sense, water management is currently done in a controlled manner by the council, but there is not an entity that regulates the quantity of water for human use.	ECO ₂
Community	The meaning of this variable is the inhabitants of a community council as a social group and its characteristics. This variable highlights the responsibility of the community in using and conservation of biodiversity and water resources. This variable does not refer to demographic dynamics. 'Community' refers to issues directly related to the social group and affect biodiversity and water resources. For example, when the community is not aware about resources, their importance and the need of to care for them, but on the contrary, they sell community resources, such as gold and wood, to outside actors thinking just on individual benefits, especially money, and not in collective ones. Although the bargaining power of the community compared to large infrastructure projects has improved, it is difficult to reach similar levels for facing dynamics such as illicit coca crops and gold mining.	GS _{3a}

<i>Variable name</i>	<i>Definition</i>	<i>Ostromian code*</i>
	Moreover, the bad management conducted by communities of water and biodiversity affect them negatively. People emphasize that there is no culture of waste management and sewage flow directly into rivers and streams without any treatment.	
Tourism	Tourism has become one of the various sources of income for livelihoods in the studied socio-ecological systems. However, this activity generates a number of direct impacts on biodiversity and water resources. A major cause is the very limited regulation of the activity and the construction and operation of 'balnearios' (beach resorts) along the river banks. As a result, various problems are observed such as washing cars and motorcycles, cloth washing, solid waste disposal and sewage directly into water sources and use of river beaches without any control.	Sxa
Ancestral knowledge	This variable involves the body of knowledge, practices and beliefs of the community about the relationships among living beings (including humans) and their immediate environment. In other words, there is an ancestral knowledge regarding the socio-ecological system in which they live, which evolves through a process of historical adaptation and is transmitted from one generation to another. Participants in workshops relate directly ancestral knowledge forgetting to the increased alteration of natural cycles. In the past, people had very clear the principles of authority, but now there is not credibility in them. Ancestral knowledge is usually transmitted by the elderly, which in turn affects the creation, maintenance and administration of rules regarding the use of biodiversity and water resources. The migration of the young and the increasing connectivity of the councils with urban centres, among other external factors, impact negatively on this variable, by eroding important cultural aspects such as identity and sense of belonging.	U7a
Traditional mining	The mining activity, when is carried out improperly and unsustainable, affects biodiversity and water. Extraction procedures and the use of chemicals destroy and pollute the habitat of different species of flora and fauna. It should be clarified that artisanal mining does not affect the ecosystem at the same level as industrial mining does. The artisanal techniques and local knowledge related to this activity are passed from generation to generation. In general, since the xggos there is an increase of gold mining, which is linked to international gold price trends.	S5b

<i>Variable name</i>	<i>Definition</i>	<i>Ostromian code*</i>
ARGENTINA		
Fishermen associations	Internal networks (associations and chambers) related to the management, use and marketing of resources. Fishermen also have tended to form coalition groups to influence policies in their favour and to face external SH as those belonging to Petrochemical Industrial Pole or government organizations. Such unions represent an increase in the social capital of users. Fishermen share information and develop collective actions through these network structures.	GS3
Changes in coastal environment and estuary	It describes a series of physical changes in coastal environment and estuary observed by users. The main changes mentioned are the coastal erosion due to beaches destruction by transit vehicles and buildings, shifts of dunes system, advance of the sea over beach; changes in the seabed by dredging and increases in salinity levels. This variable depends on human and environmental factors including climatic change and variability.	O2a
Wildlife resource system	By wildlife resources stakeholders mentioned the relevance of animals and the equilibrium of interactions between species in a biological sense. Both commercial and non-commercial species were taken into account by users in a complex system as trophic chain. Stakeholders also refer to the variation in native species, changes in their characteristics and modifications in its diet due to anthropic effects (such as pollution, dredging, non-native species introduced by men) and climate change.	RS7
Resources sustainability	Sustainability of coastal resources and fishery resources along time. The possibility to maintain an equilibrium between the resource extraction and its regeneration in order to achieve the ecologic and economic sustainability of SES. Resources sustainability is interpreted as a result of the interactions between human and biological variables.	O2c
Fish catches	Number of fishery resource units extracted by artisanal fisheries. It depends on: i) seasonality; 2) fishing effort and fishing fleet; 3) the quantity of licenses and other legislation norms; 4) a lot of negative aspects which reduced the stock of resource units (pollution, off-shore overfishing, dredging, among others). Income of fishermen depends directly on catches and prices. Catches have declined almost during the last ten years. Seasonality is a characteristic of fishery activity since it represents the extraction of a resource with regeneration periods. Fishing resources has its regeneration period mainly between spring and summer seasons, in medium and external zone of the estuary. During these seasons the off-shore fishing is prohibited and the greatest artisanal fishery catches are produced.	RU5
Tourism	Tourism is the economic activity consisting of the selling of tourism services and tourism products. Tourism is a very relevant activity in Pehuen-Có and Monte Hermoso, where the 'beach and sun' tourism is developed as one of the main source of income for the communities between December and March. This activity supposes the intensive use of coastal resources. Different stakeholders give tourism a positive or negative connotation. The environmental impact of tourism was mentioned and discussed as part of the definition. Comparatively tourism could be a more sustainable activity than an extractive activity like fishery. Nevertheless, tourism has now a strong	S1c

Variable name	Definition	Ostromian code*
Income	environmental impact on SES because of several aspects which should be improve to lead to sustainable tourism: 1) pollution and waste on the beach; 2) coastal zone buildings; 3) use of vehicles on the beach; among others. Income is the difference between the selling of fishery products (or tourism services), and extraction (or production) costs. The income is directly linked with use of the resource since the two main income sources of communities are fishery and tourism.	U2
Community awareness	Ideas and perceptions about activities realized by a user may affect other users and the common use of resources. This type of thinking has become relevant and has pushed the community to the realization of networking activities. This type of thinking has been taking an important place in the community pushing the networking activities realization. These ideas drive users to group in neighbourhood associations or other types of groups to put into practice some collective actions as environmental education promotion or conservation measures implementation.	I8
Conservation measures	Group of activities and procedures made by users (mainly internal SH, but also external to a lesser extent) with the goal of catching the SES sustainability. Imply a series of monetary investment activities (as the waste treatment plants) but also non-monetary investment activities as the support of old techniques with higher costs of extraction. Some practice are derived from the local knowledge on SES based on traditional knowledge, as informal close season self-imposed by fishermen when they think that it is needed.	I5
Artisanal fishery	Artisanal Fishery describes the type of activity carried out by small crafts and boats with traditional techniques as hand line, trammel or gill net, shrimp net funding, etc. Artisanal Fishery also has cultural and historical implications for stakeholders.	U9

*ECO = related ecosystems, GS= Government Systems, I = Interactions, O = Outcomes, RS = Resource Systems, RU= Resource Units, S = Social Economic and Political Settings, U = Users. Source: (Ostrom 2009).

Annex II. External drivers of change included in the morphological analysis in each case study according to STEEP categories (contrasting states included in Annex III)

Social	Technological	Environmental	Economic	Political	
MEXICO					
Tightening/loosening migration controls in the US	Technological change in timber harvesting machinery	Climate change	Changes in global market prices for timber products	Political stability	Changes in the property right system
Refers to the US government capacity to control the entrance and expulsion of immigrants in the US territory.	Technological change would affect specialization. A change in the technology used in timber harvesting refers to the way in which the community could reduce the harvesting costs in order to reach bigger profit rates.	Refers to the changes in temperature and the rainfall.	Refers to the prices of the natural resources, for instance, timber and forest prices. Market conditions refer to forest's products demand, for instance, low or high added value products as furniture or services (environmental).	Relates to the political conditions on the regional, national and local levels, (if) whether stability or conflict (either current or potential) prevails. It refers to national democratic system pressure over customary practices regimes. Currently, with the drug issues in the north states of Mexican territory, Michoacan, a near state of Oaxaca, has witnessed the presence of drug production cartels and, in consequence, the population organization to evict them. These kinds of popular organizations (self-defence forces) are independent of the government security forces so their existence means a threat to political stability.	The community possesses the right to extract and exclude external agents. But, the commoners (land owners) have the right to manage natural resources

Social	Technological	Environmental	Economic	Political
COLOMBIA				
Population	Technology for infrastructure	Climate change	Changes in commodities markets	Changes in public policy
<p>Population size is a very dynamic agent of change, since it is likely to change by action of multiple factors. Particularly in our case study the population is inserted, on the whole, within the context of national growth rates, due to the effect of the natural population growth. However, issues such as voluntary migration and forced displacement influence the dynamics of the local population size. Displacements caused by violence have generated a considerable decrease in the population at some point in time, although in the years after the conflicts, the territories have shown a recovery from its previous population size.</p>	<p>In the case study for the territory, this driver refers to the technological developments that underlie the adaptation of infrastructure in the region. These technological developments are carried out by executing large projects, called macro projects. In the area related to the case study, the main macro projects are related to port expansion, i.e., the adequacy and construction of additional infrastructure to connect the port of Buenaventura with the rest of the country.</p>	<p>The Colombian Pacific region has historically been characterized by high levels of rainfalls, relative to other regions. The distribution of rainfalls throughout the year, however, allows distinguishing between periods of higher and lower precipitations. The close relationship between rainfall and levels of river flow, which are the backbone from which communities have been established in the area, explains why black communities have adapted their production practices, especially agriculture, according to rainy periods that occur during the year. The global phenomenon of climate change impacts on many variables, among which we can highlight the precipitation patterns and temperature, being these widely recognized and easily measurable variables.</p>	<p>Except for fishing and agriculture, some of the productive activities taking place in the Colombian Pacific are subject to market performance of their products. Raw materials such as wood and drag materials in river water, as well as 'processed' products like gold, are part of the dynamics of the market, so the fluctuations in supply and demand, as well as prices sale, generate immediate impact on the intensity, scale and techniques under which productive activities that provide these goods are developed.</p>	<p>Public policies are a response to the needs of society. These needs are endless and dissimilar in different scales. Public policies are mostly intended to address national or regional needs, given that they try to encourage as many people as possible. However, the decision about what needs should be corrected will always be disputed. The Colombian Pacific represents a problematic scenario due to its nature and history: on the one hand, it contains the highest levels of biodiversity in the country, as well as it also contains the largest commercial port. Moreover, it has been a social and institutionally abandoned region, where there are various armed actors and various companies which operate unregulated. This scenario explains both the multiplicity of interests that converge in the region, and the vast list of needs that deserve consideration as grounds for public policy.</p>

