Cultures, environment and development in the transition zone between the Andes and the Amazon of Ecuador

Culturas, medio ambiente y desarrollo en la zona de transición entre los Andes y la Amazonía del Ecuador

Edited by Anu Häkkinen, Paola Minoia and Anders Sirén

FIELD TRIP 2015

Department of geosciences and geography C12

GEOTIETEIDEN JA MAANTIETEEN LAITOS C12, HELSINGIN YLIOPISTO

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DEPARTMENT OF GEOSCIENCES AND GEOGRAPHY C12, UNIVERSITY OF HELSINKI

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PREFACE

It was a great experience, what we lived in October 2015, during a research trip of two weeks in Ecuador involving two lecturers and 16 Master students from our geography department.

Study trips abroad have become a tradition for Master students in geography of the University of Helsinki and they are actually among the highlights of the curriculum. We really hope they will continue despite current financial shortages. For us the supervisors it is every time a different but rewarding adventure, quite engaging from the early planning stage, when we start looking for suitable case studies and institutions that could be interested in a collaboration with us.

This time, it was an obvious choice to take advantage of that one of the supervisors was spending prolonged periods at the Universidad Estatal Amazonica (UEA) in Ecuador, thanks to the Prometeo research project funded by the National Secretariat of Higher Education, Science, Tecnology and Innovation (SENESCYT) of Ecuador.

In the end, based on a formal cooperation agreement with the Universidad Estatal Amazonica (UEA) in Puyo, our group could benefit of excellent housing and facilities at its Center for Amazonian Research, Postgraduate studies and Conservation (CIPCA), supremely located at the scenic junction of the Piatúa and Anzu Rivers. UEA also provided bus transport. Most importantly, eight undergraduate students from UEA were selected to accompany us during the field work, a practical collaboration that we believe was very fruitful for all parties involved.

We were also kindly received by the Ministries of Education, Environment and Buen Vivir, by the government council of the Sarayaku community, the NGO Amazon Watch in Quito and the Oscar Efrén Reyes Foundation in Baños. We thank them all for their hospitality and for having shared their time and valuable knowledge with us.

For our geography students, we believe this experience has been highly formative and pleasant. They have been exposed to various sorts of issues, scales and organizations, from ministries and national governmental agencies, environmental foundations and activists based in the capital city, to local grassroots movements and rural families.

This report illustrates the results of those two intensive weeks in Ecuador, and is divided in two sections. The first section contains 5 research papers, one from an action-research group based at the UEA on inclusive intercultural education in Ecuador, and four papers with the findings of research groups formed by Finnish and Ecuadorian students; while the second section, less academic, contains a diary of the trip with students' reflections.

It is also worth saying that the intensive research period did not start on that day in Quito, but 2 months before, in Helsinki, when we started a seminar course to introduce feasible field research methods, geography of the country and the regions we were about to visit, and to discuss potential research questions, literature review and guiding methodologies. The students, grouped in 4 study units, selected distinct topics: indigenous education and cultures, physical accessibility to schooling, hydropower and community tourism, and land use and cover changes. The leading thread has been culture, environment, and development, and how these relate to each other.

Indigeneity is a topical theme nowadays in development studies and geography, and is a kind of 'moral' aim in research, with regards to the need to value cultural diversity and to engage in inclusive alternative developments. Social research from Latin America appears as particularly advanced in terms of inclusiveness and indigeneity focus, and these values have a role also at the political level. Bilingualism, multi-culturalism, community livelihoods end environment, the themes in our report, reflect those that are presented as fundamental values in the Ecuadorian Constitution approved in 2008, and that are even embodied in the governmental Secretary of *buen vivir* or *sumak kawsay*. Translating this into practical action and policies based on respect, appreciation and the involvement of local knowledges based on distinctive world views, ecologies and spirituality, however, involves considerable challenges, and we believe that there is an important role to fulfil for academic studies that approach such issues with scientific stringency.

These issues are at the core of the two essays about education and to some extent also in the essay on community livelihoods based on tourism and the impacts that result from the national strategy of energy production. The fifth paper concentrates more specifically on environmental issues, discussing the issue of land use and land cover change, in particular deforestation, and presents a methodological study about using remote sensing to evaluate changes in land use and land cover.

The research findings were presented in a final seminar titled 'Cultures, Environment and Development in the Andes-Amazonas transition zone of Ecuador' in the main auditorium of UEA, in front of many students and colleagues. Each paper was followed by a discussant from UEA and a debate.

We thank all the staff and students of the UEA who helped make this trip academically rewarding and an unforgettable life experience. We also thank the department of Geosciences and Geography of our university and FinCEAL for having co-funded the trip and the final seminar.

We hope that we will be able to continue with this tradition of teaching and learning field research in multi-cultural environments!

Ashka pagrachu, shuk punchagama!

Paola Minoia, PhD, senior lecturer at the division of geography, department of geosciences and geography, University of Helsinki

Anders Sirén, PhD, senior lecturer at the division of geography, department of geosciences and geography, University of Helsinki

PROLOGO

Fue una gran experiencia, la que vivimos en octubre de 2015, durante un viaje de estudio e investigación de dos semanas en Ecuador con la participación de dos profesores y 16 estudiantes de maestría de nuestro departamento de geografía.

Viajes de estudio al exterior han sido una tradición para estudiantes de maestría de geografía de la Universidad de Helsinki, y son realmente entre los puntos culminantes del currículo. Esperamos que puedan continuar, a pesar de los déficits actuales de financiamiento. Para nosotros como profesores es cada vez una aventura distinta pero gratificante, desde las etapas tempranas de planificación cuando empezamos a buscar sitios apropiados e instituciones que puedan tener interés en colaborar con nosotros.

Esta vez, fue una elección obvia aprovechar la estadía de uno de nosotros profesores en la Universidad Estatal Amazónica (UEA) en el Ecuador, a través del proyecto Prometeo, un proyecto de cooperación científica financiado por la Secretaría de Educación Superior, Tecnología e Innovación (SENESCYT) del Ecuador.

En fin, basado en un convenio de cooperación con la Universidad Estatal Amazónica (UEA) en Puyo, pudimos disfrutar de la excelente infraestructura para alojamiento y actividades científicas en su Centro de Investigación, Posgrado, y Conservación Amazónica (CIPCA), ubicado en un maravilloso paisaje cerca de la desembocadura del Río Piatúa en el Río Anzu. Además, la UEA proveía transporte en sus buses. Y, lo más importante, ocho estudiantes de pregrado de la UEA fueron seleccionados para acompañarnos durante el trabajo de campo, una colaboración práctica que creemos fue muy provechoso para todas las partes involucradas.

También fuimos recibidos muy amablemente por los Ministerios de Educación, Medio Ambiente, y Buen Vivir, así como por el Consejo de Gobierno de la comunidad de Sarayaku, la ONG Amazon Watch en Quito, y la Fundación Oscar Efrén Reyes en Baños. A todos ellos agradecemos por su hospitalidad y por compartir con nosotros su tiempo y conocimientos valiosos.

Creemos que esta experiencia ha sido muy formativa y agradable para nuestros estudiantes de geografía. Han sido expuestos a varios tipos de cuestiones, escalas, y organizaciones, desde ministerios gubernamentales nacionales, fundaciones ambientalistas, y activistas basados en la capital, hasta movimientos de base y familias rurales.

Este informe demuestra el resultado de aquellas intensas dos semanas en Ecuador, y es dividida en dos partes. La primera parte contiene 5 artículos de investigación, una de un grupo de investigación-en-acción basado en la UEA que enfoca en educación intercultural incluyente en el Ecuador, y cuatro artículos con los resultados de los grupos de investigación formados por los estudiantes finlandeses y ecuatorianos. La segunda parte, menos académica, contiene un diario del viaje con las reflexiones hechas por los estudiantes.

Vale destacar que el periodo de investigación intensiva no empezó el día que llegamos a Quito, sino dos meses antes, cuando empezamos un módulo basado en seminarios, introduciendo métodos factibles de investigación de campo, la geografía del país y la región que íbamos a visitar, y juntos analizando posibles preguntas de investigación, y haciendo búsquedas de literatura. Los estudiantes mismos se repartieron en 4 grupos de estudio y definieron cada grupo un tema distinto:

Educación y culturas indígenas, accesibilidad física a educación, desarrollo hidroeléctrico y turismo comunitario, y cambios de la cobertura y el uso de tierra. El denominador común ha sido culturas, medio ambiente, y desarrollo, y las relaciones entre ellos.

Indigenidad es un tema de mucho interés actual en estudios de desarrollo y en geografía, y es un tipo de objetivo moral en investigaciones académicas, con referencia a la necesidad de valorar diversidad cultural e involucrarse en desarrollo alternativo. Investigaciones sociales en Latinoamérica son particularmente avanzadas en términos de inclusividad e indigenidad y estos valores también tienen un papel importante en el nivel político. Los temas de este informe, como bilingüismo, multiculturalismo, economía y sustento a nivel comunitario, y medio ambiente, reflejan los valores fundamentales presentados en la Constitución de la República del Ecuador aprobada en el 2008, y encarnadas en la Secretaría del Buen Vivir (*Sumak Kawsay*). Pero cómo funcionan estos valores en la práctica, y cómo los perciben las comunidades locales? En qué medida las políticas nacionales con implementadas de una manera basada en el respeto, aprecio, e involucramiento de los conocimientos locales basados en distintos cosmovisiones, ecologías, y espiritualidades? Estas son cuestiones fundamentales en los dos artículos sobre educación y también en alguna medida sobre turismo comunitario y producción de energía. El último artículo se enfoca más específicamente en asuntos ambientales, particularmente cambios de la cobertura y el uso de tierra, en particular la deforestación, presentando un estudio metodológico sobre percepción remota como herramienta de monitoreo.

