A participatory process for developing a regionally appropriate climate change curriculum in Pando, Bolivia

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ABSTRACT

Climate Change is an issue that is affecting many countries around the world. Bolivia is very vulnerable to the negative effects of climate change mainly because of its high biodiversity and limited capacity to respond to adverse events. Bolivia has therefore been developing a series of documents related to climate change and education. In 2009, a new educational law was approved. Currently, Bolivia is in the process of implementing a new national curriculum, which now needs to be regionalized and diversified.

This project seeks to support that diversification. The main objective was to develop a participatory process for creating a regionally appropriate climate change curriculum in educational curricula in Pando, Bolivia.

The project was conducted in the summer of 2012 (May – August) in Cobija, the capital city of Pando. This involved a participatory process with school principals and teachers actively involved. I carried out the organization of workshops by training a support team, recruiting teachers, distributing materials on the national curriculum and climate change, and moderating workshops to encourage teacher participation via discussion and design of curricular materials.

The use of participatory methodologies made learning more active and meaningful in order to motivate post-workshop applications of results by teachers in their schools.
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1. Introduction

Climate change is an ongoing issue that is affecting everyone on the planet. It is already impacting natural, social and economic systems in many nations. The United Nations Framework Convention on Climate Change (UNFCCC) establishes that adaptation and mitigation strategies are important in order to address climate change (UNFCCC, 2006). Adaptation and mitigation strategies for climate change must have a strong educational component, training and public awareness because people must understand potential measures in order to adapt to negative effects of climate change. The UNFCCC also recognizes that fully involving individuals and communities is key in the success of strategies to address climate change, as well as public participation, access to information and international cooperation (UNFCCC Handbook, 2006). The need for immediate action is clear, as stated in the Article 3 of the United Nations Framework Convention on Climate Change (UNFCCC, 2006):

"It should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects and lack of full scientific certainty should not be used as a reason for postponing such measures ... " UNFCCC, 2006.

These measures result in the need to change attitudes and behavior through education, reinforced by many multilateral environmental agreements such as the Proclamation of the United Nations

Article 6 of the UNFCCC establishes education, training and public awareness as key objectives to address climate change (see Figure 1). Parties are expected to promote and facilitate these objectives at national, regional and sub-regional levels (UNFCCC Handbook, 2006).

Figure 1: The objectives of Article 6 of UNFCCC – Promoting Public Participation

As in other parts of the world, climate change is an important issue in Bolivia. Bolivia is highly vulnerable to the negative effects of climate change for several reasons: the existence of high biodiversity sensitive to environmental changes; high levels of poverty and a lack of human resources to develop and implement adaptation and mitigation strategies; and the water supply in
many regions of the country depends on sources such as snow melt that may be impacted by climate change. Bolivia has been identified as being especially vulnerable to extreme weather driven by climate change. The negative effects of such events can cause the loss of biodiversity, as well as lows of agricultural production, alterations in water regimes and public health problems, with vulnerable populations such as children, the elderly, pregnant women and poor people (SNCECC, 2009).

1.1 Climate Change in the Curriculum of the Bolivian Education System

Environmental education, an important component of raising awareness and changing attitudes, had its beginnings in two foundational important documents. The first document was the Belgrade Charter (UNESCO-UNEP, 1976) and the second was the Tbilisi Declaration (UNESCO, 1978). The Belgrade Charter was adopted by a United Nations conference at Tbilisi, USSR and provides a widely accepted statement of goals for environmental education. Environmental education is rooted in the belief that humans can live in a compatible fashion with nature and act equitably toward each other. Another fundamental belief is that people can make informed decisions that take into account sustainability, that is, the well-being of future generations. Environmental education therefore aims for a democratic society in which environmentally-literate citizens effectively participate in societies that are sustainable.

Bolivia has 20 years of history developing programs, strategies and documents related to environmental education, climate change and educational policy (Figure 2). Bolivia is part of the United Nation Framework Convention on Climate Change (UNFCCC) and as a consequence
developed many strategies between 1995 and 2009, such as: the National Climate Change Program, First and Second Communication on Climate Change, and the National Strategy for Education and Climate Change Communication, among others. The goal of these strategies is to integrate climate change issues into the educational process in order to induce society to adapt to environmental change.

In 2009, the new State Constitution was approved. The document requires that Bolivia structurally change the education system. In 2009, the Ministry of Environment approved the National Strategy on Environmental Education, and in 2010, the Ministry of Education developed the Plurinational Curriculum Education System and a Core Plurinational Curriculum Design.
The Educational System in Bolivia had been changed several times since 1994 (Figure 3). Before 1994, behaviorism was the educational model that Bolivia followed. The main characteristics of this model can be described as a closed curriculum based on objectives with the teachers fulfilling the role of instructor with a passive student. In 1994, the Educational Reform was passed (Law 1565) requiring a more open and flexible curriculum based on competencies, and the teacher was given the responsibility to provide support to active and creative students (Fonturbel, F. 2004). Finally, in 2010, the Avelino Siñani–Elizardo Pérez, Law (070) was approved. This law is based on holistic objectives with a strong social component tied to
contributions to community, with the teacher being an entrepreneur whose task is to ensure productive students.

Figure 2: Changes in the Bolivian Educational Model 1994-2010

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum</td>
<td>Closed</td>
<td>Open, flexible</td>
<td>Real, loyal, decolonized</td>
</tr>
<tr>
<td>Didactic</td>
<td>Knowledge</td>
<td>Know, live, do, be</td>
<td>Practice, theory, evaluation, production</td>
</tr>
<tr>
<td>Content</td>
<td>Cognitive, psychomotor, affective</td>
<td>Conceptual, procedural, attitudinal</td>
<td>Scientific, technical and technological</td>
</tr>
<tr>
<td>Curriculum instructional planning</td>
<td>OBJECTIVES: Verb, content, condition, level</td>
<td>COMPETENCIES: Performance, content, context, process</td>
<td>GUIDING, HOLISTIC OBJECTIVES: Be, know, do, decide</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Memorization of knowledge, abilities and behaviors</td>
<td>Abilities, skills and knowledge</td>
<td>Values and attitudes, knowledge and skills, and practical skills, transformation and transcendence</td>
</tr>
<tr>
<td>Individual</td>
<td>Passive employer</td>
<td>Competitive technician</td>
<td>Transcendent</td>
</tr>
<tr>
<td>Teacher</td>
<td>Instructor</td>
<td>Support</td>
<td>Master entrepreneur</td>
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<td>Student</td>
<td>Passive</td>
<td>Active, creative</td>
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</tr>
<tr>
<td>Instrument</td>
<td>Text</td>
<td>Module</td>
<td>Chapter</td>
</tr>
</tbody>
</table>

Source: Socio Community decolonizing curriculum, 2011

1.2 Political and Administrative Decision-making Levels for the Implementation of the New Educational Model in Bolivia

In the context of the new Bolivian Constitution and Law 070, the Ministry of Environment and Ministry of Education have worked to develop documents, policies and strategies related to climate change and education. However, the implementation process has been slow, so some policies remain only on paper. One key issue is that the communication between the Ministries has not been frequent, resulting in duplication of efforts, expenditures and slower progress than
might have been permitted by a more coordinated approach. While the Ministries have important contributions to make in education and climate change, they need to improve communication in order to more efficiently produce results (Figure 4). Consequently, there remains a need to advance the development of curricula and teaching tools in order to implement current educational policy in Bolivia.