Social	Technological	Environmental	Economic	Political
ARGENTINA				
Changes in the size of human population	Weather Forecast and navigation technology	Climate change	New entries in the harbour and dredging intensification	State of environmental regulation
Future human populations are unpredictable but can strongly affect how societies operate and use of natural resources.	Technological change could affect the efficiency (in terms of costs and energy requirements) by which natural resources can be used, whether for local use or sale.	The change in weather patterns is perceived by users as decreasing rainfall, length of dry periods, increased water temperature, increased rotation and wind speed.	The petrochemical Industrial terminal represents a group of industries and businesses located near the Port of Ing. White, between Ing. White and Gral. Cerri. Despite having a significant economic value to the region, the benefits are not perceived by the community. The petrochemical terminal is recognized as a power group that influences policy in their favour, and whose only common interest is economic. Interested parties included in this variable are the Consorcio de Gestión de Puerto de Bahía Blanca (Harbour management consortium, CGPBB) and Asociación de Industrias Químicas de Bahía Blanca (Association of Chemical Industries, AIQBB). These companies and agencies are competing directly with users through space near the sea, the entrance to the sea and the use of some resources such as drinking water.	The attitude of decision makers towards external legislation units of resources and system resources. According to stakeholders, the lack of political interest in environmental sustainability can be seen through different actions or omissions of decision makers: 1) the content of the formal rules established for the management of resources, 2) the rules formal established with reference to other issues that may affect the sustainability of the environment and 3) the political support for projects with negative consequences on the environment.

Annex III. Morphological matrix of the three case studies

MEXICO						
VARIABLE S	Drivers of change					
	<i>Social</i>		<i>Technological</i>		<i>Environmental</i>	
	Tightening/loosening migration controls in US (external issues)		Technological change in timber harvesting machinery		Climate Change	
	State 1: Migration controls in recipient countries tighten and allow fewer entries per year than at present	State 2: Migration controls in recipient countries are relaxed and allow more entries per year than at present	State 1: timber harvesting machinery technology reducing production costs	State 2: timber harvesting machinery technology remains the same and productions costs remain the same or increase	State 1: temperatures will increase only slightly and rainfall patterns could remain similar to today	State 2: temperatures will increase 2C and rainfall will decrease very significantly
Collective-choice rules	Rules transformation (more population in the community)	Rules would remain constant	Rule transformation to ensure an equitable profit distribution	Rules remain constant or, if higher costs, there will be a bigger pressure on decision making	Rules would remain constant	Rules adaptation to new context
Extraction and exclusion rights of natural resource	Extraction level would increase in order to satisfy needs	Extraction level would reduce	There would be an incentive to increase the extraction level and to exclude external individuals	Extraction level would decrease	Extraction and exclusion rights would remain constant	Extraction and exclusion levels would be lower
Monitoring and sanctioning processes	Monitoring and sanctioning processes would remain constant	There would be fewer people for monitoring activities	There would be an incentive to increase the monitoring and sanctioning activities	Monitoring and sanctioning processes would remain constant	Monitoring and sanctioning processes would remain constant	Lower pressure for monitoring and sanctioning activities
Livelihoods	There would be the need to get new livelihoods	Livelihoods would remain constant	There would be an improvement in livelihoods	Livelihoods would remain constant or get worse	There would be the possibility to promote livelihoods	Livelihoods would diminish

Economic activities (forestry and agriculture)	There would be an intensification and diversification of economic activities	There would be a reduction of economic activities	There would be a meaningful boost to the economic activities and the profitability	There would be the same or a lower profitability level	There would be the chance to take advantage of a bigger part of the forest	Productive processes would be transformed
History of use	History of use would modify due to the higher pressure on the forest resource	There would be changes in favour of the forest in the history of use	A more efficient resource's use would take place	There would be deficiencies in the resource's use	History of use would have slight changes	There would be a transformation in the resource's use patterns
Government Organizations	Instability in government system would take place	There would be fewer people to cover directive charges	Government organizations would remain constant	Government organizations would remain constant	Government organizations would remain constant or experience slight changes	Government organizations would have to adapt to new requirements
Drivers of change						
Political			Economic			
Change to the property right systems		Political stability		Changes in global market prices for timber products		
VARIABLES	State 1: Current situation remains as is today	State 2: Constitutional change by which communities will lose territorial and resource management rights.	State 1: Self-defence forces are not in the territory	State 2: Self-defence forces appear in the territory	State 1: prices go up	State 2: prices go down
Collective-choice rules	Rules would remain constant	Collective-choice rules will disappear	Rules would remain constant	Collective-choice rules would disappear	Rules would remain constant	Rules would remain constant
Extraction and exclusion rights of natural resource	Extraction and exclusion rights would remain constant	Extraction and exclusion rights would be given by private actors	Extraction and exclusion rights would remain constant	Extraction and exclusion rights would be given by external and violent groups rather than the community	There would be an incentive to increase the extraction level and to exclude external individuals	Extraction and exclusion levels would be lower, at least in relation with the forest resource.

Monitoring and sanctioning processes	Monitoring and sanctioning processes would remain constant	Monitoring and sanctioning activities would be done by private actors	Monitoring and sanctioning processes would remain constant	Community would lose their territory	Processes would be harder than current status	There would be the chance to reduce the monitoring and sanctioning activities
Livelihoods	There would be the opportunity to improve livelihoods	Community would have to search for their own livelihoods	There would be the possibility to promote livelihoods	Partial abandonment of livelihoods	There would be an improvement in livelihoods	Pressure on livelihoods would increase
Economic activities (forestry and agriculture)	There would be the opportunity to diversify the economic activities	A radical transformation in economic activities would take place. These transformations would be subject to private or individual actors	There would be increasing opportunities to diversify and intensify economic activities	Economic activities would have to experience a transformation	Economic activities diversification would be lower with everything else held constant, but it would represent an improvement	Community would have to search for new activities to satisfy economic needs
History of use	History of use would have no meaningful changes	Patterns of use would change to an opposite pole	There would be slight and meaningless changes in the resource's use patterns	There would be a meaningful changes in the resource's use patterns	There would be a transformation in the resource's use patterns due to the bigger pressure on it	There would be a lower pressure on the resource
Government Organizations	Government organizations would remain constant or experience a payment system implementation for directive charges	Government organizations would be limited to the vigilance of the private actors that would own the territory	Government organizations would remain constant	Other types of government would be implemented in the territory	There would be pressures to improve the charge and governance situation	Government organizations may be weakened

COLOMBIA						
VARIABLES	Drivers of change					
	Social		Technological		Environmental	
	Changes in population size		Changes in technologies for infrastructure		Climate Change	
	State 1: Annual increase of 2.2%	State 2: Population remains stable	State 1: Increases rapidly building infrastructure in the region	State 2: The construction of infrastructure in the region increases slowly	State 1: Mid-upper temperature increases by 2%	State 2: Temperature and precipitation averages remain stable
Agriculture	Food demand increases, causing expansion of land use and exploitation of the territory, using new technologies to increase the efficiency and effectiveness of agricultural processes. Biodiversity loss is presented.	The pressure on natural resources is stable and mechanisms for environmental sustainability are sought. Agriculture environmentally responsible is encouraged.	The expansion of the agricultural frontier mountain rises in the area, given the pressure for land use for infrastructure. Construction projects replaced agricultural work and stimulate employment in the short term. Traditional farming practices are lost.	Agriculture remains under traditional practices; food supply does not increase and the demand for land for new players. Farmers alternating between agriculture and other activities that generate additional revenue.	There is an affectation on agriculture. Increases uncertainty in the knowledge of weather patterns (rainfall - drought), under which agricultural practices are oriented. Agricultural expansion is given, which implies changes in land use. Arrival of cultivable species not previously; there is also disappearance of crop species that do not support the changes.	The production remains stable. Although there is uncertainty about weather patterns, people do adapt their practices according to their agricultural knowledge. There are no major changes in land use.
State of forest	Increase the pressure on forests. The arrival of people with different traditions hinders community control over timber	The rate of forest loss does not change. Although no reduction of habitat for biodiversity, control	The rapid construction of infrastructure encourages the use of wood. Despite the control, the incidence	The use of wood for construction activities has increased slowly; allowing ecosystems and vegetation recover in the long term. Loss	Altered weather patterns increases the vulnerability of the forest to the effects of logging. The replacement of forest	The stability in the climate allows the generational change of forest species, a situation that absorbs and impacts