Los resultados de las investigaciones fueron presentados en un seminario final llamado "Culturas, medio ambiente y desarrollo en la región de transición entre los Andes y la Amazonía en el Ecuador", en el auditorio principal de la UEA, ante muchos estudiantes y colegas. Luego de cada presentación intervino un comentarista de la UEA, y un debate en plenario.

Agradecemos al Departamento de Geociencias y Geografía de la Universidad de Helsinki por haber financiado la gira y también a FinCEAL por financiar el seminario final. Esperamos que continúa esta tradición de estudios de campo en ambientes multi-culturales.

Ashka pagrachu, shuk punchagama!

Paola Minoia, PhD, profesora titular de la división de geografía, Departamento de Geociencias y Geografía, Universidad de Helsinki

Anders Sirén, PhD, profesor titular de la división de geografía, Departamento de Geociencias y Geografía, Universidad de Helsinki

SEMINARIO FINLANDES-ECUATORIANO DE INVESTIGACIÓN:
CULTURAS, MEDIO AMBIENTE Y DESARROLLO
EN LA ZONA DE TRANSICIÓN ANDINO-AMAZONICA DEL ECUADOR
9.30-12.30 el 28 de octubre 2015
UEA, PUYO, AUDITORIO PRINCIPAL

Programa

09:30 Saludos del Dr. Julio Cesar Burgos Vargas, Rector de la Universidad Estatal Amazónica

09:40 Presentación de los proyectos de investigación por la Dra. Paola Minoia, Universidad de Helsinki

09:50 – 12:10 Presentaciones de trabajos estudiantiles de investigación:

09:50 - Accesibilidad de los alumnos Kichwa a las escuelas locales y centralizadas en Sarayaku, Santa Clara, y Tena (D. Guevara, O. Hagstrom, A. Ropponen, M. Rönnberg, E. Saari, W. Shiguango) - Comentarista: Lineth Fernández, Directora Académica.

10:20 – La cultura quichua en la educación formal (N. Fabritius, A. Häkkinen, S. Laurila, D. Lozada, L. Mamallacta) - Comentarista: Rosaura Gutiérrez

10:50 - Desarrollo hidroeléctrico y turismo comunitario (F. Aldaz, R. Grefa, M. Meri, N. Miettinen, M. Puttonen, H. Puustinen) - Comentarista: *Ruth Arias*

11:20 – Análisis de NDVI para determinar el uso del suelo (M. Grefa, J. Koskinen, M. Lindholm, M. Pullogando, I. Voutilainen) - Comentarista: Eliza López Di.r Vinculación con la colectividad

11:50 - Discusión plenaria presidida por el Dr. Anders Sirén, Universidad de Helsinki y Prometeo/Universidad Estatal Amazónica

12:20 - Comentarios finales y clausura

FinCEAL+ DEVELOPING FINNISH SCIENCE, TECHNOLOGY AND INNOVATION COOPERATION BETWEEN EUROPE AND THE LAC REGION

Abstracts (English)

1- Accessibility of Kichwa students to local schools and centralized in Sarayaku, Santa Clara, and Tena - This research has focused on physical access to schools, especially for Kichwa students of the bilingual and intercultural schools. The study has been based on travel maps, space-time surveys, and interviews involving students of primary and secondary schools Sarayaku, Santa Clara, and Tena, and GIS analysis.

2 - Kichwa culture in formal education - Education is one of the first priorities of the current state policy, and the current reform is integrating the aim of improving the overall quality of teaching with the need to revitalize different nationalities, including languages, cultures and ecological knowledges of kichwa communities. Students have interviewed school principals, teachers and parents of Sarayaku, Santa Clara and Tena schools, to understand different changes and challenges in the implementation of this reform particularly in rural isolated contexts.

3 - Hydroelectric development and community tourism - This research focuses on hydroelectric projects as a possible cause of economic, social and environmental impacts. In particular, the group has studied the impacts on community tourism in Baños, Santa Clara actors and Tena, through participant observation, transect analysis and interviews involving tour operators, activists, and representatives of public institutions.

4 - NDVI analysis to determine land use - This study focuses on evaluating the feasibility of distinguishing different types of land use and cover, such as primary forest, secondary forest, fields, pastures, urban areas, and others, based on the index of normalized difference vegetation (NDVI) calculated from Landsat satellite data. Field sampling was conducted in several urban, rural and forest areas around Santa Clara and Tena.

Resumen (Español)

1- Accesibilidad de los alumnos Kichwa a las escuelas locales y centralizadas en Sarayaku, Santa Clara, y Tena - Esta investigación se ha enfocado en la accesibilidad física a las escuelas, especialmente para los alumnos kichwas de escuelas bilingües e interculturales. La investigación ha consistido en la realización de mapas de viaje y otras actividades con estudiantes de escuelas primarias y secundarias de

Sarayaku, Santa Clara, y Tena, y análisis de sistemas de información geográfica (SIG).

2 – La cultura Kichwa en la educación formal - La educación es una de las primeras prioridades de la política estatal, y la actual reforma está integrando el objetivo de mejorar la calidad con el de fomentar la revitalización de las diferentes nacionalidades, y en particular de la lengua, cultura y conocimientos ecológicos de las comunidades kichwas. En este estudio de campo se ha entrevistado a directores de escuelas, maestros, y padres de Sarayaku, Santa Clara y Tena, para ver los diferentes cambios y desafíos en la implementación de esta reforma.

3 - Desarrollo hidroeléctrico y turismo comunitario - Esta investigación se enfoca en proyectos hidroeléctricos como una posible causa de impactos económicos, sociales y ambientales. En particular, el grupo ha estudiado los impactos en el turismo comunitario y ha involucrado encuestas con varios actores sociales, tales como operadores de turismo, activistas, y representantes de instituciones públicas en las áreas de Baños, Santa Clara, y Tena.

4 – Análisis de NDVI para determinar el uso del suelo - Este estudio se enfoca en evaluar la factibilidad de distinguir diferentes tipos de uso y cobertura del suelo, tal como bosque primario, bosque secundario, campos de cultivo, pastos, áreas urbanas, etc, basado en el indice de vegetación de diferencia normalizada (NDVI), calculado a partir de datos de satelites Landsat. Muestreo de campo se realizó en varios sitios urbanos, rurales y selváticos en los alrededores de Santa Clara y Tena.

PART 1: ESSAYS / ENSAYOS

Photo: Anu Häkkinen 2015

Intercultural education in the Amazonian context: examples from Pastaza

Rosaura Gutiérrez Valerio de May[1], Juan J. Leiva Olivencia[2], Thomas May[3], Janeth M. Herrera Valverde[4] and Víctor Aurelio Llangarí Ashqui[5]

Abstract

In Ecuador, there has been currently a growing tendency to value cultural diversity as a key element in the development and improvement of the quality of the national education system. The need to promote social and educational inclusion of young people from the indigenous communities, especially in the Amazonian region, it is reorienting the pathways of intercultural and bilingual education. This article aims to provide a reflective look over multiculturalism in the Ecuadorian educational context, and to highlight specific initiatives promoted by the Universidad Estatal Amazónica (UEA) as a program named *ruedas vinculantes* (connecting circles). The objectives are to analyze the current educational positioning of different social and pedagogical actors and to identify intercultural activities that can support personal, emotional and social strengthening of educators, students and families of the indigenous communities.

Introduction

The new Constitution of Ecuador (2008) initiated a legal framework favoring equality and inclusion of the indigenous nationalities within the national education system together with the prevailing culture. However, many situations of exclusion persist in the practice. This paper will describe the situation and challenges in the Amazonian province of Pastaza in the field of education, and will present some grassroots initiatives aimed to strengthen interculturalism and bilingualism at the secondary and higher education levels. The intent is not to present accomplished results of research, but to shed light on action research

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processes, which have been developed in the University integration community Department of the Universidad Estatal Amazónica (UEA).

Social and legal aspects

Ecuador has great cultural diversity and the Constitution of 2008, Article 1 defines the country as a multicultural and multiethnic one. There are 14 indigenous nationalities in the three regions of the country (Coast, Andes and Amazonia). Seven per cent of the population have self-declared to belong to one of these nationalities (INEC, 2010); nine of them live in the Amazon province of Pastaza (MCDS 2016).

The new Law on Intercultural Education established in March 31, 2011 recognizes that all levels of education have to represent and give value to all existing cultures in the national space. As the System Model for Intercultural Bilingual Education (MOSEIB) points out, this principle is based on earlier actions for cultural preservation of native peoples developed in the 1940s through initiatives of intercultural bilingual education under the leadership of an indigenous leader, Dolores Cacuango (MOSEIB, 2013). However, inequalities and prejudice against native groups still persist among people of all classes and intellectual levels.

According to MOSEIB (2013), owning the degree of teacher is not sufficient to get a position in one of the Intercultural Bilingual Education (EIB) institutions; it is not necessary for teachers to belong to one of the indigenous nationalities, but to also master indigenous languages. However, for mestizos it is possible to teach in EIB by proving oral and written knowledge of Kichwa, the second official language of Ecuador. These requirements are proposed for ensuring an intercultural and bilingual education in order to promote the use of languages and the maintenance and development of the different cultures as living elements which should be respected and integrated into the educational process.

The reality on the ground: significant progress and persistence of exclusion

'Kichwa at home, Spanish at school': so a teacher in a rural school of Orellana province explained the language barrier in a school district that required the exclusive use of the dominant language and culture. This situation contrasts with the practice of the EIB Units in Puyo, Pastaza, where local Amazon languages are considered to be important objectives of learning development and communication between teachers and students, and where other aspects of the Amazonian culture are taught, such as the recognition and cultivation and medicine plants, and the development of remedies both in the fields and in school labs.