Figure 4: Political and Administrative Decision-making Levels for the Implementation of the New Educational Model in Bolivia

Source: Author’s elaboration, 2012

Besides challenge of coordination among ministries, there are other factors that contribute to lack of effective application of the new Educational Law, such as:
• Lack of vertical communication among governmental agencies at the national, departmental (regional) and local levels.
• Overlapping of functions or vaguely defined functions at different levels of government (national, departmental, local).
• Limited diffusion of Education Law 070, especially to the local and departmental levels.
• Lack of well-trained personnel in the new curriculum who can in turn train other teachers.
• Few in-service training opportunities for teachers.
• The Educational Council of Indigenous Peoples\textsuperscript{1} have been developed 7 regionalized curriculum (second level of curriculum implementation) so far, however, those are limited to indigenous cultures and do not take into account a mestizo population.

1.3 Conceptual Framework to Address Climate Change in Bolivia

Integrating climate change issues into the educational curriculum is fundamental to developing human resources that will increase the population’s capacity to plan for and respond to the negative effects of climate change. I therefore reviewed Bolivia’s new education model as developed by the Ministry of Education, focusing on the issue of implementation at the regional and local levels, particularly with reference to the issues of adaptation to climate change. Based on that review, I developed the conceptual framework of this project, which seeks to support local and regional implementation of a climate change curriculum in Pando, Bolivia. The

\textsuperscript{1} The Educational Council of Indigenous Peoples (CEPOS its acronym in Spanish) is organization of social participation in education of indigenous nations in Bolivia (Bolivia has 36 indigenous nations recognized in the Constitution). Currently are eight CEPOS nationwide: Aymara, Amazon Multiethnic, Quechua, Guarayo, Chiquitano, Guarani, Mojeño, and Yuracaré (www.cepos.bo).
conceptual framework has three main parts which are interconnected each other, as shown in Figure 5.
Figure 5: Conceptual Framework to Address Climate Change Capacity Building in Bolivia

Source: Author’s elaboration, based on Education Ministry of Bolivia information, 2012
The triangle-shaped feature in the middle of the figure shows the three types of actions needed to confront climate change in Bolivia, including 1) mitigation strategies, 2) adaptation strategies and 3) education. I focus on education as a complement to adaptation and mitigation strategies. Education as capacity building in turn supports adaptation and mitigation; the three must work in tandem. In turn, education for climate change is related to the other components of the figure, namely Bolivia’s Education Law and its implementation at various levels. Therefore, Figure 5 shows the education component of climate change response as linked to the other parts of the figure.

The blue figure made of squares embedded in a circle, which is located in the upper left corner, and the three green rectangles located in the lower left corner, together reflect the new educational model in Bolivia. The new curriculum is based on a holistic objective with strong a strong social component. This curriculum differs markedly from the past in that it strongly embraces the concepts of “to be” as related to spiritual values, “to know” as related to scientific knowledge, “to do” as related to productive activities, and “to decide” as related to empowerment and policy making. This curriculum is also consistent with societal goals and values, and decentralization, taking into account theory, practice, evaluation and production as integral and inseparable parts of experiential learning in the educational process of students.

The curriculum includes four fields, each composed of different areas, including “universal knowledge.”2 An important part of the curriculum relates to the “linchpins”3 that make possible

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2 Universal Knowledge refers to the scientific knowledge taught around the world and includes mathematics, physics, chemistry, biology, and literature, covering law, axioms, and postulates well-known around the globe.
the articulation of theory and practice in a real world context. There are 4 articulator linchpins: socio-community values, various types of cross-cultural interaction (inter-, intra-, and multicultural), education for production, and living in coexistence with mother earth and community health. The last linchpin encompasses the issue of climate change, and includes different components like environment, community health, and risk management. Climate change is articulated with a number of topics like forest, water, food, diseases and emergency response. This portion of Figure 5 provides the framework for education on climate change adaptation in Bolivia and in this project.

The final component, consisting of three rectangles (red, orange and green) located in the lower right corner, is related to implementation levels of the educational curriculum. Although important strides have been made in visualizing the conceptual underpinnings of the desired plurinational curriculum for Bolivia as a whole, today it still has not been adapted to the regional and local levels and thereby contextualized for effective implementation. Bolivia is a diverse country, with biophysically different regions as well as varying cultural identities and “cosmo visions,” and this diversity needs to be reflected in regional and local curricula. Even though the new Education Law 070 specifies that the curriculum must be regionalized and diversified, the efforts of the Ministry of Education to accomplish this have not advanced at the regional and local levels.

In Figure 5, the Plurinational curriculum has three levels of implementation:

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3 Linchpin refers to articulator axes (ejes articuladores).
4 Cosmo vision or “worldview”, is the indigenous point of view of the surrounding the environment.
• **First Level – National implementation:** This refers to the core Plurinational curriculum, which has been developed. This is the document that specifies the priority areas of knowledge and content at the national level, which is intended to serve as an umbrella to be followed in the educational system in Bolivia.

• **Second Level – Departmental / Regional implementation:** This is still in the process of development. However, the implementation of regionalized curricula depends on autonomous regional institutions. As recognized in the Bolivian Constitution, Bolivia has 36 nations, grouped into seven regions that each need to develop regionalized curricula under the new education law. The parameters taken into account for the division into seven regions were: the territory, language, worldview, knowledge, skills, cultural practices, and needs of each region (CEPOS, 2013). The seven regions, with their indigenous groups (and administrative departments), are:

  o Chaco Region: Guarani, Wenayek and Tapiete (Santa Cruz, Chuquisaca and Tarija)
  o Valles Region: Quechua (Cochabamba, Potosí, Chuquisaca, Oruro, La Paz and Tarija).
  o Altiplano Region, Yungas and Lakeside: Aymara, Uru and Afro-Bolivia (La Paz, Oruro, Cochabamba and Potosi).
  o Eastern Region: Chiquitano, Guarayos, Ayoreo and Guarasue (Santa Cruz).
  o Amazon Region South: Yuki, Yurakaré, Mojeño, Ignatian Mojeño Trinitarian Canichana, Siriono Baure, Xaverian, Movima, Cayubaba, More, Joaquiniano, Itonama (Santa Cruz, Beni and Cochabamba).
- Central Amazon Region: Tsiname, Mosetén, Leco, Uchupiamona, Maropa, Tacana I (Beni, Cochabamba and La Paz).
- Northern Amazon Region: Yaminahua, Machineri, Esse Ejja, Tacana II, Cavineño, Chacobo, Pacahuara, Araona (Pando and La Paz).

The Educational Council of Indigenous Peoples has been developed 7 regionalized curricula: Aymara, Quechua, Guarayos, Chiquitano, Guarani, Mojeno, Ayoreode. However, they do not all 7 regions listed above. In particular, there is still no regionalized curriculum developed for the Northern Amazon Region (Pando and Beni). Overall, none of the regionalized curricula has been implemented.

- **Third Level – Local / Classroom Implementation:** This level involves processes to diversify the core curriculum to respond to local realities. This has not begun yet. Implementation at the local level is intended to operate thru the grassroots, at the school level, via teachers who know the neighborhoods and communities of the children they instruct. Local implementation thus requires active participation by teachers, who must not only understand the national curriculum by also prepare their own materials that are appropriate for their particular context.