	<p>harvesting by operation of law (ie, of self-regulated manner, taking into account that this is a community resource), for which there is no control over exploitation. This causes decrease in forest cover and water resources, as well as loss of biodiversity.</p>	<p>over the extraction achieved by operation of law to mitigate the significant effects on the decline in forest cover. Ecosystems do recover in the medium term and thus the biodiversity of the area.</p>	<p>of intensive cutting in the forest. This results in the reduction of plant cover, threatening biodiversity and water resources upon which the maintenance of forest matrix.</p>	<p>of forest, despite still is a threat of loss of habitat for biodiversity, not increase significantly.</p>	<p>species is altered with changes in temperature. It takes place a change in the structure of plant and animal communities. There is an increased risk of forest fires (this does not apply in Bajo Calima).</p>	<p>consequences of logging on biodiversity and water resources.</p>
<p>Community</p>	<p>With increasing population, the dynamics of the community and informal norms begin to be modified, either by the arrival of new rules, as well as by changes in existing. The figure of the Community Council is stable, as the community seeks that this figure is not blurring. However, local authorities may face trouble regulating the activities to the population increase.</p>	<p>By keeping the population stable, formal and informal rules of the Community Councils manage efficiently transmitted. There is more control over compliance and these reflect the dynamics of the community.</p>	<p>The increase in infrastructure construction allows the entry of new players who are not clear on the rules of the community. Therefore increases the breach thereof. A process of fragmentation of the community is presented.</p>	<p>The community dynamics remain similar. The role of Community Councils is strengthened to find new outlets for marketing of local products.</p>	<p>The community rules are modified in order to respond to new problems arising from the change in temperature. These new rules are stricter with the responsible and sustainable use of resources.</p>	<p>Changes in the rules of the community are minimal with respect to natural resources, as the dynamics remain stable. However, it seeks to strengthen cultural production processes, health, food security, etc.. Strengthens, in turn, agricultural production and tourism.</p>
<p>Water management</p>	<p>Growing demand of water resources, and pollution sources, making it difficult to make a control resource use and fair</p>	<p>By staying stable population, mechanisms are created to achieve equity in the distribution, adequate</p>	<p>The development of mega infrastructure projects significantly increases the demand of water resources and pollution thereof. The</p>	<p>Infrastructure projects require a sparing use of water resources. Water sources retain their ability to recover and people are</p>	<p>The availability and access to water resources is limited, so the tension in the Community Councils and increase</p>	<p>The community management plans to make medium and long term, putting limits on water consumption and</p>

	and equitable management.	access and resource management by the community.	resource is privatized for the benefit of individuals, preventing equitable access by the population.	promoted in formal and informal rules for resource management by the community. You may be in a stage of privatization of water, following the logic of the Departmental Water Plans.	competition on a common resource is promoted. Privatization of water in areas of common use is given. As a result of the shortage, increase conflict and disease.	improving control over it. There is increasing awareness in the use of the resource.
Ancestral knowledge	The ancestral knowledge is weakened because traditional practices are not transmitted to the entire community. Other knowledge systems composed of different practices for the use of natural resources, are mixed with the ancestral knowledge.	To maintain a stable population, it is possible that the ancestral knowledge is strengthened and more appropriate for community members, which generates benefits in the management of natural resources. The culture is strengthened.	Rising megaprojects brings new actors to the areas, who are seeking ways to extract natural resources with new technologies. The ancestral knowledge passed to the background and is not implemented by the new generations.	The gradual increase in the number of mega projects and the occasional arrival of new players to the area, allowing the ancestral knowledge is still used by the community and transmitted to new generations. While there is not a total dependence on him, if that is important in the processes of production, medicinal, spiritual and cultural level.	Concern about the consequences of the rise in temperature generates strengthening the dissemination of traditional practices by the community. These practices become an essential tool in production, medicinal, cultural and other processes; but also traditional practices are combined with other knowledge. Mechanisms of protection and dissemination of knowledge within the community are created.	By keeping the temperature stable, ancestral knowledge is still used in the same way. The community depends on this knowledge, but does not fail to be an important factor. This knowledge is supplemented with other technologies using resources.
Tourism	The load capacity of the tourist places becomes saturated. Wastes and increase the resilience of natural areas is	The areas for tourism do not exceed the carrying capacity and may make an environmentally responsible tourism.	Building infrastructure facilitates the arrival of tourists to the area. This, on the one hand, improves the accessibility and allows	The slow growth of technological development in these processes allows gradual natural regeneration of	The loss of forested areas and the increase in temperature reduces the quantity and quality of landscapes with	The landscapes continue with the current tourism potential and other ecosystem services that tourists enjoy are

	<p>reduced, which generates long-term loss of areas with ecotourism potential. Additionally, increased families involved in the activity decreases the profitability thereof.</p>	<p>The population regulates the amount of people who can enter and conservation of landscapes for this activity, so that you can stimulate ecotourism in the area is achieved.</p>	<p>the establishment of ecotourism projects that integrate environmental services with the construction of hotels and recreation areas. The modernization of tourism processes, position tourism as a profitable activity in the area. However, if the implementation of tourism activities is given in a disorganized way, there is a great risk of serious impacts on ecosystems, as well as on social conditions.</p>	<p>ecosystems, and thereby improving the provision of other ecosystem services that enable future ecotourism in the area.</p>	<p>ecotourism potential. With this other ecosystem services potentially useful in stimulating economic activity in this region are reduced. As weakens and moves to the background.</p>	<p>enhanced. Long term ecotourism activity is positioned as an activity for economic growth in the region and there are concerns about the recovery of ecosystem services to continue stimulating the activity in the area.</p>
<p>Artisanal mining</p>	<p>The 'barequeo' decreases because the increase in population increases the pressure on mineral resources and the community is the need for practical large-scale gold mining. Traditional practices of mining (tunnels) change, the extraction increases and the ecosystem is altered.</p>	<p>The 'barequeo' remains an occasional activity performed by the community. There is strong pressure on the mineral resource.</p>	<p>Increased infrastructure attracts new players looking to exploit mineral resources. This implies the loss of artisanal mining and industrial drives.</p>	<p>Pressure on mineral resources is lower, but with new actors arrive extraction techniques on a large scale; however, traditional practices continue in the community.</p>	<p>The decrease in water availability hampers the development of traditional mining. If the water runs high temperatures, artisanal mining may disappear and mechanized increase. If artisanal mining persists, its adaptation to the new conditions will require a change in the techniques. The effort required to perform mining increases.</p>	<p>Pressure on the large-scale extraction, by external actors increases. This causes a decrease in the practice of both artisanal and mechanized.</p>

<i>Drivers of change</i>			
VARIABLES	<i>Economic</i>		<i>Political</i>
	Changes in Markets		Changes in Public Policy
	State 1: Rising domestic prices of gold and wood by 20% annually	State 2: Decrease in domestic prices of gold and wood by 20% annually	State 1: Inconsistency and instability against resource protection
Agriculture	<p>Agricultural production is relegated, as the community is mainly engaged in mining and logging, as they are better paid activities. There is a shortage of agricultural products. Prices Rise in wages.</p>	<p>By decreasing the price of gold and wood, agriculture increases, generating pressure on the ground. Seek ways to improve the production and marketing of products.</p>	<p>Development policies aimed at increasing productivity agrochemical use and the establishment of monocultures. An extension of the agricultural frontier and ecosystem deterioration happens. There is an affectation on agriculture and traditional production practices. Sustainability policies left side, allowing excessive exploitation.</p>
State of forest	<p>The high prices of wood and gold stimulate removal. It is harvested indiscriminately, both for timber and for access to gold mines. Logging is encouraged to build mining infrastructure. This results in a loss of habitat and threatens biodiversity and water resources.</p>	<p>The decline in gold prices and wood stimulates alternative activities in the area for income generation. This long-term, allowing recovery of the areas affected by these extractives. It may also be an intensification of mining activities, in order to compensate for the drop in prices.</p>	<p>The institutional weakness of the environmental authorities causes a reduction in the control and monitoring of forests. Consequently, deforestation rates increase and there is a judicious monitoring.</p>
Community	<p>Rising gold prices and wood creates a great demand and an increase in the exploitation of these resources. This, coupled with the presence of new actors, splits the community. The rules regulating conservation of</p>	<p>Pressure on other natural resources increases on behalf of productive and extractive activities such as fishing, agriculture and mining, so the authorities of the Community Councils should create</p>	<p>The government policies focused on economic development generate the dynamics within the community was also pointing this goal, blurring the conservation actions of the community.</p>
			<p>Harvesting and sustainable use of forests, stimulated with community conservation policies that recognize the importance of maintaining habitat as a refuge for biodiversity is promoted. There is the possibility of implementing conservation payment schemes, and state initiative.</p>
			<p>The dynamics of conservation and use of natural resources that have been created by the communities are adopted and replicated by local and regional authorities, in order to contribute not only to conservation but to strengthen the community itself.</p>

natural resources is difficult. One option to improve the regulation is generating use permits; however, such schemes may encourage illegal mining, which weakens community resource management processes.

mechanisms for stronger controls in the use of these resources.

Water management

The boom in mining activities increases pollution of water sources available for consumption in the community. Scarce water resources. Furthermore, the water supply service is privatized and aqueduct, which ultimately triggers a rise in the resource.