Nevertheless, even there, the situation is far from providing equal opportunities for all students of indigenous nationalities and cultural groups. UEA research group identifies some gaps which are clearly seen in the transition from high school to higher college or university according to the average scores in academic admission examination for the National Higher Education (ENES). They were higher for the case of mestizos (740.7 points) than for indigenous students of the different nationalities with (687.8 points) and a significant difference of ($p = 0.05$ student's t test). The score difference indicates that the ENES test, which is designed to measure the ability for pursuing higher education rather than to assess knowledge, while the opportunities for students of indigenous nationalities are lower than for the mestizos, and it puts them into a serious disadvantage position (Gutierrez et al., 2015). The available information does not allow to get a complete diagnosis of the problem; but among various factors influencing the results. They can be recalled by the smaller proportion of students from indigenous nationalities who have followed preparatory test courses; or difficulties in mastering Spanish as a non-native language that probably influences linguistic understanding and expression skills measured in the ENES.

Besides the challenges posed by the university admission tests, other reasons stop indigenous youths of Pastaza from studying after the high level. A survey operated by the EIB governing council of the Unit "Amauta Nanpi", involving teachers and psychologists indicates that high percentages of students do not show interest in further study, to rather work and support their families (UEIB, 2013). Many teenagers have already had obligations by fathers and mothers and they see immediate earning as the way to escape from the extreme poverty risks, rather than investing in higher education.

Intercultural educational activities involving UEA

The approval of the UEA Integral Human Development Program by the University Council in February 2015 has paved the way for the so-called *ruedas vinculantes*, i.e. 'connecting circles' or round table. This group work methodology originates from Integrative Community Therapy Methods aimed to recover and develop individual and collective skills, promoting self-esteem, building active citizenship, as well as sincere and joyful relationships and healthy practices. It also fosters the rediscovery of cultural identity and popular wisdom and helps reducing the exclusion of Amazonian cultures in education, promoting self-esteem of marginal groups, and supporting equitable communication processes.

Integrative Community Therapy involves practices that facilitate the creation of solidarity networks, mobilizing resources and capacities of individuals, families, work teams and communities, raising the therapeutic dimension of the group. This group therapy encourages sharing life experiences among participants, strengthening and/or rescuing the self-esteem

of people, who do not often recognize the causes for their suffering and their oppressions (Camarotti, 2014). Round tables involve community wisdom with their skills and sensitivities as a base to rebuild the individual and social agent, weaving together a network of support that encourages the meaning of life. Ruedas vinculantes are put into practice through integrative community therapies that include the following components: 1) reception; 2) selection of topics; 3) contextualization; 4) brainstorming of problems from question tags 5) Closing ritual (Barreto, 2015).

Two units have benefited from this program and started a pilot project with UEA to train community therapists who will then extend the work to the entire region. One is the EIB Unit 'Amauta Nanpi', located in the city of Puyo, having 25 years of experience in education and promotion of cultures and Amazon native languages. This unit works particularly with children from different native communities of the Amazon region, who have migrated with their families to the city of Puyo with scare resources and suffering discrimination. The unit comprises 470 students and a faculty of 27 teachers. The other unit is the EIB of San Jacinto; it is also active since 25 years and located in the Canton of Mera, Pastaza, which is located 20 km from the city of Puyo. The unit was founded on August 1st, 1990 with the Ministerial Agreement No. 3458, as an elementary school with no name; later it was named 'San Jacinto' and finally got recognition as EIB Unit by Ministerial Decision No. 293 of 20 October 2006. This school has 163 students and 15 teachers.

According to a framework agreement between UEA and the Nationalities of Pastaza Province, launched during the academic year 2014-15, a collaborative work has been promoted by the Department of Academic Relations and the two mentioned EIB units together with students, teachers and parents. Until December 2015, a total of 19 ruedas vinculantes round tables have been organized, involving 219 females and 187 male participants; three ruedas have involved parents and other three included teachers and students. The work focused on the following topics: conflict with teachers' evaluation system; conflict of not getting along with parents; stress for workload; problem of alcoholism in school environment; students' desertion in two ruedas round tables; conflict with mothers; confusion with religion; abandonment of mothers; not feeling valued; concern with duties assigned in classroom; anger in family; lack of sufficient resources for children; fear of failing in examinations; difficulty of not getting along with children; sadness for family distance; concern about vices; concern for students; lack of job stability.

Concluding remarks

Transforming the school to build a more just and united society is a challenge in multiculturalism that is particularly felt in intercultural and bilingual schools of Pastaza

province. The work is progressing with the implementation of social and pedagogical initiatives proposed by MOSEIB (2013), but it is needed a great changes in the mentality of teachers and institutions. Training should be carried out by higher educational institutions of Ecuador. Needed cultural change in education should move from a model centered on disciplinary teaching to one focused on student learning, through personalized and inclusive projects focusing on educational models for cultural diversity (Lewis, 2012).

The institutional culture of schools should respect and it should be based on the most visible ties and community bonds and emphasized all possibilities for increasing positive interaction between family and school. The school should be a stage of community empowerment, not just a place where students and faculty go to study. The voice of families and communities should be welcome in intercultural and bilingual schools in the province of Pastaza; therefore, it is necessary to promote the emergence and consolidation of ruedas building networks between families and schools.

Finally, intercultural and bilingual teacher training is a key for transformative and inclusive educational activities carrying out ruedas. The need is to creating education and psychology spaces for debate and reflection on culture and emotions in order to reach positive synergies, favoring personal growth, professional development, improving schooling and social coexistence.

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La educación intercultural en Ecuador en el contexto de la Amazonía: ejemplos de Pastaza

Rosaura Gutiérrez Valerio de May[1], Juan J. Leiva Olivencia[2], Thomas May[3], Janeth M. Herrera Valverde[4] y Víctor Aurelio Llangarí Ashqui[5]

Resumen

En los últimos años existe una tendencia creciente a valorar la diversidad cultural como un elemento clave en el desarrollo y mejora de la calidad en el Sistema Educativo Ecuatoriano. Así, la necesidad de promover la inclusión social y educativa de los jóvenes de las distintas y numerosas comunidades indígenas, especialmente en la región amazónica ecuatoriana, supone una oportunidad de reorientar el sentido pedagógico y social de la interculturalidad y la educación intercultural bilingüe. En este sentido, el presente artículo pretende ofrecer una mirada reflexiva sobre la interculturalidad en el contexto educativo ecuatoriano, e, igualmente, poner de relieve determinadas iniciativas impulsadas por la Universidad Estatal Amazónica (UEA) como las ruedas vinculantes, con el propósito de diagnosticar de forma compartida con los distintos agentes sociales y pedagógicos la situación socioeducativa actual, y, también, proponer acciones educativas interculturales para el empoderamiento personal, emocional, social y comunitario de educadores, estudiantes y familias de estas comunidades indígenas.

Introducción

En el Ecuador, con la nueva constitución de 2008, existe un marco legal favorable para una inclusión de las nacionalidades indígenas en el proceso educativo, a niveles iguales con la cultura predominante. Sin embargo, en lo concreto, persisten muchas situaciones de exclusión. En esa contribución se describe la situación en la provincia amazónica de Pastaza, incluyendo algunas iniciativas de base que pretenden seguir fortaleciendo la educación intercultural bilingüe, a los niveles de secundaria y superior. No es la intención de presentar

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resultados acabados de investigaciones, sino de dar a conocer procesos de investigación-acción que se están desarrollando en el ámbito de la Universidad Estatal Amazónica y su Departamento de Vinculación.

Aspectos sociales y legales generales

El Ecuador es un país con una gran diversidad cultural, por lo que la Constitución Nacional de 2008 en su artículo 1 lo define como *pluricultural y multiétnico*. Existen 14 nacionalidades indígenas con presencia en las tres regiones del país. Un 7% de la población se han declarado pertenecientes a estas nacionalidades (INEC, 2010), y en la provincia amazónica de Pastaza se encuentran nueve de estas nacionalidades (Web Site).

El 31 de marzo del 2011, en Ecuador entró en vigencia la nueva Ley Orgánica de Educación Intercultural, con la cual el Estado reconoce que la educación en todos sus niveles abarca y valora a todos las culturas que existen en su territorio. Tal como señala el Modelo del Sistema de Educación Intercultural Bilingüe (MOSEIB, 2013), se han venido desarrollando acciones a favor de la preservación de las culturas en los diferentes pueblos originarios con anterioridad, y las primeras iniciativas de Educación Intercultural Bilingüe se desarrollaron ya en la década de 1940, bajo la conducción de una líder indígena llamada Dolores Cacuango (MOSEIB, 2013). Sin embargo persisten las desigualdades en oportunidades para el sistema educativo, y valoraciones impregnadas por prejuicios en contra de estos pueblos, en todas las clases sociales y en personas de todos los niveles intelectuales.

Según el MOSEIB, para ser docente en las Instituciones Educativas Interculturales Bilingües, además de poseer el título de docente es preciso pertenecer a una de las nacionalidades indígenas y dominar una de sus lenguas. También es posible para personas mestizas ser docente en estas instituciones, en caso que demuestra el dominio oral y escrito de la lengua kichwa, que es el segundo idioma oficial del Ecuador. Con estas prescripciones se pretende garantizar una educación intercultural y bilingüe para las nacionalidades que promueva el uso de las lenguas y el mantenimiento y el desarrollo de sus culturas, como elementos vivos, respetados e integrados en el proceso educativo.