This project focuses on the third (local) level of implementation and seeks to develop a participatory process with teachers as a model to incorporate climate change in a diversified curriculum. Working with the teachers in a participatory mode is a good bottom-up strategy that permits the recognition and incorporation of local real needs into the curriculum. At the same time, a participatory process ensures inclusion of the voices, experiences and perspectives of local teachers who have crucial local knowledge but who have not been included in national
curriculum development because they do not reside in big cities and thus have relatively little political or economic power. Teachers represent the transformative potential of society and therefore constitute a vital change factor to promote adaptation to climate change in line with the needs and risks facing society.

1.4 Objectives

1.4.1 General Objective

Develop a participatory process for creating a regionally appropriate environmental education curriculum which helps introduce the theme of climate change into schools in Pando, Bolivia.

1.4.2 Specific Objectives

- Engage interested stakeholders such as government, administrators, NGOs, students of the Amazonian University of Pando, and school teachers in the process of creating a Climate Change curriculum in Pando.
- Train a team of students of the Amazonian University of Pando as a support team in the participatory workshops.
- Identify schools and faculty who currently teach and who want to teach about environmental issues while at the same time developing a transparent process for selecting representative teachers.
• Hold a series of participatory workshops in which teachers can share pedagogical methods and materials they are employing in the classroom on the subject of climate change, so they can review material on the subject and identify key points to be incorporated into their curricula based on issues of cultural and environmental relevance to Pando.

• Distribute materials and resources so that teachers can evaluate and modify the materials, giving teachers the opportunity to analyze the Core Plurinational Curriculum, and to develop and test in the classroom their own lesson plans.

2 Methodology

2.1 Participatory Methodologies

Participation is a process through which stakeholders influence and share control over initiatives, decisions, and resources which affect them. Participatory methodologies are a growing family of approaches to enable and empower people to share, analyze, and enhance their knowledge of life conditions by planning, acting, monitoring, evaluating and reflecting (IIED, 2011). Participatory methodologies give people the opportunity to do their own investigation, analysis, presentation, planning and action and thereby to “own the outcome” (DFID, 2002).

In this project, participatory methodologies allow participants to generate a deep analysis of the new school curriculum, and to critically reflect on and make suggestions for modifications in the contents as a means of adapting them to application in their schools in Pando. As a result,
participatory methods allow teachers to prepare lesson plans in a creative mode with local knowledge for use in their classrooms. Thus, teachers developed their own lesson plans, which nurtured their feelings of ownership of the materials and curriculum.

The principles behind participatory methodologies are:

- *It is possible, and desirable, to increase participation in development by involving those immediately affected by the needs to be addressed by a particular project.* Through the participatory methodologies teachers got involved in the workshops, participated actively in the activities, and created their own outcomes.

- *Issues can be investigated from different perspectives and using a range of approaches, such as involving multidisciplinary teams.* In the workshops, participating teachers came from different parts of Bolivia, but all of them taught in schools in Pando. Regardless of the diverse birthplaces of teachers, everyone was aware of the importance of incorporating climate change into the curriculum and that the negative effects from these changes affected different regions of the country differently. As residents of the Amazon region, participants were aware that they face major challenges to address climate change, because the Amazon ecosystem is fragile and vulnerability. Furthermore, participating teachers came from different disciplines such as language, mathematics, biology, and social sciences, among others, which meant sharing of different disciplinary views about climate change and how this should be addressed in the curricula.
There are important techniques that need to be developed in a participatory approach: active listening to others; involving all the stakeholders; building local capacity; cultivating team work; developing a self-critical learning culture; and building an environment of trust and confidence in order to cultivate partnerships (DFID, 2002). All the techniques mentioned above were taken into account during the planning of the project as well as implementation, via management of the active participation of the teachers who attended the workshops.

The use of participatory methodologies offers many advantages, such as:

- **Incorporation of local knowledge and expertise.** The workshop served as a forum for teachers with more experience working on environmental education in the classroom. This allowed teachers to share their experiences with all workshop participants. In turn, teachers received feedback from their peers on their work, which constituted an environment where ideas and experiences were exchanged, permitting social learning.

- **Commitment to processes that promote equity and empowerment of those who are otherwise marginalized.** The Department of Pando is far from the center of Bolivia. Pando has no road infrastructure that enables quick and easy access to Bolivia’s capital, La Paz, and air travel is expensive for most people in Pando. For these reasons, Pando often has been left out of consultative processes for making important decisions at the national level. By contrast, participatory methodologies allow working more inclusively with stakeholders. The participatory workshops empowered local teachers in Pando as to how they can be part of the implementation of the new educational curriculum in Bolivia.

- **Building new relationships to support partnerships.** The workshops included principals and teachers from nine public schools in Cobija, along with two experts in the field of
education and the new Education Law, a representative of the Departmental Directorate of Education, students in the normal school for teachers, and students of Environmental Engineering at UAP. This environment generated the possibility of expanding professional networks, such as: teachers with teachers, teachers with experts, principals with government representatives, among others.

In sum, participatory processes build capacity among participants. Participation educates while empowering, and creates networks of relevant persons who can continue to collaborate (Elliot J., et al., 2005). There are several participatory tools such as role playing, field visits, ranking exercises, learning games, simulations, pantomimes, brainstorming, jigsaw puzzles, discussion forums, and focus groups, among others. Each one has specific characteristics with advantages and disadvantages, so they need to be chosen according to the desired outcome. In this project, I made use of: jigsaw puzzles, discussion forums, learning games, roundtables, plenaries, participatory discussions, small group discussions, testing and experimenting.

### 2.2 Participatory Active Learning Action

Participatory Active Learning Action is associated with the spread of diagramming and visual techniques developed in the 1970s. Methodologies for participation were developed drawing on earlier traditions of participatory action research which had been long established as an integral part of many grassroots organizations in the Southern Hemisphere (IIED, 2011). In Latin America, Paolo Freire (1981) developed methodologies for action research which were later adopted in other countries. The Plurinational Curriculum in Bolivia was based on some the ideas
of Paolo Freire, Edgar Morin, Jean Piaget, Avelino Síñani and Elizardo Pérez. Pérez and Síñani were Bolivians who contributed greatly to the teaching-learning process in Bolivia (Curriculo Plurinacional de Bolivia, 2010).

Participatory methods are a diverse and flexible set of techniques for visual representation and stakeholder involvement characterized by a set of underlying ethical principles. Participatory Active Learning Action as a philosophy of learning has its theoretical basis in the behaviorists, the cognitive theorists, the constructivists and the social learning theorists’ views of learning (IIED, 2011). Methods and approaches to teaching, learning and research on the environmental dimension of any subject have to be necessarily active and participatory in nature because this allows stakeholders to achieve meaningful learning via the move from theory to practice in a real context.

Environmental education is very important at every educational level (IIED, 2011). From an early age, environmental education has the potential to generate awareness and build skills for the care and preservation of the environment, making possible profound and permanent change in everyday behavior that fosters sustainability. Learner centered activities such as learning-by-doing, field studies, experimentation, group discussions, games, role-playing, project work, problem solving and inquiry approaches are some active learning techniques that encourage participation (Freire P., 1981). In this sense, participatory methods that engage teachers help build their capacity and help create a better product. Doing so also models how educators can develop activities that enhance learning among students by facilitating a participatory and hands-on process for student learning.
2.3 Field Practicum Location and Host Organization

The field practicum was carried out during May-August of 2012. The site was Cobija, the capital city of the Pando. The host organization was the Amazonian University of Pando (UAP); their motto is: "the preservation of the Amazon is an essential part of survival, of life, of progress and development of the beautiful land of Pando". The UAP began operation on December 3, 1993. Currently the UAP has six academic areas with more than forty undergraduate degree programs, as well as graduate programs. The university is present in 4 of the 15 municipalities of Pando (Cobija, Santa Rosa del Abuna, Puerto Rico and Villa Nueva), which offers the opportunity of study for rural people, see Map 1.