Extractive activities are restricted by price, so that the resource has a period of time to recover in the area, improving availability and access to communities. Additionally, a recovery of water quality (decontamination) occurs.

No control over access and monitoring and pollution to water resources. Institutional weakness neglects equity in resource distribution and increase conflicts over the use of the same. Water resources and therefore decreases their availability.

There is a culture of conservation in communities and access to resource planning in response to the distribution. The threat of resource depletion is reduced and water supplies for future generations increase. The quality of water resource is recovered.

Ancestral knowledge

With rising prices, ancestral knowledge is marginalized, as the community is focused on the exploitation of gold and wood, through industrial methods, leaving aside their traditional practices. While traditional knowledge decreases, fails to disappear. Cultural, medicinal and food safety aspects of ancestral knowledge is also weak.

As prices fall, communities mechanized mining activities left side and engaged in traditional activities, through the use of local knowledge.

A policy focused on increasing production through industrial methods, promotes the ancestral knowledge is less important and is overshadowed by the communities and their supporting organizations.

A policy focused on sustainable development, which emphasizes the ancestral knowledge and production practices, allows ownership and dissemination by the entire community.

Tourism

Extractive activities outweigh ecotourism and landscapes are transformed with mining and deforestation, so there are places to practice responsible tourism with the environment.

Extractive activities are restricted, which with ecotourism is promoted as a source of income and opportunity for alternative development in the region is discouraging. Environmental services are promoted, which promotes the conservation of

Institutional weakness is reflected in the lack of policies for the management of community conservation areas with potential for tourism, so there are no major incentives for the development of this activity in the area.

It does pose a model of responsible ecotourism; conservation policies based on community areas and manages to profitable and sustainable businesses around environmental services.

biodiversity.

Artisanal mining

Rising prices in turn generates no increase in artisanal mining, as new players arrive and with them new technologies for extraction. The community neglects craft practices, to engage in large-scale extraction, given its profitability.

With falling prices, external actors leave the extractive activity that is being developed in the area. Artisanal mining takes force within the community.

Mineral development policy focuses on the extraction of mineral resources with new technologies, which substantially decreases the 'barequeo', giving way to the large extraction area. This threatens biodiversity and water resources by increasing the environmental impacts of the activity.

Conservation policies aimed at enhancing the 'barequeo' as key extractive activity, as well as achieving resource extraction does not generate large-scale changes in the environment.

ARGENTINA

VARIABLES	Drivers of change					
	Social		Technological		Environmental	
	Demographic Change		Weather forecasts Technology and navigation		Climate Change	
	State 1	State 2	State 1	State 2	State 1	State 2
Wildlife resources	Current trend is maintained.	It decreases. severely	Unstable. The result depends on the use and application that is given to that technology.	Remains the same	Remains the same	Unstable. Modification and adaptation of species.
Community Awareness	Improving as a result of the education of the coming generation	Divided opinions. Unstable results.	Improves. Greater influx	Remains the same	Remains the same	Increases due to the experience of external events
Artisanal Fisheries	Villa del mar: it disappears; Other communities: sustainability.	Villa del mar: it disappears. It remains in the rest of communities with alterations.	Improves due to increase efficiency	Tendency remains (or it could even be reduced)	Remains the same	Decreases and will be modified
Amendments to the coastal / estuary environment	Changes deepen according to the current trend.	Rises dramatically	Less modification due to greater controls	Tendency of current modifications is remained	Remains the same	Increases enormously because the erosion due to external events
Income	Cannot be known.	It cannot be known.	Grow	Remains the same	Remains the same	Decrease when affected by fishing
Tourism	Increased by external influx.	Increase. Risk of low sustainability due to the need of public works.	Increases	Keep increasing because is a less intensive level of service in technology	Remains the same	Changes but it will depend on the type of predominant change
Sustainability of resources	Remains the same.	Decreases. Increased risk and pressure on resources.	Improves	Decreases	Remains the same	Modifications. Change and adaptation of flora and fauna species

Fishermen associations and neighbourhood	Remains the same	Increase.	Organization and communication are improved. Greater influx	Its relevance is increased due to social demands	Remains the same	Strengthen. Greater level of problematic generates more union.
Conservation measures	Remains the same	Increase in reaction to minimize impacts.	Improvements. Greater level of waste processing and improvements of materials	Decrease	Remains the same	Increases following the threat of external events
Catch (hunting)	Maintained or increases if new techniques appear.	Maintained or increase if new techniques appear.	Increases. Better selection, location and fending off harmful species	Appreciably decreases or not changes	Remains the same	Modified, but do not know how: change of species
Drivers of change						
VARIABLES	Economic			Political		
	New entries to the harbour and dredging intensification		State of environmental regulation		Changes in legislation of productive activities	
	State 1	State 2	State 1	State 2	State 1	State 2
Wildlife resources	Maintain or increase	Decreases greatly	Increase in wealth and intensity	Decreases	Increase due to a decreased pressure on resources system	Decreases
Community Awareness	Remains the same	Increases	Increases due to the effects of the implementation and dissemination of policies	Increases but due to reaction to the bad situation	Increases because of the implementation of better measures	Remains the same or increases
Artisanal Fisheries	Increases due to a minor impact on resources	Decreases	Increases because of the improvement of the resource	Decreases	Increases	Current tendency is maintained
Amendments to the coastal / estuary environment	Maintain based on the remaining impacts	Greatly increase	Tendency would decrease. Erosion processes would stifle	Greatly increase	Tendency would decrease. Erosion processes would stifle	Increases

Income	Increase due to the improvement of the resources	There are alterations, but no consensus about how	Increases	Decreases	Increases	Maintain decrease or
Tourism	Maintains or could increase, depending on which degree affects	It could decrease, depending on the proximity to the estuary region	Increase. Improvement in the services.	Decreases	Would not interfere mainly	It cannot be known whether it will be affected in relation to the quantity, but it would be a major impact tourism
Sustainability of resources	Increases due to minor impacts	Greatly decreases. Ecosystem 'breaks down'	Increases	Decreases	Increases	Decreases
Fishermen associations and neighbourhood	Strengthen and/or broaden. Dredging action continues. Emergency of other problems	Strengthen and increased mostly	Maintained or strengthen. Action as spectators	Strengthen or increased due to complains	Would not interfere or could generate other conflicts between fishermen	Greater participation by the protests and reaction to the maintenance of the situation
Conservation measures	Remains the same	Greatly increase as reaction to the problems	Will keep increasing	Increase as reaction to the conflict	Increases	Increase much more as reaction
Catch (hunting)	Probably increase	Decreases dramatically	It cannot be known. There is no guarantee of increasing	Decreases	Increases, or at least it doesn't decrease	Risk of falling. Major conflicts within the areas of Monte y Pehuen Co.

Annex IV. Scenarios narratives (summarized and translated from Spanish)

Scenario	MEXICO
Resources reallocation	<i>Due to economic interests new techniques are adopted to reduce costs and improve production efficiency. As a result there is intensification of resource exploitation, privatization, exclusion of stakeholders and emigration of community members. The institutional framework changes to focus on the economic needs of individual actors rather than on the collective. The connection between the community and the resource weakens, reducing monitoring and surveillance activities, and leaving the community in a vulnerable position against external actors.</i>
Policy dominates	<i>Generation of a strong central government for implementation of policies which mitigate the effects of negative impacts on the environmental, economic and social sectors. The federal 'technology' policy aims to mitigate the effects of climate change and increase and diversify livelihoods. A greater presence of actors and policies for sustainable growth improves resource exploitation and changes patterns of forest use. The strength of local government organizations and collective community rules depend on the union with the federal government, which are subject to restrictions, preventing the entry of outside groups (drug or private entrepreneurs).</i>
Social entrepreneurship	<i>Generation of environmental, social and economic sustainability. This scenario was suggested by the community and is based on a system of collective ownership with capacity to undertake economic projects, that introduces technology for more efficient and better resource exploitation without over-exploitation. The income of the community increases, and in the long-term they have more efficient and sustainable forest management. Emigration stops as the local economy creates jobs and the bodies in charge of the organization of forest succeed in implementing a payment system for managerial positions. The rules of collective use have more importance and this is reflected in increased collective and individual welfare.</i>
Sustainable socio-ecological system	<i>Modification the community's rules of collective decision-making is required to allow a better distribution of income. The rights of exclusion and extraction remain, giving economic sustainability through responsible use and consumption of forest, which promote diversification of economic activities and specialization into production areas that give added value. Human solidarity and social cohesion enhance monitoring. Sanctions, conflict resolution and governance will be strengthened. The challenge is to adjust the rule system to accommodate the new form of organization, a social market economy.</i>
Chaotic world	<i>Disorder, violence, and an inability to maintain resource management due to high migration. Climate change hinders long-term plans to manage the resource. Employment is reduced, government organizations lose relevance by reducing their functions and insufficient supply of players to cover the 'cargos' (unpaid tasks allocated to individuals by the community). Private actors exploit the resource to the maximum to destroy the source. In 20 years time all will be lost: The resource, collective organizational forms, livelihoods and the rules of collective use, mining rights and exclusion would be private and business activities change in terms of production and location.</i>