La realidad en el terreno: avances importantes y persistencia de la exclusión

¨En casa, todo kichwa, y en la escuela, todo castellano¨. Así se expresó un maestro de una escuela rural en la provincia ecuatoriana de Orellana, explicando que su escuela era parte de un distrito educativo de lenguaje castellana, y que esto implica el uso exclusivo de la lengua de la cultura dominante. Esta situación contrasta con la práctica en las Unidades Educativas

Interculturales Bilingües en Puyo, Pastaza, donde las lenguas amazónicas locales son parte importante de la comunicación y el desarrollo de saberes y conocimientos entre profesores y estudiantes, donde se cultivan plantas medicinales amazónicas, se enseña su uso y la elaboración de remedios a partir de ellas en un pequeño laboratorio.

Sin embargo, la situación está lejos de una igualdad de oportunidades entre estudiantes de nacionalidades indígenas y de otros grupos culturales. Esto se nota claramente en la transición de la educación secundaria al nivel universitario: De acuerdo a una investigación realizada en la Universidad Estatal Amazónica, los puntajes promedios obtenidos en la prueba de admisión académica ENES eran mayores en el caso de los mestizos (740,7 puntos) que en el caso de los estudiantes de nacionalidades indígenas (687,8 puntos), con una diferencia significativa ($p = 0,05$ test t de estudiantes). La diferencia en el puntaje indica que en la prueba ENES, que está diseñada para medir la capacidad de realizar estudios superiores, y no para medir conocimientos, las oportunidades de los estudiantes de nacionalidades indígenas son menores en relación con los mestizos, y los pone en desventaja (Gutiérrez et al., 2015). No es posible, con las informaciones actualmente disponibles, analizar de forma contundente las razones de esta situación. Hay una serie de factores que pueden influir, desde la menor proporción de estudiantes de nacionalidades indígenas que han podido a los cursos de entrenamiento, hasta el hecho de que el castellano no es su lengua nativa, lo que probablemente influye en las habilidades de expresión y comprensión lingüística, aspecto que se mide en el ENES.

Más allá de las dificultades de superar la prueba de admisión a una carrera universitaria, existen otros motivos para que los jóvenes de nacionalidades indígenas en Pastaza no sigan estudiando después del nivel secundario. A través de una encuesta realizada por el consejo de gobierno de la Unidad Educativa Intercultural Bilingüe "Amauta Ñanpi" (UEIB, 2013), la constatación y evidencia por parte de docentes y la psicóloga de la institución, se observa que hay un alto porcentaje de estudiantes que no les interesa seguir estudiando porqué debe trabajar y aportar con recursos para la familia. Muchos adolescentes ya tienen obligaciones como padres y madres de familia y están buscando una salida inmediata a su situación de pobreza extrema, lo que no ven en la educación superior, aspecto que mediante el trabajo de acompañamiento desde la universidad va aportando para una mirada diferente.

Acciones educativas interculturales con participación de la UEA

Ruedas vinculantes

Con la aprobación del Programa de Desarrollo Humano Integral de la UEA por el Consejo Universitario de la misma universidad, se han puesto en marcha desde febrero 2015 la

práctica de las Ruedas Vinculantes. La Rueda Vinculante que proviene de la Terapia Comunitaria Integrativa es una metodología de trabajo con grupos, que permite recuperar y desarrollar las capacidades y recursos individuales y colectivos. Favorece el rescate de la autoestima, la construcción de una ciudadanía activa, relaciones interpersonales más claras, sinceras y alegres, y la salud integral. También fomenta el redescubrimiento de la identidad cultural y valora la sabiduría popular. Por lo tanto, contribuye a reducir la exclusión de las culturas amazónicas en el ámbito educativo, promueve la autoestima, y ayuda a que los procesos de comunicación se vuelvan más equitativos.

La Terapia Comunitaria Integrativa es una práctica que facilita la creación de redes solidarias, movilizando los recursos y capacidades de las personas, las familias, los equipos de trabajo y de las comunidades, suscitando la dimensión terapéutica del grupo. Estimula el compartir las experiencias de vida entre los participantes y a fortalecer y/o rescatar la autoestima de personas que, muchas veces, no reconocen el sufrimiento como algo que les oprime (Camarotti, 2014). La Rueda es una metodología construida desde la sabiduría comunitaria, desde sus capacidades y sensibilidades para reconstruirse como sujeto individual y social, tejiendo juntos una red de apoyos que alimenta el sentido de la vida. Para la ejecución de las Ruedas Vinculantes, se sigue el patrón de la Terapia Comunitaria Integrativa (TCI), que contempla: 1) Acogida, 2) Selección del tema, 3) Contextualización 4) Problematización a partir de la pregunta mote (comodín o simbólico) 5) Ritual de cierre. (Barreto, 2015).

Dos unidades que mantienen convenios con la Universidad Estatal Amazónica han sido beneficiadas de este programa que funciona como proyecto piloto para ser extendido a toda la región en la medida que se formen nuevos/as Terapeutas comunitarios. Se trata de la Unidad Educativa Intercultural Bilingüe (UEIB) "Amauta Ñanpi", ubicada en la ciudad de Puyo, la cual trabaja hace 25 años en la educación, promueve la valorización de las culturas y las lenguas originarias de la Amazonía, acogiendo especialmente a los niños y niñas que provienen de las diferentes comunidades de interior amazónico, que por la migración de las familias llegan a la ciudad de Puyo con escasos recursos y están sufriendo discriminación. Cuenta con una población estudiantil de 470 estudiantes y un cuerpo docente de 27 profesores. La otra entidad es la Unidad Educativa Intercultural Bilingüe (UEIB) San Jacinto, igualmente va a cumplir los 25 años de vida institucional, ubicado en el Cantón Mera, Provincia Pastaza, a unos 20 km de la ciudad de Puyo. Fundado con el Acuerdo Ministerial No 3458, el colegio del Ciclo Básico Intercultural Bilingüe sin "nombre", el 1 de agosto de 1990, posterior dotado con el nombre "San Jacinto" y finalmente con Acuerdo Ministerial No 293 de 20 de octubre del año 2006 convertido en Unidad Educativa Intercultural Bilingüe, actualmente cuenta con 15 docentes y con 163 estudiantes.

Respaldado por un convenio marco entre Universidad Estatal Amazónica y las Nacionalidades de la Provincia de Pastaza, se estableció un trabajo permanente de estas unidades educativas interculturales bilingües con el Departamento de Vinculación Académica de la Universidad Estatal durante el año lectivo 2014- 2015, dirigido a estudiantes, docentes y padres de familia. Para diciembre 2015, se habían realizado en las dos Unidades Educativas Interculturales Bilingües Amauta Ñanpi y San Jacinto un total de 19 Ruedas Vinculantes, con la participación de 219 del género femenino y 187 del género masculino. De ellas 3 con los padres de familia 3 los docentes y con estudiantes. Los principales temas abordados que fueron seleccionados en las 19 ruedas relacionados a: El conflicto con el sistema de evaluación docente. El conflicto de no llevarse bien con los padres. Estrés por el cúmulo de trabajo. El problema de alcoholismo en el ambiente escolar. La Deserción estudiantil en dos ruedas. El conflicto con la madre. La confusión con la religión. El abandono de la madre. El no sentirse valorada. Preocupación con los deberes que le asignan en las aulas. Rabia en la convivencia familiar. La falta de recursos para dar lo suficiente a los hijos. Miedo de no alcanzar un cupo en las postulaciones. La dificultad de no llevarse bien con los hijos. Tristeza con la distancia familiar. Preocupación con el vicio. Preocupación con los estudiantes. Falta de estabilidad laboral.

Observaciones finales

Transformar la escuela para construir una sociedad más justa y solidaria en un reto de la interculturalidad en los centros educativos interculturales y bilingües de la provincia de Pastaza. Se trata de continuar con la aplicación de los principios, las iniciativas y los valores sociales y pedagógicos del MOSEIB (2013), pero esto implica cambios en la mentalidad de los docentes, en la cultura institucional y, por supuesto, en el necesario impulso formativo en materia intercultural y bilingüe que debe proseguir en las instituciones educativas ecuatorianas.

El cambio de mentalidad de los docentes está relacionado con transitar de un modelo centrado en la enseñanza y en lo disciplinar a un modelo educativo más centrado en el aprendizaje de los estudiantes, más personalizado e inclusivo en proyectos y medidas de atención a la diversidad cultural existente (Leiva, 2012).

La cultura institucional de los centros educativos requiere un mayor impulso en lo que sería incrementar y visibilizar al máximo los lazos y vínculos comunitarios, donde debe subrayarse las posibilidades de encuentro e interacción positivas entre familia y escuela. La escuela debe ser un escenario de empoderamiento comunitario, y no únicamente un lugar donde acuden estudiantes y profesorado. La voz de las familias y su desarrollo socio-comunitario debe tener acogida en las escuelas interculturales y bilingües de la provincia de

Pastaza, por lo que resulta necesario promover el surgimiento y consolidación de las ruedas vinculantes con familias.

Finalmente, la formación intercultural y bilingüe del profesorado no es pilar clave de las acciones educativas transformadoras e inclusivas que las propias ruedas vinculantes vienen impulsando. Se trata de crear espacios psicopedagógicos de debate y reflexión sobre cultura y emoción van de la mano para poder llegar a establecer sinergias positivas, favorecedoras del crecimiento personal, el desarrollo profesional y, por ello, una mejora significativa y relevante en la generación de la convivencia escolar y social.