Map 1: Geographical Location of the Pando Department and UAP

Source: http://www.uap.bo
2.4 Process of Implementing a Participatory Methodologies to Incorporate Climate Change into the New Curriculum

A participatory methods toolkit, a practitioner’s manual (Elliot J., et.al, 2005) mentions the general steps in the process of implementing participatory methodologies: 1) define the purpose and goals of the strategy; 2) recruit a project team; 3) determine scope and focus of the involvement process; 4) understand the social context of the issue; 5) determine who should be involved and why; 6) understand the time frame; design the plan; 7) promote the event; 8) implement the plan; 9) evaluate the process and results; and 10) produce and disseminate final report. Basically we followed the same pattern for this project; the process is explained below.

2.4.1 Recruit a Project Team

To carry out the project it was necessary to form a support team. The support team was selected based on eligibility via participation in previous workshops conducted with students of environmental engineering from the UAP. Twelve students were selected, and they went through four training sessions.

Training sessions prepared students to support implementation of the planned activities in the workshops. In the first training session, students received information about the project and a copy of the planning workshops. In the second session, the students received information on the new education law, the new national curriculum, and climate change. They reviewed the contents and engaged in discussion to address questions and doubts. Each group went home with the task
of reviewing the workshop tools as related to climate change concepts. In the third session, students returned with their proposals for focal topics with specific learning tools ("dinamicas") for workshops to display for their peers. After the focal topics were presented, 10 were selected for presentation at the workshops. In the fourth session, the students presented the chosen topics in front of the group, and each group was asked to produce two learning games (one for each workshop). At that time the presenters received feedback and suggestions from their peers, which permitted adjustments. The group then concluded with a review of the logistics for the workshops. The topics selected were: measuring pollution, learning key concepts (climate change, greenhouse effect and acid rain), local biodiversity, urbanization, taming the monster of garbage, live net, mimicry and defense mechanisms, logging effects, why water is important, and energy consumption. The main idea of the topics was to show teachers playful ways to teach key concepts about climate change in a practical way.

These training sessions were used to prepare the topics, learning games and to organize the support team. The team consisted of 5 groups to help in the workshop logistics. Th groups had the following tasks:

1. Checking and filling out attendance sheets and informed consent approved by Institutional Review Board 02 (IRB-02). The attendance lists were filled out in the mornings and evenings, and all workshop participants filled out the informed consent forms.

2. Arrange refreshments and snacks, and prepare the classroom for the activities and learning games. The workshops were very dynamic, so we had to constantly change and
move the chairs and tables in the room. When we worked in small groups, or when working in roundtables or presentations, the configuration of the room had to change.

3. Organize the material generated by the teachers during the workshop. During the workshops, a significant amount of curricular material was generated, which had to be organized and selected, and served as a means of verification for further analysis.

4. Development, completion and delivery of certificates and didactic materials. At the end of the workshops, certificates of participation were delivered to all participants. These certificates were endorsed by the Departmental Directorate of Education for a total of 72 academic hours, including hours of theory (workshop attendance) and hours of practice (test of the lesson plans in the classroom). The certificates will help teachers in their annual teacher evaluations. Certificates of different types were given to different participants: teachers, expert presenters, and the support team. We distributed all the materials used in the workshop, including presentations by experts, the content of the education law, the new educational model, the new plurinational curriculum, climate change information, videos, learning games, and others. Significantly, the majority of teachers who participated in the workshop did not have information on the new law on education and curriculum.

5. Prepare digital presentations and documents and pictures. Due to the large number of digital documents, we needed to have a group responsible for this. They watched over the proper functioning of equipment, and took photographs and recorded videos of the workshops.
2.4.2 **Determine Scope and Focus of the Involvement Process**

The scope was to work with schoolteachers to identify ways to incorporate different aspects of climate change across the curriculum. The focus on climate change was to make teachers understand the importance of addressing the negative impacts of climate change through the process of education and communication, which could promote adaptation to respond effectively to the negative effects of climate change.

2.4.3 **Understand the social context for planning the workshops**

Before carrying out workshops some administrative tasks had to be undertaken:

1. Contact the Departmental Direction of Education in Pando in order to secure approval to publicize the project in the schools. We spoke with the Departmental Director of Education to obtain permission to coordinate with the 10 educational districts of Pando. We explained the project in detail, and got the director to endorse the certificates giving their support for curricular hours for the teachers who participated in the workshops.

2. Contact District Directorates. Pando has 10 district directorates (1 urban, 9 rural). Once we had the permission of the Departmental Directorate of Education, we sent invitations to the 10 district directorates of education. Chart 2 lists the directorates, along with information about their teachers. At first, the idea was to coordinate with the district directors so they would assign three teachers (through the Teacher Application Form, to
participate in the workshops, and so we would have 30 participants representing all around Pando.

Chart 2: Relationship of Education Districts, Schools and Teachers in Pando

<table>
<thead>
<tr>
<th>N</th>
<th>Educational District</th>
<th>Municipality</th>
<th>Number of Teachers</th>
<th>Total Schools</th>
<th>Secondary Schools</th>
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<td>Cobija</td>
<td>Cobija</td>
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<tr>
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<td>166</td>
<td>38</td>
<td>4</td>
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<td>3</td>
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<td>Bolpebra</td>
<td>51</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<td>Puerto Rico San Pedro</td>
<td>148</td>
<td>40</td>
<td>4</td>
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<tr>
<td>5</td>
<td>Filadelfia</td>
<td>Filadelfia</td>
<td>64</td>
<td>38</td>
<td>6</td>
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<tr>
<td>6</td>
<td>Gonzalo Moreno</td>
<td>Gonzalo Moreno</td>
<td>126</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>San Lorenzo</td>
<td>San Lorenzo</td>
<td>131</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>El Sena</td>
<td>El Sena</td>
<td>63</td>
<td>29</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Santa Rosa</td>
<td>Santa Rosa Ingavi</td>
<td>50</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Santos Mercado</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Nueva Esperanza</td>
<td>Nueva Esperanza Villa</td>
<td>69</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Villa Nueva</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td><strong>15</strong></td>
<td><strong>1396</strong></td>
<td><strong>292</strong></td>
<td><strong>45</strong></td>
</tr>
</tbody>
</table>

*Source: Report of the Departmental Directorate of Education in Pando, 2011*

However, it was not that easy. We received responses from just one directorate, Cobija district, and the other 9 did not respond. Several times we passed by their offices to talk with them, but they were very busy or absent. Some directors claimed that they had no economic resources to support participation. Other district directors mentioned that their towns were too far away from Cobija, and made the suggestion that we go to the schools in their municipalities. After analyzing this possibility, we realized we had neither the time nor the resources to replicate the workshops in each of the rural schools. We eventually had to make a decision, and decided to work with the District Directorate of Cobija.
3. Visit schools in Cobija, publicize the project, and invite teachers to participate. After obtaining permission to enter the schools by the District Directorate of Cobija, we visited 14 schools (9 public and 5 private) that had primary and secondary level programs. We spoke with the directors and explained the project in detail. We also gave them the teacher application forms and registration forms for the workshops.