Scenario	COLOMBIA: Bajo Calima	COLOMBIA: Alto y Medio Dagua
Ideal scenario	<p><i>Forests are conserved and used sustainably. Wastewater is treated. Fewer boats on the river. Food comes from subsistence farming and local animals. The water supply is independent of the city. Ecotourism appears. Organizations exist to train young people, preparing them for life in their environment and hence reducing emigration. Construction of a community centre, hospitals, entertainment. No coca cultivation, problems of mining and armed conflicts are resolved.</i></p>	<p><i>Values and traditional knowledge are promoted, remain strong and adapt to the current dynamics of the territory. External and local actors push ecotourism. The Community Council maintains relationships with other entities (public and private) for greater control of natural resources, with prior consultations before the completion of mega projects. The forest is maintained by protection policies, ongoing monitoring and reforestation. New techniques treat wastewater. Aqueducts and water saving infrastructure are constructed. Traditional techniques are used in farming (poly-culture and medicinal plants) and in mining, with close control of natural resource use. The armed conflict has decreased.</i></p>
Undesirable	<p><i>The population has been displaced as a result of war and armed conflict. Outsiders begin to live here together with few locals remaining who do not maintain the traditions of the area. They exploit the territory: introducing monocultures, continue with coca crops, mining, spraying glyphosate, cut down forests. Protection and conservation disappear, and ecotourism is not possible. There is uncertainty as to how to tackle climate instabilities. There are no plans to prevent water pollution. Lack of commitment and weakness of the Community Council, abandonment by youths, disappearance of cross-generational continuity for future sustainable development.</i></p>	<p><i>Population, urbanisation and demand for food all increase, with no clear management of the waste generated. Riverbeds are altered and there is no control or monitoring of forest clearance. Tourism falls. Emigration means less control of holdings and the legitimacy and traditions of the community are lessened by the involvement of external actors. New techniques develop for natural resource use (monocultures, use of agrochemicals, and mining on a large scale). Roads and pipelines modernise and expand. Public insecurity is generated.</i></p>
Stable	<p><i>Significant changes in forest cover and riverbed due to port expansion. To promote the infrastructure for the port, local subsistence crops are displaced. However, improving water transport boosts trade and ecotourism. Armed conflict continues, as do logging and illegal mineral extraction, which threaten traditional community practices. There are abundant sources of water but no plan to improve delivery systems or prepare for climate change. The inter-generational change strengthens the Community Council but there is no recuperation of the natural resources, nor change in initiatives, due to ignorance and noncompliance with the regulations.</i></p>	<p><i>The forest and river are recovering. The water and sewage system is strengthened but strategies for the treatment of wastewater and solids are needed. Ecotourism is encouraged. Agriculture is based on subsistence (traditional agricultural practices). Industrial mining decreases and is artisanal. The territory has an office of the Council and community sub-sites. Thanks to prior consultation, this increases their ability to interact with the district and other organizations (Ecopetrol). Education projects and leadership training encourage and maintain the ancestral knowledge, but control over the population is difficult due to their large numbers.</i></p>

ARGENTINA

Policy reforms

The population grows, waste management improves. Temperatures raise causing changes at all levels. Advances in weather forecasting and navigation allow better understanding of the location of marine species. The number of businesses is reduced and only dredging for maintenance is performed. Legislation and regulations broaden the areas of fishing, there are more controls and better management of resources, increasing catches of artisanal fisheries. Services are improved and increase revenue from tourism. Neighbourhoods associations and fishermen are more organized and better connected by new technologies, generating community awareness and conservation.

A new paradigm of sustainability

The growth rate is maintained. Increasing community awareness, resident participation and organisational improvements, via social networking and the ease of access to new technologies to better diagnose weather forecasts. NGOs are environmentally conscious. Increased environmental regulation prevents coastal erosion and traffic controls on fishing permit greater populations of fish, and prevents the intrusion of trawling fleets in artisanal-fishery zones. Improvements in recycling and wastewater reclamation plants. Tourism increases, and service quality improves and diversifies into more sustainable activities.

Barbarization

Population increases, fauna decreases drastically and traditional fishing villages disappear as they depend on this resource. There is no improved regulation, reflected in the coastal environment, increasing risk and pressure on resources affecting sustainability. High costs for access to new technology and conservation measures decline. Climate change. Emergence of new industries, increasing dredging and breaking the ecosystem. Increasing air and water pollution for less control and environmental regulation. Uncontrolled tourism with greater environmental impact and the proliferation of fishing conflicts decreases income from both activities.

Annex V. Possible response options to address future changes

Mexico- classified in 7Ps afterwards by the researchers

Type of action	External stakeholders	Internal stakeholders
Policies	<ul style="list-style-type: none"> → Policy decentralisation process → Alignment with federal government agencies and projects → Creation of local policies according to local development. → Review of the governance system → Accountability → Payments for 'cargos' system → Policies to maintain success → Management schemes → Restoration of local governance system 	<ul style="list-style-type: none"> → Better income distribution → Creation of a financing institution based on communal income offering familiar or individual credits → Rent distribution among users → Look for extra funds
Programmes	<ul style="list-style-type: none"> → Infrastructure projects → Technical support 	<ul style="list-style-type: none"> → New investments → Reforestation programme → Promotion of territorial identity
Plans	<ul style="list-style-type: none"> → A clear development plan → Projects monitoring → Revision of current plans → Development plan → Communal statute revision → Land use plan → Reforestation process → Monitoring processes 	<ul style="list-style-type: none"> → Forest management plan revision → Promotion of territorial identity → Revision of forest management plan
Procedures	<ul style="list-style-type: none"> → Users inclusion → More interaction with the community → Individual and familiar projects/concessions → Collective investment projects → Community cohesion for the maintenance of its current traditional system → Strengthen the relation between research organizations and community → Strengthen communal organisation 	<ul style="list-style-type: none"> → Inclusive agreements between community and federal government → New investments → Social conflict in order to protect collective interests → Increase institutional links → Funding new forms of agricultural production → Firms' performance surveillance

Processes	<ul style="list-style-type: none"> → Strengthen some processes → Promote conservation culture → Development of a 'forest culture' 	<ul style="list-style-type: none"> → Defence of the territory against external threats
Products	<ul style="list-style-type: none"> → Investment sources → Adaptation to market processes → Entrepreneurial spirit → Human capital formation → The 'Comisariado' cannot be responsible for firms performance anymore → Better income distribution → Analysis of migration trends 	<ul style="list-style-type: none"> → Diversification of economic activities → Promotion of ecotourism
People	<ul style="list-style-type: none"> → Training and advice → Forest culture → Human capital formation → People really committed to firms' performance → UNSIJ's students involved into the community's activities → Reinforcing collectivism → Formation of human capital → Research projects → Education → Children's education → Promote social cohesion → Maintain the community-based management system → Gender equity 	<ul style="list-style-type: none"> → Knowledge about collective history in the community 'working together' → Training and advice provided by research organizations → Collective education philosophy → Formation of human capital → Modernization of customary practices

Colombia – what the community can do

Alto y Medio Alto y Medio Dagua	Bajo Calima
<p>Strengthening and evolution of the internal organization of the community</p> <ul style="list-style-type: none"> → Transfer of knowledge and leadership skills to younger generations. → Written reconstruction of the history of the community and its rules → Build local capacity to complement the traditional ecological knowledge. → Promote the participation of young people and approach to the process of reconciliation in mega projects beneficial to the community. → Search for job opportunities for local young people. 	<p>Organizational strengthening</p> <ul style="list-style-type: none"> → Revisit the role of Consejo and reinforcement of its role beyond employment generation → Reinforcement of the Junta Directiva as the ruling authority → The Community Council should be involved in designing policies for the territory.
<p><i>Concerted approach to natural resources management</i></p> <ul style="list-style-type: none"> → Maintaining the relationship with nature and the forest, strengthening and preserving the identity with the territory. → Participation of the Academia and increased integration of scientific and local knowledge. → The Community Consejo must commit to working with carbon market clean development initiatives. → Awareness among young people that the future is to work for the community. 	<p><i>Establishment of self-education and ethno-education</i></p> <ul style="list-style-type: none"> → Education based on deep knowledge of the territory. → Changing misconceptions about medicinal and crops plants. → Spiritual and religious education, so that young people know the traditional rites.
<p><i>Outreach and consultation between the Community Councils and external organizations</i></p> <ul style="list-style-type: none"> → Technical support of social and environmental organizations, to reconciliation actions conducted before the start offsets of megaprojects in the area. → Participation of environmental authorities in autonomous work processes to make these organizations work with the community. → Willingness of organizations to generate teams, which will allow the coordination between Community 'Consejos' and other organizations. 	<p><i>Use and management of forest</i></p> <ul style="list-style-type: none"> → Respect for regeneration cycles (times) of species and control over the intensity of extraction. → Forest land use planning to establish conservation-oriented areas.
<p><i>Use and land management (declaration as protected areas)</i></p> <ul style="list-style-type: none"> → Recover and preserve the practices of oral transmission of knowledge as part of the promotion of an education that generates identity and appreciation to the territory. → Teach children and young people about the use of natural resources that enables empowerment and community awareness. → Keep protected areas to allow the reasonable use of natural resources. 	<p><i>Increase impact on sustainable public policies</i></p> <ul style="list-style-type: none"> → Involvement of Community Consejos in Public policies.

Productive land management

- Identify farming families, promote their return to the abandoned land and improve their conditions, strengthening food security.