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Kichwa indigenous culture in formal schooling in the Puyo region in Amazonian Ecuador

Nora Fabritius, Anu Häkkinen and Soili Laurila[1]

Abstract

After centuries of linguistic and social oppression of indigenous peoples in Ecuador followed an ethnic indigenous movement that has been considered the most influential all over Latin America. Since then, agreements and conventions on different administrative levels have been carried out and the negotiations continues on both state and community level on how indigenous languages and cultures should be preserved. The school institution is one of the most important socialization agents for children, and therefore also an important agent in cultural maintenance, revitalization and revival. Therefore this study aims to explore what factors influence the implementation of the culture of indigenous Kichwa in formal education in Amazonian Ecuador. Through visits to schools in three different locations and interviews carried out with teaching staff and state representatives in the field, we concluded our final results. The factors influencing the presence of indigenous culture in education are strongly related to the location and size of the school, the schooling program and material resources as well as with the motivation of the local families and the local community. Actors and social movements on different levels, national and local, are influencing how the local culture is realized in the schools visited. It seems that an open dialogue between all actors is needed to achieve a formal schooling system that can strengthen students' identity and cultural heritage in a way that supports their performance and future educational possibilities, without excluding the great plurality of the Ecuadorian state.

1. Introduction

After centuries of colonization and oppression of indigenous peoples in Ecuador, the first indigenous movements striving for cultural and social rights emerged in the 1960's. This mobilization has been considered the strongest indigenous uprising in the continent (Katz & Chumpi Nantip 2014). The formal state-led schooling system was one of the most powerful

[1] In addition Lorena Eliza Mamallacta Cerda and Diana Estefanía Lozada Ramos participated in the fieldwork.

"vehicle for the assimilation of indigenous peoples" (Lipka & Stairs 1994) and their culture, leading among other to a fast language shift from Amerindian languages to Spanish (Perreault 2003; Valdiviezo 2009; Sumida Huaman & Valdiviezo 2014). Since then indigenous movements for cultural and linguistic rights have risen and indigenous communities have gained control over their children's schooling (Lipka & Stairs 1994). The aim of our study is to reveal what factors influence the presence of indigenous Kichwa culture in formal education in the Puyo region in Amazonian Ecuador.

Kichwa (also known as Quichua) is an indigenous language with most speakers in Ecuador today and it is also spoken in the area of our interest. There are approximately two million native Kichwa speakers in the Ecuadorian highlands and 60 000 in the Amazonian region (Haboud 1998). It is important to acknowledge that both the culture and language of indigenous Kichwa is rich in its varieties and dialects. In 1981 the standardized variety of Kichwa, *Kichwa unificado*, was created by the representatives of speakers of the different varieties of Kichwa. Kichwa unificado was believed to increase the literacy within Kichwa communities and to support the maintenance and revitalization of the language, but it also engendered debate on the authenticity and use of unified variety of Kichwa (Hornberger & King 1998).

As former research on indigenous education in Ecuador shows, the implementation of national education policies and the local linguistic situation as well as the presence social movements vary on different socio-spatial levels (Perreault 2001, 2003; López 2009; Sumida Huaman & Valdiviezo 2014). During our field research we visited three schools; Ahuano's Millennium school which is a big school in an interconnected area close to the city of Tena, "Camilo Huatatoca" school in the small town of Santa Clara that is going through a fast urbanization and three schools which are in the isolated village of Sarayaku. This constitutes our geographical differentiation approach. The chosen schools also apply different schooling programs; Educación Intercultural Bilingüe (EIB) and Millennium. The former concentrates on providing intercultural bilingual education to indigenous people, and the latter is a governmental education program aiming for the quality of educational services through "comprehensive educational infrastructure with innovative physical and technological resources" (Ministerio de Educación 2016). This choice also provides an insight into how varying educational policies affect the situation. We believe that this approach opens up for a discussion on the tugs-of-war between the state and local communities on schooling of indigenous children in Ecuador.

We begin our outlook on the issue by getting familiar with the historical background of indigenous education and the creation of indigenous identity politics as part of it in Ecuador. Then we pay closer attention to the intercultural education policy of EIB and its proposed constraints. After we present the cultural negotiation in indigenous education (Stairs 1994) as a theoretical framework for our field work as well as the research question. Then

following we introduce the methods and material for our field work, after which we move into the final results concluded in the field. In the final conclusions we put forth our final deliberation within' the issue and encourage for further discussion.

2. The battle for indigenous education and the creation of indigenous identity politics

The school institution is closely linked to the history of nationalism and colonialism which grounds our study in the field of critical theory (Lipka & Stairs1994, Shaw et al. 2010). During the age of colonialism many of the Indian children of Ecuador were put into catholic schools which neglected their own culture and knowledge, and so started the assimilation of the indigenous of Ecuador. After Ecuador's independence, education came to be one of the main strategies in the early 1900's for molding all inhabitants into unified citizens of the state, all sharing an imagined common history, culture, language and ideology. The formal school was "viewed as the critical means of integrating the indigenous population into national life" (Foote 2006). Since the indigenous uprising of the 1960's education on the indigenous' terms has according to May and Aikman (2003) been one of the "key legal and political demands" of the indigenous rights movements. The first organization explicitly indigenous was initiated in 1964 and in the following decades many new organizations have embarked. The most visible and influential of these is arguably the organization Confederation of Indigenous Nationalities (CONAIE) (Perreault 2003).

The descriptions 'white-mestizo' and 'mestizo' refer to those groups of the population in various Latin-American countries that are the result of a white European and an indigenous mixture. They represent the biggest segment of the Ecuadorian population, around 77% of the total. The term white-mestizo reflects the post-colonial attachment of mestizos to white culture denying the indigenous matrix (Oviedo & Wildemeersch 2008). Therefore also one the milestones for indigenous rights was the Constitution of 1998, that changed the national identity of Ecuador from white mestizo to multicultural and multiethnic, which marks a change in the history of nationalism in Ecuador. Although this kind of recognition is consequential, it has been perceived as mainly symbolic (Hornberger & Coronel-Molina 2004).

Perreault's (2003) analysis on political multiscale organizing among indigenous groups in the Ecuadorian Amazon provides a relevant historical perspective on the current status of the indigenous mobilization in Ecuador. Along with the neo-liberalization and decentralization of 1980's came the inclusion of international non-governmental organizations (NGO's) and agencies for indigenous politics and a new form of global support for indigenous organizations emerged. Eventually this led to the 'glocalization' of identity politics that is still present today where ethnic identities are reconstructed through organizations that are rooted in local places but simultaneously global in nature (Perrault

2003). With the aim of accessing resources and claiming political rights the indigenous organizations have created a more materialized and outspoken form of indigenous identity. In other words the cultural representation upheld by various actors in indigenous politics has redefined local identities and views on cultural heritage.

2. 1 EIB (Educación Intercultural Bilingüe) as an educational policy

Out of educational and practical-level achievements carried out in late 1980's the most relevant are: the recognition of bilingual intercultural education referred to as EIB (Educación Intercultural Bilingüe), it's directorate DINEIB (Dirección Nacional de Educación Intercultural Bilingüe) and the curricular model MOSEIB (Modelo del Sistema de Educación Bilingüe) created for the implementation of the bilingual intercultural education (Oviedo & Wildemeersch 2008; Martínez Novo & de la Torre 2010). The aims of EIB took a step further in 1993 when cultural maintenance, inclusion of local knowledge and creation of innovative indigenous pedagogical practices were set out as the main goals for EIB (Martínez Novo & de la Torre 2010). In practice this means a deeper dialogue with local communities regarding indigenous education. Also the current Constitution of Ecuador (2008) has two main articles regarding indigenous rights and education:

-*"Article 57. Indigenous communes, communities, peoples and nations are recognized and guaranteed, in conformity with the Constitution and human rights agreements, conventions, declarations and other international instruments, the following collective rights: 14. To develop, strengthen, and upgrade the intercultural bilingual education system, on the basis of criteria of quality, from early stimulation to higher levels of education, in conformity with cultural diversity, for the care and preservation of identities, in keeping with their own teaching and learning methodologies."*

-*" Article 347. The following shall be the responsibility of the State: 9. To guarantee the intercultural bilingual education system, where the main language for educating shall be the language of the respective nation and Spanish as the language for intercultural relations, under the guidance of the State's public policies and with total respect for the rights of communities, peoples and nations."*

The new constitution of 2008 has again increased the role of the state in indigenous education (Martínez Novo & de la Torre 2010). The control of the budget of EIB was moved from CONAIE to the Ministry of Education and other indigenous organizations, since it was perceived that EIB had become too politicized and ideological. Martínez Novo & de la Torre (2010) did not perceive this development as necessarily a bad thing, as the new government was promising greater redistribution to the poor and more investment in education in general and some of the problems of EIB are the same as those of educational institutions that serve the poor. Also the indigenous collective didn't according to Martínez Novo & de la Torre

challenge the transfer of EIB to the Ministry of Education, which promotes the idea that the indigenous movement wasn't fully committed to bilingual education.

The implementation of EIB in Ecuador has been studied thoroughly. Researchers agree that EIB is crucial for the enhancement of ethnic identity and of indigenous peoples rights but that the interpretation on local level and the practices of EIB have often failed, especially when compared with the goals outlined in 1993 (see f.ex Oviedo & Wildemeersch 2008; Martínez Novo & de la Torre 2010; Katz & Chumpi Nantip 2014). Indigenous education continues to be perceived as a second-class education that even restricts the social mobility of the indigenous children, compared to if they would attend Hispanic schools. There is also an obvious lack of resources, such as for example teachers and equipment. This is often linked to the fact that indigenous schools often are located in peripheral areas. Therefore there is still an ongoing debate between the wish to create equal educational prospects for all citizens, which is one of the main goals of education today (Antikainen et al. 2013) and the wish to provide education tailor-made for supporting minority cultures (Stairs 1994).