4. Develop a preliminary list of participants for the workshops. After visiting the schools several times, we compiled a preliminary list of participants for the workshops. We received responses from 38 teachers, representing 9 schools in Cobija.

2.4.4 Determine Who Should be Involved and Why

The teacher selection process was implemented through a review of teacher application forms. We took into account the experience the applicants had in environmental education and their willingness to actively participate throughout the process of the workshops. The teachers selected for participation in the workshops had previous experience teaching environmental topics. That was a requirement for participation, in order to obtain useful contributions for the final product and to provide teachers with a professional development opportunity to enrich their work.

2.4.5 Understand the Time Frame
The last week of June and the first week of July is the winter holiday in the Bolivian educational system. In the month of June, we already had the list of pre-registered participants for the workshops. By that time, we had to decide the best dates to conduct the workshops. We had 3 options: before, during or after the winter break.

1. **Before winter break:** Teachers are busy concluding the semester with final exams, so the participation of teachers would be very low.

2. **During the winter holidays:** Most teachers were not from Cobija, and during vacations, they travel to their hometowns to spend time with their families. So, participation would be low.

3. **After the winter holidays:** Winter holidays usually take two weeks, but when the winter is very cold, it stretches up to three weeks. To conduct the workshops, we needed three consecutive weeks: the first week for the first workshop, the second week for test the lesson plans in classrooms, and the third week for the second workshop. In the end we decided to conduct workshops after winter holiday, because we had more time and it was likely that more teachers would participate.

The workshops were held from 18 to 20 July (first workshop), and 1 to 2 August (second workshop). In the middles of the two weeks, 23 to 28 July, teachers tested their lesson plans in their classrooms.

### 2.4.6 Design the Plan
We designed the program for each workshop, using participatory methodologies. We decided to use jigsaw puzzles, discussion forums, learning games, round tables, plenaries, participatory discussions, small group discussions, testing and experimenting. Workshops were planned to occur during a three week period: the first week was for the first workshop, the second week teachers tested the lesson plans in classrooms, and the third week teachers returned for the second workshop (see Figure 6).

2.4.7 Promote the Event

We drew up an advertising campaign to promote the event. This campaign included the following: interview in the radio, invitation to the workshop through advertising on television, posters, and personal calls to people on the pre-registered list.

2.4.8 Implement the Plan

In this section we discuss how the workshops were implemented and the results that we obtained. The workshops were organized into several main activities: including those noted above. At the end of the workshops we compiled valuable information to guide the construction of the participatory model to incorporate climate change in the new curriculum. This model can be followed in order to incorporate climate change into a diversified curriculum (Figure 6).
Figure 6: Participatory Workshop Process

Schoolteachers

Climate Change and Amazonia Workshops

First Workshop – 3 days long
29 participants (18-20 July)

- Presentations
  - By a resource person
  - Participatory discussions
  - Sharing expertise

- Learning games and videos
  - Support team
  - Testing and experimenting
  - Practical demonstration
  - Video reflexions

- Group work
  - Roundtable
  - Jigsaw Puzzle
  - Small group discussions
  - Assignments

- Evaluation
  - Questionnaires

Second Workshop – 2 days long
33 participants (1-2 August)

- Presentations
  - By a resource person
  - Participatory discussions
  - Sharing expertise

- Learning games and videos
  - Support team
  - Testing and experimenting
  - Practical demonstration

- Group work
  - Roundtable
  - Small group discussions

- Plenary
  - With experts
  - Consultant with specialist

- Evaluation
  - Questionnaires

In classroom testing lesson plan
1 week (23 – 28 July)

- Content on CC in the curriculum
  - 4 Fields / Knowledge:
    - Science / Technology: 5 areas
    - Cosmos / Thinking: 2 areas
    - Community / Society: 5 areas
    - Life / Land / Territory: 3 areas

- Analysis matrix school planning
  - Areas with climate change content:
    - Science / Technology: 2
    - Cosmos / Thinking: 1
    - Community / Society: 1
    - Life / Land / Territory: 3

- Elaboration of lessons plans
  - Community and Society:
    - Communication / Language : 4 lesson
    - Life, Land and Territory:
      - Physics / Chemistry: 3 lesson plans
      - Biology / Geography: 5 lesson plans
      - Natural Sciences: 2 lesson plans

- Conducting test lessons plan
  - Readjust the original version
  - Action – Sharing expertise
  - Practical demonstration
  - Testing and experimenting

- Prepare final report
  - 9 Presentations of teacher progress report and portfolios

Source: Author’s elaboration, 2012
First Workshop: The first workshop was conducted on 18-20 July, and each day it ran from from 9:00 AM to 12:00 PM and then from 2:00 to 6:00 PM. The first workshop had 29 participants, including 17 school teachers and 12 students from UAP. The workshop was implemented as follows:

- **Day One:** The workshop began with an ice breaker activity to introduce organizers and participants and to create an atmosphere of trust. The ice breaker then continued with an outline of rules such as punctuality, respect, turning off cell phones and active participation in all workshop activities. Then there was a presentation on the new education law 070 by a departmental representative of the education system, followed by another presentation on the new national educational curriculum. During the afternoon we conducted the activities with the teachers. This included working in small groups where teachers interacted with each other and organized and documented their past experiences in environmental education. Some teachers had more experience than others, but all had participated in environmental education programs with different institutions. Finally, each group presented a summary table of their experiences. At the same time, some teachers registered to present their experiences in environmental education in the second workshop. Before we concluded the first day, we presented materials on climate change to teachers so they could prepare for the next day. We also asked them to bring a model of their lesson plans the next day.

- **Day Two:** After the welcome, the ream reminded participants of what they had done the day before. We then showed videos related to climate change. Some of the videos were informational, while others intended to provoke reflection. The overall aim of the videos
was to show teachers that these teaching resources exist online, and that videos clearly and simply illustrate climate science in ways that can be used with school students. We also made a presentation on the science of climate change, including the causes and consequences as well as adaptation and mitigation strategies. This reinforced the printed materials handed out during the previous day. During the afternoon, we worked on a group analysis of the core national curriculum, identifying areas and subjects that have content on climate change. After that, each group analyzed the matrix for school planning. Finally, each teacher elaborated his or her lesson plan. This was the heaviest part of the workshop, and continued beyond day 2. This required several steps. First, groups of teachers were formed according to their area of knowledge (mathematics, languages, natural sciences, physics, chemistry and social sciences). This process produced 4 groups: 1) community and society (communication and language), 2) land, territory and life (physical and chemical), 3) land, territory and life (biology and geography), and 4) land, territory and life (natural sciences). First, we worked at the macro-level via the analysis of the national core curriculum. Then we moved down to the school matrix by subjects, and finally each teacher developed lesson plans for their courses. In the late afternoon, teachers presented their findings on climate change content in the school curriculum, and the results of the matrix school planning analysis. Before teachers left, we reminded them to continue working on the lesson plans that would be presented the next day.