Argentina – classified in the 7 Ps as done by stakeholders

7 P	What the community can do	What the government can do
Policies	Measures of social protest (complaints, actions to require compliance with standards, cutting routes)*	Ban Act Artisanal Fisheries Act Coastal Law
Programs	Training programs and promoting integration between organizations Community environmental education outreach programs	Recycling Program Resource preservation program
Plans	Development of fishing terminal Plan for coastal planning and management of the reserve area	Construction of roads for Monte Hermoso and Pehúen C6 Plan for coastal planning and management of the reserve area
Procedures		Process control in the operation and work of the various actors
Processes	Process training organizations to discuss the problems	
Product	By-products of the fishing terminal	
People	To be educated To be informed	Turn down the level of corruption

*In discussions following the workshop, the research team considered that this measure would have better fitted the 'Process' category.

Annex VI. Analysis of robustness of response options:

Mexico – internal (left column, black smiley face) and external (right column, red smiley face) stakeholders

Responses	Scenarios	Resources reallocation	Policy dominates	Social entrepreneurship	Sustainable socio-ecological system	Chaotic world
Human Capital Formation	☺	☹	☹	☺	☹	☹
Training and advice	☺	☹	☺ ^{*2}	☹	☺	☹
Strengthen the links between community and organizations	☺	☹	☺ ^{*1}	☹ ^{*1}	☺	☹
Creation of local financial organizations	☺			☺	☺	
New sustainable investment projects based on individual and collective schemes.	☺	☹		☺	☹	
Strengthen customary practices and collective memory	☺		☺	☹	☺	☹
Economic activities diversification and modernization	☺		☺	☺	☹	
Grow the agricultural sector because of its key role in local economy	☺		☺	☺	☺	
Review and improve development and forest management plans	☺	☹	☺ ^{*3}	☹	☺	☹ ^{*4}
Implement an efficient accountability method in the governance system				☺	☹	
A 'cargos' payment scheme's implementation				☹	☹	

*¹ Specifically agreements between federal government organizations and the community; *² Subject to *¹; *³ Subject to *¹; *⁴ Reforestation plan.

Colombia: Bajo Calima (1) and Alto y Medio Alto y Medio Dagua

Response	Scenarios	Undesirable	Stable	Ideal
Bajo Calima				
Organizational Strengthening		☹☹	☺☺	☺☺
Establishment of self-education and ethno-education		☺	☺☺	☺☺
Land Use and management		¿?	☺	☺☺
Impact on sustainable public policies		¿?	☺	☺
Productive land management		¿?	☺	☺
Alto y Medio Alto y Medio Dagua				
Concerted approach to natural resources management		☺☺	☺	☺
Outreach and consultation between the Community Councils and external organizations		¿?	☺	☺☺
Land use and management (declare protected areas)		☺☺	☺	☺
Strengthening and evolution of the organizations		☺	☺☺	☺☺

Argentina

Response	Scenarios	Barbarization	Policy reforms	A new paradigm of sustainability
Social protest		☺	☺	<i>It would not be necessary</i>
Train and promote organizations		☺	☺	☺
Educate and inform about the environment		☺	☺	☺
Develop the fishing terminal		☺	☺	<i>It would have already been done</i>
Perform a coastal management plan and reserves		☺	☺	<i>It would have already been done</i>
Legislate the ban, artisanal fisheries and coasts		☺	☺	☺
Make recycling programs		☺	☺	?
				<i>Perhaps it would be necessary to re-adapt them</i>
Build the coastal road from Monte Hermoso - Pehuén Co		☺	☺	<i>It would have already been built</i>
Control the development of productive activities		☺	☺	☺
Lower levels of corruption		☺	☺	☺

Annex VII. Operationalization of response options

Mexico

RESPONSE OPTION	What do we have to do?	How do we have to do?	Who is responsible?	Flexible or reversible and costs	Environmental effect
External stakeholders (in a workshop)					
Training and advice	Basic education, business training, creation of the wood industry (improving current production processes),	Improve current processes through technical advice provided by external organizations such as Universidad Autonoma de Mexico (UNAM) and Universidad Norte Sierra Juarez (UNSIJ)	Local technicians groups, youngsters, and the external administration council (this council has to be nominated by the General Assembly, but, it will possess a certain degree of autonomy)	This response is reversible, due to training and advice does not affect the Socio Ecological System negatively. Community, external organizations and federal government are responsible for the implementation costs	Training and advice should improve forest conservations through better practices and development of better forest management infrastructure and plans
Strengthen the links between community and organizations	Community has to strengthen the links with the UNSIJ, Comision Nacional Forestal (CONAFOR), Secretaria Medio Ambiente y Recursos Naturales (SEMARNAT), Comision Nacional de Areas Naturales Protegidas (CONANP), (Servicios Ambientales de Oaxaca (SAO), Estudios Rurales y Asesoria (ERA), UNAM and other external organizations	Local authorities have to be informed about organizations' plans and programmes and sign some agreements subject to community's interests	Local authorities (it should be through a commission nominated by the General Assembly) and representatives of each institution (previously informed) are responsible for this task	Due to the response options nature, it is flexible in the sense that community has the power to limit or improve links or agreements depending on its objectives	This response is related to the training and advance suggestion. So, conservations practices could be improved through the relationship between organizations and community
Reviewing and improving development and forest management plans	The current plans have to be revised and adapted to current conditions	All involved agents have to participate in plans elaborations processes, which have to be conducted based on participatory methods (including internal and external Stakeholders)	Organizations such as SEMARNAT, federal government, UZACHI, CONANP, CONAFOR, SHCP, SAO, ERA and the General Assembly are responsible. The majority of participants suggested that national policies have to be	This response is not flexible and reversible at all because of development and forest management plans time horizons, 3 and 10 years, respectively. If there is a mistake, their rigidity will not allow to amend it in the short-term	If development and forest management plans were elaborated in a consistent manner, forest conservation would be better. Conservation infrastructure and knowledge improve forest status

			considered into plan's elaboration such as fiscal ones		
Creation of local financial organizations	The community has to implement a financial scheme in order to fund local projects	Financial organizations have to offer credits to commoners or settlers to implement familiar or individual projects in the territory. But, it has to be based on external sources	External financial organizations and federal government are responsible for this task	The flexibility and reversibility degree of this option is not certain due to introduction of external financial organizations increase the possibilities of find a fraudulent one as has been already occurred. Its reputation is not easy to recover (reputation is one of the most complicated issues in the community and its irreversibility is not straightforward)	There will not be significant environmental effects (at least, directly)
New sustainable investment projects based on individual and collective schemes	Currently, collective activities are not providing enough individual welfare. So, it is important to generate individual projects	Individual projects have to be based on private concessions to individuals or families or groups inside the territory	Local authorities and General Assembly are responsible for these concessions supported by federal legislation	Reversibility is not straightforward due to the interaction between individual and collective project is still resilient in the community. Current rules are not flexible to implement these concessions	Individual or familiar or group's concessions should increase resource extraction levels or some threats to forest conservation
Strengthen customary practices and collective memory	Customary practices and collective memory have been weakened because of several factors. But, they have to be strengthen	Basic education is the best way to approach this issue. External prototypes are threatened customary practices on young inhabitants, so, children have to be educated promoting collective memory in primary and secondary school (and/or at home)	Heads of families, teachers, primary and secondary staff are responsible to achieve this task	The flexibility of this measure is not clear due to basic education teachers (lecturers) come from outside the community and they are resilient to customary practices and collective memory. However, if they are from the community or educated in a similar context, knowledge transmitted by them should be aligned to these initiatives	Customary practices and collective memory are essential for forest conservation, otherwise, the current forest status could be different
A payments scheme on 'cargos' system	The community cannot still remain functioning without cargos system payments. They need to earn some money for	Workshops' participants indicated that the best way to implement this payments scheme is	The commoners are responsible for this task	Flexibility is not ease duo to it represents a controversial issue in the community. The General Assembly rigidity should limit this	Indirectly, this response should improve local authorities performance, which leads to a better

	their job. Otherwise, a 'cargo' may be seen as a punishment	through the approval of the General Assembly.		initiative	conservations practices
Internal stakeholders - follow up interviews					
RESPONSE OPTION	<i>What do we have to do?</i>	<i>How do we have to do?</i>	<i>Who is responsible?</i>	<i>Flexible or reversible and costs</i>	<i>Environmental effect</i>
Training and advice	The community needs forest management training and advice provided by diverse organizations and universities. The best manner to do this is through project proposals in which young people get involved and design advice programmes	Santiago Comaltepec should support its development and future plans on training and advice given by some organizations (all included into external Stakeholders category). The General Assembly should be the platform to ask for a specific training and advice. This response may be addressed to young inhabitants.	The UZACHI should place an important role in this activity. The UNAM should be a sourced of high education related to administration and accountability. The UNSIJ should be responsible for the technical advice. Local authorities will be responsible for workshops or training sessions	This response is flexible and reversible due to the community possesses the capacity to limit or break down agreements hold with diverse organizations and it could amend the contents of courses and advice	Training and advice promotes better conservation practices. Commoners and settlers acquire knowledge to improve their current relationship with the resource. Their effects would be transmitted through better forest management plans
Strengthen the links between community and organizations	Hold a close relation between organizations and the community. Also, communication between organizations and the community has to be strengthen	Governmental organizations have to be invited to support local development. Also, some forums have to be organised in order to communicate programmes and projects offered by the organizations. Likewise, collaboration agreements have to be signed	The community and organizations are responsible for this task. Inside, municipal and communal authorities are on charge of it (through a special commission pointed out by the General Assembly)	This option is flexible and reversible in the sense that community is able to decide about its partners and the reversibility is straightforward	Environmentally, this response should improve conservation practices in the same way that training and advice do. The interaction between community and organizations allows that more information can be shared.
Reviewing and improving development and forest management plans	The community has to revise current plans and they are subject to be tested	The General Assembly must be the principal actor in the plans' elaboration process. Also, the participatory methods have to be carried out in order to obtain most of the	Municipal and Communal authorities and ex-authorities, Union Zapateca Chinanteca (UZACHI, i.e. the forest company), CONAFOR, Secretaria de	This response is not flexible at all and its reversibility is not ease. Time inconsistency should create some problems due to municipal and forest management plans are made for 3 and 10 years, respectively	Its impact over the forest is relevant due to forest management plan establish how the resource will be used in the next ten years