3. Cultural negotiation in indigenous education as a theoretical framework

As students from a different social and cultural context with limited previous knowledge about the study object, we approach this study with focus on reflexivity. As called for by certain indigenous movements seeking to decolonize indigenous research (IPSG 2009), we need to acknowledge that we are analyzing and interpreting the situation in the Puyo region from our cultural and social standpoint (Shaw et al. 2010). This is particularly important in our case as our main concepts; indigenous, ethnic identity and cultural elements, are socially constructed and constantly socially negotiated and transformed (Barth 1968; Wikström 2009).

To create a theoretical framework for our study we chose Arlene Stairs (1994) model (Figure 1) for cultural negotiation in indigenous education. Stairs has within her studies of indigenous education created a model with five categories of culture and the actors involved in implementing said categories into education. In our study we analyze our material by this model and by this definition of culture.

Stairs has divided culture into three main categories as shown in Figure 1. The first being "What", which contains the language of instruction and the content of the study materials in different subjects, for an example the parts of history that is chosen to be included into teaching. This is according to Stairs the easiest one to implement into education through policy-making. The second category is "How", which contains the ecological and social level meaning how environmental and social relations are included into teaching. This includes the take on humans' relation to nature and to each other, behavior and social roles.

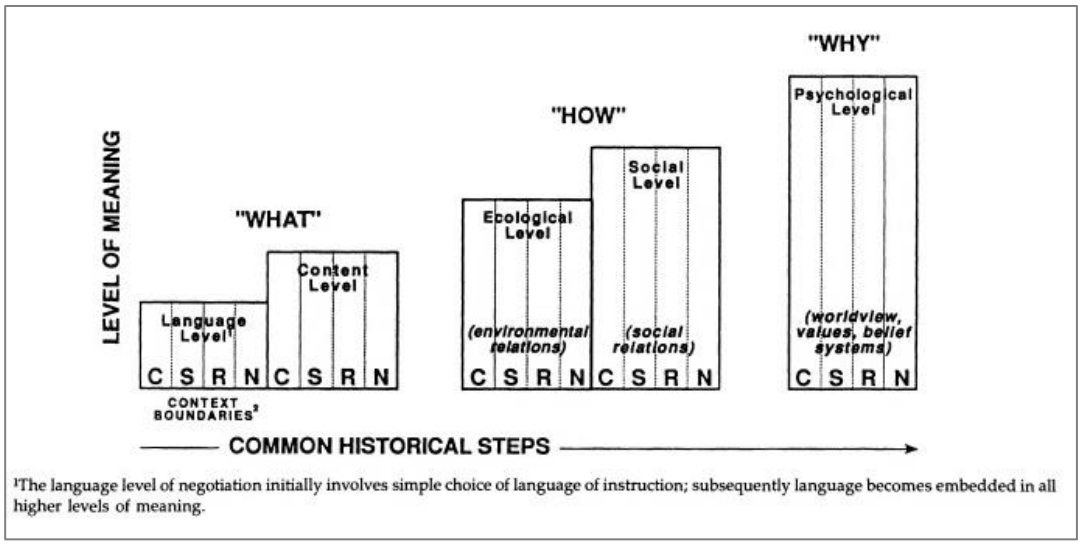

Figure 1. *Stair's (1994) model for cultural negotiation in indigenous education with the actors on different levels that can participate in the negotiations. The actors being the following; Classroom/Teacher (C), School/Community (S), Region/Educational System (R) and State/National (N).*

The last category is the "Why" which contains a deeper level of meaning, it contains worldviews, values and belief systems. This is the hardest category to integrate into the formal education according to Stairs. It is therefore common that the implementation of "How" and "Why", are the last to be achieved in formal education for indigenous minorities. It is easier to change the language of instruction or the content of the material than to create a dialogue between indigenous and national worldviews, values and belief-systems. But if a cultural dialogue is achieved, Stair's studies show that the students perform significantly better in their studies and their identities and their self-confidence are strengthened. In addition to this, the indigenous cultures can be maintained and even revitalized through formal education, something that for long have been one of the main goals for indigenous movements of Ecuador (López 2009).

When it comes to indigenous movements, privileging the state and national-level movements (R and N) is taking attention away from quotidian processes of local mobilization and politics of place (the S and the R). It has been proved with various methods that the indigenous communities themselves are most pivotal in promoting their language and culture revitalization as they are working from bottom to up (Hornberger 1997, Valdiviezo 2009). Concerning the new constitution of 2008 in indigenous education, Martínez Novo and de la Torre (2010) raised a question concerning the risk of an arising top-down mobilization of indigenous education. If this risk becomes reality, or it already has, the spaces of autonomy for indigenous movement in education might get swiped away. Therefore, we will pay extra attention to the role of the school, the teachers and the

community in inclusion of indigenous culture in school. Our research question is therefore the following: which factors influence the implementation of indigenous culture and language in formal schooling in Ecuadorian Amazon?

4. Methods and Material

We wish to gain insight into the views on indigenous education on different spatial and administrative levels, in accordance with Stair's (1994) four levels of actors; classroom (C), community (S), educational program (R) and state level (N). Therefore our main method for this case study are thematic interviews carried out as part of the field research with parents of students (S level), teachers and rectors (C and S level) and state representatives (R and N level). Through the conducted interviews we also gained information on policies and educational structures in this, to us, unfamiliar context. As culture is a complex concept and we do not have much pre-knowledge of the established elements of the local indigenous cultures, we let these aspects rise from the interviews without pre-assigning importance to any cultural element or area of knowledge. We however, use Stairs model of culture in education to help us identify different cultural elements as we go.

We spent a two week long period doing field research during which we interviewed the Minister of Bilingual Intercultural Education and the Minister of Buen Vivir. For our case study we chose five elementary schools in three different areas in the Ecuadorian Amazon: the Millennium School in Ahuano close to the city of Tena, Santa Clara Bilingual Intercultural School "Camilo Huatatoca" in the town of Santa Clara, and two primary schools (Kali kali and Sarayaku center) and one secondary school, Unidad Educativa Sarayaku, in the village of Sarayaku. Visiting the schools we met with the rector and 18 teachers of Santa Clara's Camilo Huatatoca School and three parents and five teachers in Sarayaku where we also had a meeting with the village leaders. In Ahuano's Millennium School we interviewed one teacher and the rector. All interviews were conducted in the schools which allowed us to also conduct non-systematic observation during the visits. We acknowledge that this project was conducted during very short period of fieldwork and that this is one of the main restraints on our study. This is why our goal is solely to gain some insight into the situation of indigenous formal education in Ecuadorian Amazon and perhaps open up for further discussion.

During the research we had to pay special attention to the ethical notions of this study, as we have limited possibilities to predict how our study will be perceived in the local communities as we were working in a culture unfamiliar to us (Smith 1999). We had a senior researcher with us that has been working in the area for many years as well as students from the UEA supported us in regards to cultural sensitivity. As research on the indigenous has in the past unintentionally or intentionally come to harm local communities, we needed to proceed with

caution. For an example we decided not to gather signed consent forms during the interviews, even though this is standard in Finnish research as we learned that locals have had quite bad experiences with signing papers from authorities, and would most likely react negatively. Instead we tried to make sure all informants knew for what purpose we gathered information and that participating was optional and that their anonymity would be protected if they wished so.

5. Results

We distinguished three main aspects that affects the presence of indigenous knowledge and culture in the schools we visited; location and size of the school, schooling program and material resources and motivation of families.

5.1 Location and size of the school

One of the main factors influencing the representation of local culture in the schools were their location and size, which directly affects from what kind of demographic area the students and teachers come from. Ahuano's Millennium school has 400 students situated close to the city of Tena, which is a city with 34 000 inhabitants. According to the rector, none of the students come from Kichwa villages (*comunidades*), as they all live in areas of mixed nationalities. However, still 60% of the school's students are Kichwa. The canton of Santa Clara has a bit over 3000 inhabitants; the city center is markedly smaller but growing rapidly and becoming urbanized. The city is surrounded by several Kichwa communities. Therefore the Santa Clara school (Figure 2) has around 250 students of which majority are Kichwa but come from 25 different communities.

The schools in Sarayaku on the other hand are located in the remote village of Sarayaku situated along the Bobonaza River. There is no road leading to Sarayaku, so villagers use canoe (1 day) or airplane (25 minutes) to reach the closest city which is Puyo in the northwest. The village has approximately 1200 inhabitants. Out of the three schools visited, two (Kali kali and Sarayaku center) are smaller schools with approximately 50 students and Unidad Educativa Sarayaku was a collective educational unit with 380 students. In the Sarayaku schools, all children are naturally from Sarayaku. Therefore the three research areas have very different level of connectivity, which we witnessed having an impact on the representation of local culture in various ways.

***Figure 2**. Classroom in Santa Clara's Camilo Huatatoca school.*

The location of the school has a great impact on the language skills of the students and also on where the teachers were from. As could be expected, the language change from Kichwa towards Spanish is an ongoing process that reaches interconnected areas where the population is more ethnically mixed, before the remote more demographically isolated communities (King 2001). In the more interconnected areas of Tena (Ahuano School) and Santa Clara the children communicated solely in Spanish with each other. In Sarayaku on the other hand, the language of communication is mainly Kichwa both in the education as well as between the students.

If the teachers are from the same communities as the children, it is also possible for the teachers to speak the local Kichwa dialect with the children, as is the case of Kali kali elementary school in Sarayaku. In Santa Clara school and Ahuano's Millennium school, the teachers come from a relatively vast area and the language of instruction is mainly Spanish. However, Kichwa is used when needed if the teacher knows the language (75% of Santa Clara's teachers and 50 % of Ahuano Millennium school's teachers are Kichwa). In some cases this means that the variety of Kichwa used between teacher and student is Kichwa unificado if the teacher is not a native Kichwa speaker, or if the teachers do not speak the same dialect as the students. In Santa Clara they also used to have a shaman as a teacher, which one can see as important criteria for successfully implementing local culture and traditional knowledge into formal education. In Sarayaku the teachers in Kali kali elementary school were born in the village. This means that the teachers share the common culture with the children. The teachers also had made the Kichwa instruction materials themselves which means they can use examples from the local culture in their textbooks. The numeric size of the school does not seem to influence where the students come from in

areas as isolated and enclosed as Sarayaku, as students will still all come from the same community.