- **Day Three:** We began by reminding participants of the content of the previous day. After that, teachers continued working on lesson plans. When lesson plans were completed, new groups were formed so that each teacher could share their lesson plans.
with their new group and thereby receive suggestions and comments to their lesson plans. After this exercise, every teacher presented their lesson plans to the whole group and received additional suggestions. Once lesson plans were completed, the support team performed the topic dynamic and learning games again for teachers who were unable to complete them in the first days of the workshop. Then we organized a roundtable where teachers gave their comments, suggestions and criticisms of the core plurinational curriculum. Finally, we explained the methodology for the lesson plan testing week and what supporting documents that teacher should provide (portfolio of evidence and progress report) in the second workshop. Before participants left, they made a written evaluation of the workshop, taking into account its organization, content and the efficiency of the support team. The evaluations, which we discuss in more detail in the next section, helped to improve the content and structure of the second workshop.

In Classroom Lesson Plan: Teachers applied their lesson plans during the week following the first workshop, from 23 to 28 of July. Teachers who participated in the first workshop had one week to test their newly-developed lesson plans in their classrooms. In the second workshop, they presented a portfolio with all the information and a final report which outlined the main constraints, barriers, processes of learning and approaches used to adapt their class plans. In the first workshop 14 lesson plans were developed:

- Community and society (communication and language): 4 lesson plans.
- Land, territory and life (physical and chemical): 3 lesson plans.
- Land, territory and life (biology and geography): 5 lesson plans.
- Land, territory and life (natural sciences): 2 lesson plans.
In the second workshop, 9 of 14 teachers with applied lesson plans presented the portfolios and progress reports. The 9 lesson plans tested were:

- Jose Alexandel Castillo Montano, Defensores del Acre School, Biology and Chemistry, Population growth and ecosystems.
- Macario Vargas Aruquipa, Defensores del Acre School, Physics and Chemistry, Solid Wasted and their effects in the environment.
- Rossana Panozo Villazon, Fe y Alegria Nuestra Senora del Pilar School, Language, Culture and environmental justice and the relationship with the Amazon ecosystem.
- Ana Isabel Rojas Aguada, Fe y Alegria Nuestra Senora del Pilar School, Natural Science, Interactions with Mother Earth.
- Tania Pula Braulio Donato, Fe y Alegria Nuestra Senora del Pilar School, Natural Science, Environmental conservation in equilibrium with Mother Earth.
- Jenny Loreto Aguilera Franco, Fe y Alegria Nuestra Senora del Pilar School, Natural Science, Good Environmental Practices.
- Willma Balboa Castro, German Bush School, Natural Science, Decreasing global warming through solid waste good practices.
- Miguel Angel Caseres Rivero, Dr. Antonio Vaca Diez School, Geography, How climate change affect the Amazon region.
- Dimilza Julieta Casas Llanos, Dr. Antonio Vaca Diez School, Geography, Agriculture in the Amazon.

Second Workshop: The second workshop was conducted on 1 and 2 of August; each of those days, we worked from 9:00 AM to 12:00 PM and 3:00 to 6:00 PM. The second workshop had 33
participants: 21 school teachers and 12 students of UAP. The workshop was organized as follows:

- **Day One:** First we welcomed the participants, and implemented an ice breaker to create an atmosphere of trust. We then read a summary of the first workshop. This was followed by presentations of previous experiences in environmental education. Two schools participated: Nuestra Senora del Pila Fe y Alegria School and Dr. Antonio Vaca Diez. Subsequently, the support team conducted the topical dynamics and learning games. For these activities, teachers were organized into groups and each did the 5 topical dynamics prepared by the UAP students. In the afternoon, the teachers presented the results of the tests of their lesson plans. Of the 14 teachers who developed the lesson plan in the first workshop, 9 teachers tested their plans. Each teacher presented his or her findings, including difficulties encountered, to the audience. They then received suggestions and observations from their peers. We concluded the first day with a panel discussion by an expert in curriculum development. This is the same person who evaluated lesson plans and provided important advice to the teachers, who also in turn had the opportunity to ask questions and resolve doubts about how to diversify the curriculum.

- **Day Two:** After an opening welcome, we started with presentations by the staff of the Ministry of Education and other experts in education. The first presentation provided an analysis of the 070 Education Law from an environmental perspective. The second presentation covered the relationship of climate change with the Education Law 070. The third presentation talked about the articulator linchpin elements of the new educational model and its applicability in the classroom. These presentations were important for
teachers, as the talksd provided a space where teachers could ask questions and receive answers about the new law, the curriculum and its implementation. In the afternoon, we did work in groups where the teachers did a final analysis of the new curriculum and the Education Law 070. This provided them with the opportunity to give comments and suggestions and in turn obtain feedback. After that we held a plenary session with specialists from the Pando education district. For the plenary, participants offered questions about the process of implementation of the new curriculum, regional and local diversification and contextualization, and clarification of various concepts. The workshop ended with conclusions and a final evaluation.

2.3.1 Evaluate the Process

After each workshop, written evaluations were performed. These evaluations took into account three important aspects of the workshops: 1) event organization, 2) content and methodology, and 3) the performance of the support team. The final evaluation also allowed participants to make suggestions to improve future workshops and to elaborate on their comments on both process and content.

2.3.2 Produce and Disseminate the Final Report

The dissemination of the results is very important is the participatory process. Through this final report we give the results and analysis of information generated in the workshops. This
information will be sent to teachers who participated in the workshops, so that they can continue the process of diversification of the curriculum in Pando.

3 Analysis and Discussion of the Results

3.1 Level of Participation in the Project

Indicators of participation in the workshops include the following: 1) the number of participating schools, 2) the number of teachers, 3) the number of students in the support team, 4) the number of lesson plans developed in the first workshop, 5) the number of teachers who tested their lesson plans between the two workshops, 6) the number of teachers that participated as presenters at the second workshop, and 7) number of portfolios submitted in the second workshop.

3.1.1 Schools who Participated in the Workshops

At the beginning of the project we invited 14 schools (9 public and 5 private) to participate. Of these, 8 are public schools and 1 school for people studying to become teachers (ESFM) participated. In Graph 1 we can see that two schools maintained the same number of participants in both workshops (Mariscal Sucre and German Bush). Three schools increased their participation in the second workshop (Nuestra Senora del Pilar Fe y Alegria, Defensores del Acre Turno Tarde y ESFM – Normal). One school decreased its participation in the second workshop (Dr. Antonio Vaca Diez). Two schools participated just in the first workshop (San
Francisco de Asis and Jose Manuel Pando), and one school only participated in the second workshop (Unidad Educativa Cobija).

**Graph 1: Schools that Participated in the Project**

![Graph showing participation of schools in workshops](image)

*Source: Data collected in the workshops, 2012*

We do not have the exact reason why teachers from private schools were not involved in the project. Like those from public schools, they had confirmed their attendance and appeared on the list of pre-registered participants. However, we conclude, based on the reasons given by some teachers who participated, that the teachers from other schools did not participate for one or more of the following reasons:

- The school principals did not give them permission.
- Teachers did not want to miss five days of school (the period of the two workshops).
- Teachers found no one who could replace them in their classes.
- Teachers had conflicting academic activities.

The main reason why the six teachers who participated in the first workshop did not return to the second workshop was because they did not test their lesson plans. They mentioned that they did
not have enough time to test the lesson plan in classroom and would not go to the second workshop without the portfolios of evidence and the final report.

### 3.1.2 Number of Participants in the Workshops

In the workshops we had 62 participants in total: 29 participated in the first workshop and 33 in the second workshop. As noted earlier, participants included principals and teachers from 9 schools in Cobija, two experts in the field of education and the new Law of Education, a representative of the Departmental Directorate of Education, students from the normal school for teachers, and students of Environmental Engineering at UAP.