		actors' point of views. Monitoring is also important to evaluate how the new plans will be developing	Agricultura, Ganaderia, Agricultura, Dearrollo Rural y Pesca (SAGARPA) and SEMARNAT have to be included into the discussions and elaboration processes		
Creation of local financial organizations	The community is conscious about the local lack of financial resources to invest on familiar and/or individual projects. The necessity of local financial organizations is crucial for future plans	Currently, there is a controversy against an external financial entity because it defrauded some commoners. So, the best manner to install a financial institution in the community is through own resources. This institution should be created and supervised by the General Assembly, but, do not operated by the Assembly (funded by communal monetary resources)	The General Assembly and a special commission (nominated by the Assembly) will be responsible for this task. It is clear that the commoners should be the surveillances	Reversibility should be complicated due to some community's members are resilient to individual or familiar projects. So, if there is a local financial institution funded by communal sources, there would exist an internal dispute	The impact of this response over natural resource is not relevant, at least not directly, it depends upon the projects that would be implemented with these sources
New sustainable investment projects based on individual and collective schemes	Commoners and settlers are not being benefited at all by the current communal structure. So, in order to improve their welfare some individual projects are required	The General Assembly has to allocate territorial, temporal and financial sources in order to promote individual projects, under collective scheme (funded by the local financial institution)	The actors responsible for this task are the commoners, settlers, local authorities and external organizations that are able to fund these projects	As has been mentioned, there is a controversy between individual and collective behaviours in Santiago Comaltepec. So, if individualism is the main ideology, reversibility would not be straightforward	If the collective scheme and the land use are not really modified, there will not be significant impacts on the environment. Otherwise, pressures over the resource would arise
Strengthen customary practices and collective memory	In the last years, customary practices and collective memory have been weakened due to external pressure over the system. But, they must be strengthened in order to preserve good conservation	The implication of this response involves a hard work based on integral initiatives, which includes research, historical documentation, workshops, and collective	Elders, youngsters, migrants, men, women, local authorities, local schools, teachers, citizens and researchers have to be involved in this task	If some of these initiatives would be implemented, reversibility would not be a relevant issue	Regarding environmental impacts, the customary practices and collective memory have been the basis of the current conservation status. So, if the community improves them, the resource

	practices and hold their culture and traditions. Research initiatives have to be conducted (historical)	work. The best way to face this task is basic education.			will be affected in a positive way
A payments scheme on 'cargos' system	A payments scheme has been established in the 'cargos' system. But, it has to be monitored subject to local authorities' productivity	Municipal and communal authorities have to manage projects that generate some benefit for the community. So, their payment is subject to the number of projects or productivity that they can show to the General Assembly	Local authorities and the General Assembly are responsible for this task	In this case, reversibility is not straightforward due to once this scheme has been implemented, future generations will not work as a local authorities unless they get a payment. The cost of this response is charge to the communal sources	Currently, the governance system is one of the strongest factors of environmental sustainability. So, any improvement in it, will lead to better conservation practices

Colombia

Response options*	What is needed to implement this option response (e.g. use of incentives, development of rules and standards)?	Which actors should be involved in the implementation of this answer choice? (Who and when)	How does the response option affect to the Community Council and its territory?	How does the response option affect to men, women, young and older adults?	What is the relationship between this response option and the other response options?
Bajo Calima					
<p>Organizational Strengthening (1)</p>	<ul style="list-style-type: none"> · Improve communication · Assume more respect in the making and the word (when we are in power we forget what is written) · We need training on rules and standards · Improving our being aware: it's like love each self, the territory do not feel us. · Increased responsibility to choose leaders, be aware and think what is best for Community. Not all leaders have the same feeling or the ability to appropriate, each leader has their thinking and lead; therefore, we have to know who we are going to choose and we know the people who come to stand as representatives of the community. The leader must have a sense of belonging; sometimes that is trained not able to take responsibility, but may be able to train without taking responsibility. I cannot be a leader if I do not communicate and if I have no sense of belonging. · Control the dignitaries, establish oversight. Discuss things and engage in what the leaders know if they meet their work or not. · Creating a governance school. We are not prepared to manage what we 	<p>INTERNAL</p> <ul style="list-style-type: none"> · The community · Children and young people · Experienced leaders · Community Council · Teachers · Olders · The board · Committee veredal · Fundapav and Ecobios <p>EXTERNAL</p> <ul style="list-style-type: none"> · Instituto colombiano de bienestar familiar (ICBF, Colombia Family Welfare Institute) · Universidad del Valle · The Pacific University · Servicio Nacional de Apredizaje (SENA, National Learning Service) · City Hall · House of Justice. 	<ul style="list-style-type: none"> · Best Leaders · Improve communication · Better academic preparation · Improving the quality of life of the community · It would improve the sense of belonging · Better handling of territory · Less conflict, there would be no weapons or dredges would be a calmer territory. 	<ul style="list-style-type: none"> · Women and young people would have more and better participation. Could better balance participation and shortening gap between elderly and young people. 	<ul style="list-style-type: none"> · This option is which organizes everything. Everything depends on this. Being organized is easy to solve everything.

	<ul style="list-style-type: none"> have. Achieving economic resources. 				
Establishment of self- education and ethnic education (3)	<ul style="list-style-type: none"> Dissemination of ethno-education plan already held in Calima Ministry of National Education should include this plan in its curriculum, lack recognition. The Ministry is the one that makes us lose our identity. Ministry also depends in part the ethnic education plan applies. They must generate a commitment for mandatory implementation. Trained and committed to the cause teachers needed. * Increased awareness. 	<p>INTERNAL</p> <ul style="list-style-type: none"> Community Council <p>EXTERNAL</p> <ul style="list-style-type: none"> Ministry of National Education Secretary of Education Educational Organizations ICBF 	<ul style="list-style-type: none"> More land ownership Recovery of ancestral customs, traditional practices. It would be easier to spread the information to be a common language that improves communication. More and better knowledge of the territory Best representativeness (anyone can represent), with better leaders * Improved quality of life. 	It would not be differentiated, the same for everyone.	
Use and management of forest (2)	<ul style="list-style-type: none"> Appropriating the management plan made in 2000/2003 (culture areas, reserve areas, etc.). Strengthen standards already, through sanctions to support fulfilling. Monitoring is only in the reserve area, you have to expand it. Find resources to undertake initiatives to preserve and protect the forest. Search for alternative income to replace activity logging. Raise awareness and sensitize the community on the use and management that should be given to the forest. 	<p>INTERNAL</p> <ul style="list-style-type: none"> Community Council <p>EXTERNAL</p> <ul style="list-style-type: none"> Ministry of the Environment CVC Incoder 	<ul style="list-style-type: none"> Cooler air More wildlife greatest biodiversity We could have control of the forest Less pollution It minimizes global warming, climate change, Increased water sources 	Man is who makes use of the forest the most (not in all areas). Positively affected equally	

	<ul style="list-style-type: none"> Find ways to consultation with the Corporacion autónoma regional de Valle Cauca (CVC). In Calima no permission to logging, although our economic source is wood, for the state that is crime. 				
Impact on sustainable public policies (4)	<ul style="list-style-type: none"> We must start from the beginning, be well organized, with leaders or professionally trained. Have a representative within the policy, to have a true representation. Alliance with a political party, belonging to uno.Si we are organized, we will have people in Congress, in the Senate. It takes resources to get there (if suddenly we are organized is no longer needed). * It is necessary to define their own policy, to walk where we want, what we want to do. If we define itself into the future, the rest is given. That will be the path where it is heading. 	<p>INTERNAL</p> <ul style="list-style-type: none"> Community Council Other Community Councils Allied Organizations 	<ul style="list-style-type: none"> Better control of territory Better Benefits Political Control More autonomy 	No differing effects	
Productive land management (2)	<ul style="list-style-type: none"> We must be well organized. We need economic resources and advice to farmers by technicians and professionals. Policy to help organize the tourist sites. Crop production and consistent with the territory (ancient practices) Strategies. Interagency support from entities outside for ideas and projects go to flower. Public policy that is consistent with our ancestral practices, ie, a 	<p>INTERNAL</p> <ul style="list-style-type: none"> Community Council Fundapav and Ecobios <p>EXTERNAL</p> <ul style="list-style-type: none"> Incoder Ministry of the Enviroment Minity of Agriculture SENA Universities 	<ul style="list-style-type: none"> Increased revenues Increased productivity Improved quality of life More and better control of the territory Conservation of natural resources 	No differing effects	