In Ahuano and Santa Clara on the other hand, the size of the schools has a greater impact on the composition of students. In the case of the Ahuano Millennium School, five local schools had been shut down to establish the larger new Millennium school, meaning children living in very different neighborhoods all attend the same school. In Santa Clara, the case is that there is no other EIB school in the close area, so students from many different communities come together in the same school.

5.2 Schooling program and material resources

The material surroundings of the school and resources, such as education equipment, seem to affect how the indigenous culture is represented in the schools studied. First of all in the school visited, the main challenges of education are still related to the lack of material resources, teacher qualification and the accessibility of the schools. In other words, more effort seems to be put into the modernization of the educational resources than into the cultural aspects of the education.

This is something to be acknowledged here. That mentioned, when it comes to indigenous knowledge and culture, researchers claim that if the land of the indigenous disappears or transforms too much, so will the culture (Houde 2007). This indicates that modern school buildings and surroundings of the school are not necessarily easily combinable with preserving local culture in the schools. For example in Sarayaku, the locals would have preferred to have their own school buildings built out of wood and palm-leafs, both for the sake of preserving traditions but also because they have better airflow and indoor light which is essential in the hot climate of Sarayaku with limited access to electricity (Figures 3 and 4).

Regarding the schooling program, subjects taught in school and their distribution are clearly factors affecting the representation of indigenous culture in the schools. *Cosmovision* is a subject taught in all of the schools except in Ahuano's Millennium School. Cosmovision is according to the interviewed teachers a subject where "children are thought their identity", and where Kichwa and Shuar, the second largest indigenous language group (Katz and Chumpi Nantip 2014), learn about each other's culture and ways as well as about the mestizos, in an intercultural manner. Therefore cosmovision is also about teaching the children and alternative way of thinking and reflecting on indigenous traditions. This subject

Figure 3*. Traditional class room buildings in Sarayaku village.*

Figure 4. *Modern school building in Sarayaku village.*

also includes traditional knowledge such as dreams reading and beliefs. The subject is either organized by the local communities or taught by local indigenous teachers.

Also indigenous skills are taught in these schools, such as medical plants, handcraft and fishing, and in Sarayaku's Kali Kali for example, children have a one hour lesson in agriculture every week. However, there is no text book, apart from manuals produced in Bolivia and Peru that according to some teachers in Santa Clara, were used in the past. In Ahuano's Millennium school there is no particular lessons in indigenous knowledge, Kichwa language nor cosmovision. However they are organizing volunteer-based project-led festivities, but the question remains if these are actually relevant in the case of indigenous culture, as it was solely up to the students to choose topics for their projects. As the Ahuano

Millennium School was not part of the governmental EIB-program, indigenous topics was not a compulsory part of the curriculum, and so, none was implemented nor was the rector motivated to do so in the future.

Kichwa language teaching is also present at the schools of Sarayaku and Santa Clara which followed the EIB-program. Kichwa unificado is the Kichwa taught but it doesn't seem to meet everyone's needs. For example in one of the schools in Sarayaku the teachers feel that by teaching Kichwa unificado part of the culture gets lost, even though they acknowledge that the unified language offers better mobility in the wider language group, for an example when it comes to job opportunities in the public sector of all country. Apart from two of the smaller Sarayaku schools, all school material is in Spanish. Therefore the article 347 of the Constitution 2008 stating: "ensuring the system of bilingual intercultural education, which will be used as the main language of education of the respective nationality" is not fulfilled in practice.

5.3 Motivation of families

Motivations expressed by interviewed parents seem to have a major influence on what kind of school their children attend. Cultural aspects are highlighted as providing ground for the choice, as parents are interested in the coherence with skills and forms of knowledge they were using at home, and seem to be aware of what cultural elements they wished to be provided for their children through education. When it comes to the use of Kichwa language, the teachers from Santa Clara also emphasize the importance of their relation with the families, so that for instance to promote the use of Kichwa at home that is essential for language learning; otherwise, language skills cannot improve to adequate level and remedial education may be needed. This also influences what language the students use with each other in school. When students have different level of language skills, it's also a challenge for the teacher to adapt to these conditions. Parents interviewed in Santa Clara confirmed that since their children started in the bilingual school, the family has also been using more Kichwa at home.

However, apart from the language subject, it remains unclear to us to which extent the families have a possibility to affect the development of their children' school education; in fact, Santa Clara's teachers feel that parents don't express their opinion or demand for change as they trust the teachers to know what is best for their children. Regarding the importance of cosmovision lectures at school, families find it relevant, but also believe that cultural aspects and environmental knowledge such as hunting and fishing are mainly to be taught at home rather than under the schools' responsibility.

In Ecuador parents make the final decision about which schools their children attend to, and whether their children should attend bilingual school or not. In Sarayaku however, all

schools are bilingual so the choice is limited, unless parents decide to send their children to schools outside the community; which rarely happen since the sense of community and identity is very strong there. In Santa Clara, parents can choose between bilingual schools and regular schools as both exist in the region. Accessibility is one of the major issues to be considered in the school choice. It is not simply the distance that determinates the choice, but also the means of transport, time and costs. The quality of education seemed to be one of the priorities for the families, and as Millennium schools (Figure 5) are well-equipped, have better resources and educated teachers they may appear as better options than the EIB-schools; therefore, in these cases, parents give priority to quality in formal education before language and culture preservation.

Figure 5. *Modern class room in Tena Ahuano Millenium School.*

The new Millennium schools could seriously challenge the local schools offering EIB-education with limited resources for a lack of government investment. As for the EIB-school of Santa Clara, its reputation is nevertheless good compared to other schools in the area, and this is the reason why it is also attended by some mestizo students. However, the school is in the process of becoming a Millennium school, thus going to attract more children from closing schools, and for this reason, more changes are ongoing.

In general, learning Kichwa language and local culture seem to be considered as important by all interviewees. The reasons given were mostly related to the identity and keeping the culture alive, but also to the fact that according to a new government policy, some administrative posts have Kichwa language criteria, and this creates job opportunities for children having attended bilingual school. However, as the higher and university level education is organized only in Spanish, some parents might see that if they wish their children to do well in higher levels of education they should concentrate on mastering the Spanish instead of Kichwa, and in this case parents show lower motivation for schooling in

their mother tongue. This could be the case for 60 % of the children in the Ahuano Millennium school of Kichwa origin (according to the principal of the school), choosing a school that was not part in the EIB-system. However, we could not interview any parent from that school, so we cannot report their motivations directly; and we also need to acknowledge that the closest EIB-school was located two hours away from that school, so that distance may be also one of the reasons for the choice.

6. Conclusions

The most prevalent controversy we witnessed in the visited contexts regards the national versus local aspects of education. Sarayaku shows clearly this conflict of vision in education, being a community with a long history of political and social movements based on relatively isolated location and land-use struggles. The village has a board of leaders which with the help of several NGO's have fought international oil-companies and the Ecuadorian government for their right to their lands and their autonomy. The rigidity of both systems, central and local, is visible in many sectors and also in school planning. One debated topic in the agenda, as we learned, is the government's intervention on Sarayaku's schooling system which local leaders consider very important in their civil society formation. Sarayaku receives materials from the government, but they mainly follow their own curriculum as it was for instance visible in Kali kali. Moreover, the government wishes to build a Millennium school in Sarayaku, but local leaders and parents show clear opposition to this project. From both sides, we saw a resistance to come to an open discussion and mediated solution. The controversy between national and local levels is also associated with insufficient handling of various ethnic matters. As May and Aikman (2003: 144) put it, "new and complex analyses are needed for complex global times but these analyses must take diversity as a starting point and put diversity at their center" when it comes to indigenous education. Also Stairs (1994) points out that "deeply negotiated policy at a national or regional level does not insure a deeply negotiated indigenous educational practice to individual schools and classrooms". More sufficient pedagogical approaches are needed in order to recognize, value and incorporate the widely differing cultural and linguistic knowledge of the students. Stairs mentions that indigenous educational programs often only add indigenous on a superficial level, through "add-on" classes in language. This was something that at least seemed to be the case in some of the schools visited, but would need further investigation to be stated. The whole process of the intercultural education seems to be in progress in the areas studied and achieving agreements and sustainable solutions requires the will to co-operate from both national and local level. Understanding all aspects of indigenous knowledge requires a commitment to the local context, as Houde (2007) puts it.

Closely linked with the national-local level relations is the controversy between traditions' preservation and modernity, which is also present in education. As our results show, there

seems indeed to be a tug-of-war between a high standard, well-equipped schooling and schooling supporting the indigenous students' language, culture and identity. In Tena's Millennium school the high standards of education and good material resources are present, but the indigenous culture is not valued as much. On the other hand in Sarayaku it is more about the traditions and not so much of modern facilities; teachers and local leaders ask for more connectivity while other aspects of modernization (e.g. new buildings not respecting local architecture styles) are even viewed as a threat to the local integrity and autonomy. However, these two aspects of education presented here, maintenance of culture and high standard education, should not have to exclude each other. As most families expressed, it should not be a matter of one or the other, and higher standards in formal education should be realized with the respect of local communities' wishes and through deeper dialogue with the institutions.