Graph 2 shows the number of teachers who participated in the two workshops. In the left side, we can see that 17 teachers participated in the first workshop, 21 teachers participating in the second.

**Graph 2: Comparison between teachers who participated in the 1st and 2nd Workshop**

Source: Data collected in the workshops, 2012
However, not all the teachers who participated in the first workshop participated as well in the second workshop. Graph 2 (left side) shows that 27 different teachers participated in the two workshops. Eleven teachers participated in both workshops, six teachers participated just in the first workshop, and ten teachers participated only in the second workshop.

Students from the Environmental Engineering program at UAP participated in the workshops. By that time, the career has 3 open courses: first semester, seventh semester and ninth semester. We had the participation of 12 students in the support team, graph 3 shows in what semester each student were in as of the moments of the workshops.

Graph 3: UAP Students who worked in the support team

Source: Data collected in the workshops, 2012

The experience of handling the logistics was very positive for UAP students. This gave them the opportunity to develop skills related to event planning, teamwork, working under pressure, taking responsibility, public speaking, and leadership, among others. Academic outcomes
included learning teaching techniques, participatory methodologies, and scientific concepts on climate change, among others.

3.1.3 Teachers with Previously Developed Environmental Education Material Sharing Expertise as Presenters in the Second Workshop

In the first workshop, teachers who had previous experience in environmental education were asked to present their experiences in the second workshop and thereby share their expertise. To qualify, teachers filled out an application form requesting information about previous work in environmental education. At the end of the first workshop, we had three completed forms from a total of seven teachers, shown in Chart 3.

<table>
<thead>
<tr>
<th>N</th>
<th>School Name</th>
<th>Teachers Names</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Antonio Vaca Diez</td>
<td>Dimilza Julieta Casa Llanos Miguel Angel Caceres Rivero</td>
<td>Recycling and reuse of solid waste</td>
</tr>
<tr>
<td>2</td>
<td>Fe y Alegría Nuestra Señora del Pilar</td>
<td>Jenny Loreto Aguilera Franco Tania Paula Braulio Donato Rossana Cecilia Panozo Villazon Ana Isabel Rojas Aguada</td>
<td>The garden, ecological growing of vegetables</td>
</tr>
<tr>
<td>3</td>
<td>Fe y Alegría San Francisco de Asís</td>
<td>Jaime Santos Guarachi</td>
<td>Solid waste and reuse</td>
</tr>
</tbody>
</table>

*Source: Data collected in the workshops, 2012*

In the second workshop, the three groups made oral presentations on their activities. However, only groups 1 and 2 presented; Group 3 did not attend the second workshop. The main purpose of these presentations was to show that among the teachers participating in the workshops, some already had experience in environmental education. A number of teachers with experience in
environmental education had been working for many years with various institutions (NGOs, universities, etc.) in Pando, but this had not been documented.

The school group Fe y Alegria Nuestra Senora del Pilar, took the children who participated in the project "The Garden" to the workshop, so the children had the opportunity to share their experiences in the project and explain how it had influenced their lives. One of the children mentioned: "I still remember everything we learned in this project; I not only learned how to grow vegetables, I also learned to work with my fellow team members." The presentations thus emphasized that students showed a high level of learning and retention through the use of participatory methods.

3.1.4 Participation in the process of testing lesson plans in classroom

In the first workshop, 14 lesson plans were developed by the teachers. They had one week to test the lesson plan in their classroom, and then to present a teacher’s progress report, portfolios and an oral presentation in the second workshop. The main objective of this activity was to test whether the content analyzed on climate change in the first workshop was really suitable for pedagogy in the region. Teachers must implement and evaluate their lesson plans with students, and thus validate or revise the plan content. In the final report, teachers had to describe the experience of implementation, note difficulties encountered, and received suggestions for changing the content, in order to make adjustments to the lesson plans. Graph 4 shows that 9 of the 14 lesson plans were tested. All nine of these teachers presented their progress reports and portfolios via oral presentations.
The presentations indicated that the teachers had used participatory approaches in their lessons. Teachers reported that students were motivated with such methodologies. Several teachers reported that they had to make changes to the content, especially by reducing the amount of activities because there was not enough time. Others had to give the lesson in two classes rather than one as planned in order to cover all content. Some teachers mentioned that they had to spend some time researching the subject, because they felt they needed to deepen their understanding of the scientific concepts of climate change.

### 3.2 Analysis of the Core Plurinational Curriculum

The participants of the workshops analyzed the core Plurinational Curriculum. The aim of this activity was to identify the areas of the curriculum that integrate climate change issues into their content and make recommendations for a diversified curriculum. The curriculum is divided in 15 content areas, grouped into 4 fields of knowledge (Figure 7). The analysis identified seven of the
15 areas to have significant content relevant for integration of climate change. Those areas are:

1) worldviews and philosophies; 2) communication and language; 3) physics and chemistry; 4) biology and geography; 5) natural science; 6) services technology and production; and 7) agricultural technology and production.

**Figure 7: Content Analysis on Climate Change in the Core Plurinational Curriculum**

Some comments by teachers are:

- “This new curriculum is decontextualized. Terms have unsubstantiated logic and are very utopian.” Abel Cazas Valle

- “Should be more and better training on the implementation of the new curriculum through classes in each school model.” Miguel Angel Caseres
• “The basic document only talks about the Andean worldview, regardless of the Amazon”
  Jaime Santos

• “There are very few people actually trained to disseminate law 070 and the new curriculum.” Dimelsa Casas Llanos

• “Educational authorities should promote continuous training courses and workshops on environmental issues, and implement new curricula and encourage teachers to participate.” Ana Isabel Rojas Aguada

Teachers recognized the need to diversify and regionalize the curriculum. They also understood the importance of the topic of climate change. However, they acknowledged that there is little diffusion of the new education law and the core plurinational curriculum, and urged the authorities to make greater efforts at dissemination of both through participatory workshops. At the same time, teachers recognized that they should deepen their own knowledge about climate change, its scientific basis, causes, effects, and solutions.

Participants developed their own views of how climate change content needs to be addressed in the diversified curriculum. Teachers in the workshop thought that the topic of climate change should be integrated into the curriculum, but teachers highlighted several themes they felt to be priorities in Pando. Some themes have a direct relationship with climate change such as water, forests, and risk management, but others have an indirect relationship such as solid waste.

Overall, teachers emphasized that climate should take into account the following topics: health, infrastructure, agriculture, ecosystems, contaminated water, malnutrition, droughts and floods,
and prevention of epidemics. They were convinced that it is important to address the issue of climate change through these topics, because they are the most serious and visible consequences in the Bolivian Amazon. In turn, students should know about the negative effects of climate change on the region and how to prepare effectively to reduce vulnerability.

3.3 Evaluation of the Workshops

Workshop evaluations (Evaluation Form, took into account three important aspects: event organization, content and methodology, and the performance of the support team. Graph 5 shows that the participants thought that the event was well organized, the development of the activities in the workshops was logical; and that the workshops met their expectations.

Graph 5: Workshops organization

[Graph showing evaluation results]

*Source: Data collected in the workshops, 2012*

Graph 6 shows that teachers thought that the content and the participatory methodologies used in the workshops were very appropriate. Participants reported that the content covered in the event...
was useful and that they were planning to use the information provided in their teaching and professional development.