	<p>sustainable policy.</p> <ul style="list-style-type: none"> · Improving our knowledge: knowing what resources we have, what our potential. · Encourage our young people learn to produce, strengthen crops (corn, papachina, banana, etc.). · Strengthen exchanges, explore who we are going to sell. · Strengthen the diet in our territory. · To influence public policy for the promotion and sale of products. · Progress in transformation processes of raw material. · * To promote eco-tourism. 				
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Alto y Medio Alto y Medio Dagua

<p>Concerted approach to natural resources management (4)</p>	<ul style="list-style-type: none"> · Having a sense of belonging to the territory, knowing what links people to the territory · Rescue the knowledge to incorporate the education of children, to convey the message to the next generations to value the resources of the territory. Visible traditions. Teaching children and youth how to sow, how to fish, how to hunt. · Enforce internal rules to generate commitment and be aware of neighbours to improve compliance with the rules. · Make the outsiders to educate, to be formed and that if those who do become part of the collective territory management. 	<p>INTERNAL</p> <ul style="list-style-type: none"> · Families · Local organizations · Community Council <p>EXTERNAL</p> <ul style="list-style-type: none"> · State Organizations · National Government · CVC · Environmental and military to control territory Cops. 	<p>(This question is repetitive response option use and land management)</p> <ul style="list-style-type: none"> · Benefit to forests and agricultural systems. · If the resources are well managed can enhance the ability to organize the territory and livelihoods. 	<ul style="list-style-type: none"> · Young people and children are helped to raise awareness about why conserving natural resources · In general, both men and women improve individual and this in turn the collective. · So undifferentiated generates a sense of belonging, economic traditions recover. · It should work on land management from the family, as if the territory is complete, the children do not have to go from one place to another for training, but in the same territory is everything. 	
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<p>Outreach and consultation between the Community Councils and external organizations (3)</p>	<ul style="list-style-type: none"> · Developing relationships based on rules for the relationship between the council and organizations outside the territory. · Improve communication channels so that those who come from outside the territory see that if an organization. · The community council must agree to organize how you will communicate, what is going to communicate, it must be a single voice to speak for the collective interest. · Enforce the territory. · The community council must be persistent in order to be traced, provided consistent with the steps, look for ways how they can resolve conflicts. · Engage entities to the enforcement of the rules is done in addition to the same council makes its internal control. 	<p>INTERNAL</p> <ul style="list-style-type: none"> · Primarily community leaders, but community support · The community council · Other organizations that are part of the board or with whom we have agreements. <p>EXTERNAL</p> <ul style="list-style-type: none"> · CVC · Mayor · Interior · Ministry of Tourism and Development · Foundations and NGOs. 	<ul style="list-style-type: none"> · We improve manageability. Generates benefits that can be managed more resources and community projects. We seek to have more conventions and agreements to strengthen our goals. · Facilitates relationships with other entities to optimize the processes of internal structure of the community council. 	<ul style="list-style-type: none"> · To young people and children because there are more opportunities for education and training for young people. · Personal Growth older adults. · In men: the recognition of their work and better remuneration payment. · Women: increased employment and places available. · Old people: recover their ancestral knowledge, having a space for its development. · Prevents migration of young people because there are local productive alternatives, education and employment. · The opportunity to come to training youth and adults improved technology in production systems and that benefits the community in general helps the economy of the region. 	
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<p>Use and land management (declare protected areas) (2)</p>	<ul style="list-style-type: none"> Environmental education: educate and sensitize people on the management of natural resources, you must create a sense of belonging against the territory. From the home and school to teach children awareness of natural resource conservation workshops not only external but also train adults 'turn back the ancestral knowledge and put it into dialogue with current knowledge.' Take advantage of available resources using because what is necessary and what will reward using. As an area with little employment must seek strategies and alternatives so people should not depend heavily on the forest Organize the rules, enforce, monitor and control from the same Community Council extractive activities. 	<p>INTERNAL</p> <ul style="list-style-type: none"> The community and its leaders who ultimately are responsible to replicate the knowledge acquired and be spokespeople in other communities. From the family, which is part of this environment and construction process. Internal Organizations same advice: the joint action and indigenous community to be with those who share the territory councils. <p>EXTERNAL</p> <ul style="list-style-type: none"> CVC: the community should be very oriented to receive their continued support in the management of natural resources. Educational organizations Ministry of Environment Ministry of Agriculture and Rural Development 	<ul style="list-style-type: none"> The positive effect, improving the quality of life of the inhabitants of the territory of the Community Council. Manage external support and attract more international cooperation Promotes species abundance because it fails to protect biodiversity. Possible threat can approach other foreign actors who can affect resource negatively, because they are able to reach different places to take advantage of the resources, since when there is abundance and prosperity in the production of resources, it becomes attractive to actors outside the local area. 	<ul style="list-style-type: none"> Improving the health and wellbeing of children mainly, also men and women alike. The income differences between gender reflected that men have jobs, more money, while women benefit from the employment of men. In the long term, the children benefit from this strategy for conservation. 	
<p>Strengthening and institutional development (1)</p>	<ul style="list-style-type: none"> Greater proximity to the organizations and bodies that are part of the management of natural resources have an office of the CVC, where 	<p>INTERNAL</p> <ul style="list-style-type: none"> PCN: to interact at national and international level 	<ul style="list-style-type: none"> You start to build a story, so we will know how to built the Community Council 	<ul style="list-style-type: none"> It will reconstruct history, to retrieve the history of the 	<p>Strengthening organizations is the answer choice that is related to the other</p>

	<p>environmental authority has more direct control over the jurisdiction of territory control.</p> <ul style="list-style-type: none"> · Institutional Education leaders, but also to combine formal education skills. · Make talks, workshops investigating the processes of black communities that have not been documented, there is much wealth in oral tradition but start to write. · * Harnessing the ancestral knowledge to replicate, to know the History, Traditions and ancestral organizations. Bringing older talks through to recount how the land and how to exercise justice, so that ideas are driving governance practices of the past will be resumed but meeting scenarios and present contexts. <i>'Por ejemplo cuando una persona hurtaba algo lo agarraban le encamaraban lo hurtado y que saliera a pregonar que el se había robado eso, y el castigo era un castigo que trabaja de educar y no a castigar porque lo que conllevaba era que le diera vergüenza entonces no lo volvía a hacer. Quienes eran los jueces, siempre los mayores y eran los que dictaminaban qué hacer en caso de que alguien cometiera. Aunque no estaban escritas se conocían perfectamente'.</i> 	<p>rescuing memories</p> <ul style="list-style-type: none"> · Community Council ('It must be the general assembly, because one way or another we are convinced that from the smallest to the oldest has to teach') <p>EXTERNAL</p> <ul style="list-style-type: none"> · The academy through universities 'we who should tell the story, tell the story no one for us.' 	<p>for where to go and what to do to reach your goal.</p> <ul style="list-style-type: none"> · Allows you to set the path to continue the evolution of organizations, not stay in past contexts, advancing with the rules and regulations, community processes as they move into the territory. 	<p>community and will be able to contribute effectively in strengthening the territory. It affects everyone equally.</p>	<p>options, since through it the communities achieve greater: autonomy, identity, empowerment and recognition of the territory. If there is a building, the community may approach a concerted management for use and land management, through more egalitarian relationships with the organizations or external entities. The management of natural resources is linked to institutional strengthening through training of children and youth in the community and to strengthen the traditions and culture. It is necessary to prioritize the strengthening because one must begin by establishing the objectives of the community, meet the collective and strengthening organizations and addressing guidelines to ensure standards, opportunities and threats.</p>
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*Number in bracket refers to the order in which the stakeholders considered the responses need to be implemented.

Argentina

ACTIONS	WHAT?	WHO?	HOW?
Train and promote organizations	<ul style="list-style-type: none"> → Educate: give knowledge. → Spreading Ideas → Recognize/validate the existing associations → Promote the creation of more associations 	<ul style="list-style-type: none"> → We (being protagonists) → Experts/ technicians → Municipal/local government → University 	<ul style="list-style-type: none"> → Communicate and convene → Workshops and courses to address specific topics → Dissemination → Events at the beach → Development of networks
Educate and inform about the environment	<ul style="list-style-type: none"> → Provide expertise in schools → Teach the kids about the benefits of sustainable world and operate on adults → Share knowledge 	<ul style="list-style-type: none"> → Schools → Families → NGOs → We/ourselves 	<ul style="list-style-type: none"> → Inviting participants → Working together → Going to the country side → Workshops (more practice) → Training educators
Legislate the ban, artisanal fisheries and coasts	<ul style="list-style-type: none"> → Write or update laws → Create standards 	<ul style="list-style-type: none"> → We (through bills) → Political representatives (3 levels), provincial up to 12 nautical miles 	<ul style="list-style-type: none"> → Agreement/consensus over legislation → Dissemination (media) → Political Contacts → Social Protest
Control the development of productive activities	<ul style="list-style-type: none"> → Setting limits and apply → Enforcement of the regulations 	<ul style="list-style-type: none"> → Prefecture → National Service for Health and Agro-environmental (SENASA / Food Science) → Various agencies of municipal power → Provincial level: Provincial Organization for Sustainable Development (OPDS) → Own stakeholders from building networks and making complaints 	<ul style="list-style-type: none"> → Complaints → More controlling, surveillance and monitoring → Fines and solidary liability
Lower levels of corruption	<ul style="list-style-type: none"> → Lower levels of corruption 	<ul style="list-style-type: none"> → All levels of society ('us' and 'them') 	<ul style="list-style-type: none"> → Expanding community awareness → Strict Penalty ('which goes around comes around') → Justice / Prison