Graph 6: Content and methodology of the workshops

![Bar chart showing responses to questions about the content and methodology of the workshops.](source: Data collected in the workshops, 2012)

Graph 7 shows the evaluation of the support team. Teachers agreed that the support team was helpful during the workshops, they made contributions, and they were polite and willing to help.

Graph 7: Support Team evaluation

![Bar chart showing responses to questions about the support team's helpfulness and contributions.](source: Data collected in the workshops, 2012)
Teachers also offered the following additional comments:

- “Schools principals must commit more, and give more flexibility for teachers to participate in these workshops.” Yesenia Palma
- “There should be more workshops of this type of dynamic and practical way, so we understand better.” Rossana Panoso

4 Conclusions and Recommendations

4.1 Conclusions

Education is a vital element in the formulation and implementation of adaptation strategies that can help families, communities, departments and nations understand and cope with a changing climate. Since Bolivia is undergoing a new educational process, it is important that educational institutions play a proactive leadership role in this process. Participatory methodologies offer a host of attractive options to create an environment conducive to unleashing teacher creativity, an important input for diversifying the curriculum and engaging students. When provided the opportunity, teachers can share their expertise and provide ideas and feedback for each other. Doing so enables them to grow as teachers, which may also improve their classroom practice and lead to more informed and knowledgeable students.

After analyzing the results of the workshop I conclude the following:
• Most of the teachers who participated in the workshop were not aware of the content of the new Education Law 070 Avelino Siñani–Elizardo Pérez.

• Most of the teachers did not possess the necessary content to implement the desired plurinational curriculum.

• Teachers did not possess deep knowledge related to climate change and its negative effects.

These deficiencies obviously pose serious problems for the implementation of the new curriculum mandated by law. On the other hand we found that:

• Teachers want to participate in the process of the diversification and regionalization of the curriculum, and they desire more information about the process.

• There are schools and group of teachers who have experience in environmental education, so they have tools and methodologies that can be used in the diversification process.

• Teachers are interested in sharing what they have learned. Participants of the Nuestra Senhora del Pilar, Fe y Alegria school, repeated the workshops process in the schools for their colleagues, and have continued devoting time and effort to this process.

At the end of the process, we can say that principals and teachers who participated in the project were directly and actively involved. They presented their perspectives and experiences, and they produced or shared curricular materials. At the same time, we carried out the distribution of important resources and materials that will be useful for teachers. This also benefited teachers by
responding to their need for more information about climate change for purposes of development and refinement of their curricular materials. Finally, we conclude that it is very important to involve grassroots teachers on these processes. The use of participatory methodologies made learning more active and meaningful in order to motivate port-workshop applications of results.

Furthermore, it should be noted that teachers need to understand that in their main field of action, the school, Education for Climate Change targets knowledge, attitudes, positive habits and environmental protection. It is essential that educators influence children from an early age, to teach responsibility to the environment and especially to can identify the negative effects of this change. The method should be selected according to the age of the students, previous knowledge and habits that are established at that time.

4.2 Recommendations

Because the process of regionalization and diversification of the curriculum is complex, I divide the recommendations into different groups.

For the National Level – Ministry of Education

- Encourage teachers to work in the process of diversifying curriculum and use the new educational model. The Ministry of Education should develop incentives for teachers who want to participate in the process, such as: Masters and Doctoral scholarships, and creation of certificate courses related to key environmental themes.
• For the implementation and development of these guidelines for climate change in the curriculum, it is essential to work together at different levels of management with the institutions of teacher education, with the Ministry of Environment and Water, and the National Climate Change Program and other institutions.

• Broadly disseminate the new Education Law, the new core curriculum, the content and the process of diversification and regionalization.

For the Regional Level – Departmental Direction of Education

• Formulate local and regional strategies that highlight bottom-up processes in order to pursue a more effective and widespread diffusion of the Educational Law 070 and the new Plurinational Curriculum.

• Organize more participatory workshops taking into account small cities and rural communities in order to have broader participation in discussions about the curriculum content.

• Where possible, establish systematic training plans for teachers and trainers who work with students and schools.

• Be more involved in the process of regionalization and diversifications of the core plurinational curriculum.

For the Local Level - Schools Principals

• Be more aware of the new Education Law and the process required for regionalization and diversification of curricula, and show a more proactive approach to supporting this process.
• Be more involved in the process of diversification and regionalization, and motivate teachers who can incorporate diverse lesson plans in their classrooms.

For the Local Level - Schoolteachers

• Be more involved in the curricula diversification process.
• Manage the fundamentals of physical, biological and chemical interactions in nature.
• Understand the causes and effects of some change-related problems with climate at local, national and international levels, but with one’s own examples and information.
• Acquire and enhance knowledge and skills that will enable students to raise awareness about the theme of climate change
• Be sensitive to the regional and local problems of climate change, and propose solutions through locally practical activities.
• Express and change attitudes and values related to the problem of climate change, through participation in fairs, workshops and activities promoting protection of the environment.

5 Lessons Learned

After having completed the project, and looking back, there are many lessons learned; things that could have been done differently to have better results. Below I discuss some of them:
• It is important to recognize that you cannot save the world in one step. It takes many small steps, and they must be firm and steadfast to achieve lasting change in attitudes and behaviors. We need to be realistic at the moment to set goals and take decisions based on available information resources.

• The regular administrative process is not the most effective, as it is too bureaucratic and time-consuming. There are alternatives that should be analyzed in advance. For example, this project tried to go through the regular administrative process, through all administrative levels, but if we had instead talked to the head of the Teacher’s Union, it is likely we would have had greater teacher participation. In this case, the head of the union is a key to ensuring the participation of teachers.

• The directors are the driving force to schools. If the principal is involved in the process, it is easier to ensure the participation of teachers. As an example is Fe y Alegria School Nuestra Senora del Pilar. There, the director actively participated in the workshops, which guaranteed that the teachers were also very involved.

• If we want to achieve a diversified curriculum in the context of Pando, it is important include all schools, urban and rural. Because the population is widely dispersed in Pando, is complicated bring rural teachers to the city. To achieve greater participation of schools in rural areas, it is important to go where they are. It is therefore best to plan workshops in rural nuclei. This is a way to achieve the inclusion of all stakeholders.

• Time is never sufficient. It is important to manage time efficiently, minimize distractions and be assertive in making decisions. To make that possible, it is important to have all the necessary information first hand and find reliable sources.
• Having a well-trained support team is very important. In this case, the UAP students went through a training process to participate in workshops, and became important for the logistics. This method can be used to enable students to replicate the workshops in rural areas. In the same way, teachers who participated in the workshops are potential trainers to replicate the workshops to their school colleagues.

6 Further Research

It is clear that this is not the end of the road; rather it is the beginning of a long process. It is important that the process be continued to achieve expected results on a larger scale. As a next step I propose the following:

• Schools need to finalize the diversified curriculum, and secure approval of the Ministry of Education. As we saw in the workshops, it is important to finish this process, because students need to know the importance of climate change in the Amazon and the negative effects of climate change on Pando.

• Develop didactic material to support the diversify curriculum content.

• Implement the diversified and regionalized curriculum in all schools of Pando. The new Education law has been in force since 2009, and to date no progress has been made in this implementation process. It is important to complete the process of diversification of the curriculum and obtain approval from the diversified curriculum of the Ministry of Education. Then we can start with its implementation in schools of Pando and give the
students more holistic and comprehensive teaching without losing the focus on the regional context.
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