One more aspect we need to consider, that is about the situation of indigenous education in the so-called Kichwa unificado. This unified language is a good example of how some aspects of indigenous education are not necessarily in line with the real cultural identity of the taught students. If language is seen as one the primary elements of culture in education, as stated in all policies, how can Kichwa unificado help to support the indigenous identity when people do not relate to it as their own? We acknowledge that for practical purposes, Kichwa language needs to have its unified form, but language alone cannot be the only tool for enhancing local indigenous identity. After all there is still a great pluralism within the culture and language within the group of Kichwa speakers, and so, one unified language might not be able answer the needs of all indigenous nationalities. Instead, more aspects of the local cultures should be included in the education programs, starting by the cosmovision hours, to the integration of indigenous knowledge and values into all subjects. We recognize that this is not the easiest program to be implemented, but should enter in the national education strategy, and be the focus of a national forum for promoting a diversified education in the country.

Finally, as we have seen that EIB schools are more work-oriented rather than allowing access to higher education, this should also be the focus of a reform; in fact, indigenous people should not be put in front of a decision to either choose to connect to their cultures or to leave them, to access good universities and if they want to access positions of national responsibility.

In conclusion, we believe that an open dialogue between the local and national level is the only way to achieve a formal schooling system where the national and the local culture can come together, allowing indigenous children to maintain a strong identity and achieve educational success without excluding the great plurality and the local varieties of the Ecuadorian state.

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Resumen - Cultura indígena Kichwa en la educación formal en la región de Puyo en la Amazonía Ecuatoriana

Durante siglos, los pueblos indígenas del Ecuador han sufrido opresión social y lingüística, pero en las últimas décadas ha surgido en el país un movimiento indígena que ha sido considerado el más influyente en Latinoamérica. Desde entonces, ha habido negociaciones y acuerdos entre organizaciones indígenas y organismos del estado, en diferentes niveles administrativos, en torno a la preservación de los idiomas y las culturas indígenas. Las instituciones educativas en particular son factores particularmente importantes de socialización para los niños, y, por lo tanto, también para la conservación, revitalización, y resurgimiento de la cultura. La constitución política del Ecuador reconoce que es un país multicultural y multiétnico, y estipula que el estado garantizará la educación intercultural bilingüe, donde se usará para cada nacionalidad indígena su propio idioma como el idioma principal de instrucción.

El objetivo de este estudio fue de explorar cuales factores influyen en la implementación de la lengua y la cultura Kichwa, en la educación formal en la Amazonía Ecuatoriana. Es importante notar que aunque tanto la cultura como el idioma Kichwa tienen una gran diversidad de variedades regionales y dialectos, se creó en el 1981 una variedad estandarizada, el Kichwa unificado, con el propósito de mejorar la tasa de alfabetismo en comunidades kichwas y revitalizar el idioma. Sin embargo, esto también dió origen a un debates sobre la autenticidad de la variedad unificada del Kichwa.

El marco teórico del estudio fue el modelo de negociación cultural elaborado por Arlene Stairs, el que incluye cinco categorías de cultura (nivel de idioma, nivel de contenido, nivel ecológico, nivel social, y nivel psicológico) y cuatro categorías de actores (aula/profesor, escuela/comunidad, región/sistema educativa, y estado/nacional).

Para realizar este estudio de caso se escogió tres distintos sitios en las provincias Pastaza y Napo, donde se visitó un total de cuatro escuelas y un colegio y se evaluó los diferentes niveles de aplicación de la Educación Intercultural Bilingüe (EIB), en comparación con los esfuerzos para modernizar la educación a través del programa de Escuelas del Millenio.

Los sitios de estudios también se distinguían entre ellos en el sentido de su cercanía a áreas urbanas y redes de transporte. En Ahuano, cerca de la ciudad de Tena se visitó la Escuela de Milenio Ahuano donde se entrevistó el rector y un profesor. En el pueblo de Santa Clara, se visitó la Escuela Camilo Huatatoca, donde se reunió con el rector y 18 profesores. En la comunidad de Sarayaku, se visitó las escuelas Kalikali y Centro Sarayaku, y el Colegio de Sarayaku, reuniéndose, en total, con cinco profesores y tres padres de familia, y además con la dirigencia de la comunidad. Todas las entrevistas fueron realizadas en los mismos establecimientos educativos, lo que también permitió realizar observación directa de las actividades realizadas en los establecimientos respectivos.

En Santa Clara y Sarayaku, donde los establecimientos educativos eran parte del programa de Educación Intercultural Bilingüe, se enseñaba cosmovisión indígena como una asignatura aparte, donde se enseñaba por ejemplo la interpretación de sueños y creencias. También se enseñaba conocimientos indígenas como plantas medicinales, artesanías, pesca, o agricultura. Y también enseñanza del idioma kichwa formaba parte del currículo en estos sitios. En Ahuano, en cambio, no existía nada de tales asignaturas relacionadas con cultura, conocimientos, e idioma indígenas.

Solamente en Sarayaku, el kichwa fue usado como el principal idioma de instrucción. Tanto en Santa Clara como en Ahuano, se usaba casi exclusivamente el Español como idioma de instrucción, a pesar de que aproximadamente tres cuartas partes de los profesores en Santa Clara, y la mitad de los en Ahuano, eran kichwas. Igualmente, en Sarayaku los estudiantes se comunicaron entre sí en kichwa, mientras que en Santa Clara y Ahuano se comunicaron entre si casi exclusivamente en español.

En cuanto a los resultados, se distinguió tres factores principales que aparentemente afectan la presencia de culturas y conocimientos indígenas en los establecimientos educativos que se visitó: a) la ubicación y el tamaño del establecimiento educativo, b) programa educativo y recursos materiales, y c) la motivación de las familias. La ubicación, el tamaño, y la conectividad, afectan directamente el área demográfica de cual provienen los estudiantes y profesores. El ambiente físico, tal como el equipamiento educativo, parece afectar la manera que la cultura indígena es representada en los establecimientos educativos. Según se pudo observar, los desafíos principales de la educación todavía son relacionados con la escasez de recursos materiales, la capacidad de los profesores, y, en zonas remotas, también la accesibilidad física. En la actualidad se centraliza recursos a unos pocos establecimientos educativos, y se ve menos compromiso con los aspectos culturales de la educación, como por ejemplo bilingüismo y multiculturalismo. Esto tiene la consecuencia que estudiantes en zonas periféricas tienen menos acceso a educación superior.

Se recomienda que se necesita un dialogo abierto entre actores locales y nacionales para lograr un sistema de educación formal donde se combina la cultura local y la nacional, permitiendo que los niños indígenas puedan mantener una identidad fuerte al mismo tiempo que logren éxito académico, fortaleciendo así el estado plurinacional que es el Ecuador.

Accessibility to schools for Kichwa pupils of Santa Clara, Ahuano and Sarayaku in Ecuadorian Amazonia

Olga Hagström, Aino Ropponen, Marika Rönnberg and Elli Saari[1]

Abstract

This case study focuses on how Kichwa pupils travel from their homes to schools in Ecuadorian Amazonia. In particular, it focuses on accessibility issues in remote villages compared to towns and discusses the potential effects of the national education policy aiming to centralize schools and reduce rural units. We use GIS and qualitative methods and collected data through questionnaires to school children and interviews to various professionals in education and policy making, such as teachers, principals, governmental officers and NGO representatives. According to our study, schools in rural areas have challenges to maintain quality education but at the same time children face problems to reach centralized schools. In remote difficult terrain, natural hazards and lack of transportation infrastructure provide challenges; but also for families going to schools located in towns, arranging proper transportation is not easy, and these difficulties increase with the progressive closure of rural schools.

1. Introduction

In recent years there has been strong demand for quality of schooling worldwide and also in Ecuador (Post 2011; II Informe nacional 2007). The finding of petroleum in the Amazonian Ecuador in the end of the 1960's led to increased road constructions and urban growth (Gradus & Lithwick 1996) which caused rapid improvement in accessibility and made centralization of services, schooling among others, possible. This paper gives an overview on how mobility and physical accessibility to schools appears nowadays in semi-rural towns and remote areas in Ecuadorian Amazon and what kind of challenges there exists.

[1] In addition Danny Javier Guevara Llerena and Wilmer Andres Shiguango Yumbo participated in the fieldwork.

We are especially interested in Kichwa pupils, who are often marginalized in terms of accessibility to schools, particularly those living in rural areas of Ecuador (Post 2011). Our main research question was to see how Kichwa pupils currently move toward schools in Ecuadorian Amazonia. To analyze their mobility and school accessibility, we wanted to see how different mobility and transport is organized in remote communities and in towns; and what would be the changes induced by the Millennium Schools program, particularly in terms of accessibility to schools for rural indigenous children.
We first introduce some basic concepts used in our study and previous studies. Secondly, we specify the methods we used and present the results of our field work particularly with regards to Kichwa pupils. Finally, we discuss how our results are related to previous studies on school accessibility.

2. Background

According to Geurs & Van Wee (2004), accessibility can be evaluated on the basis of land-use, transportation, time and individual assets. All these components are related to transportation networks, time-distance and spatial inequality. Nutley (2000) defines accessibility as the opportunities that are "potentially achievable as a percentage of the hypothesized needs" (p. 207). A general problem in rural areas seems to be given by lower range of opportunities in terms of accessibility.

Children's mobility is highly relevant when it comes to education and its accessibility. Most children in rural areas cannot choose the location of their school, or even the means to get there. The relative location of schools and the connecting transport services create a need for time-distance coordination. In other words, access to education is weakened when transport is lacking. As the main purpose of transport is to provide accessibility (Nutley 2000), insufficient transport infrastructure affects negatively socio-economic development (Olsson 2009).

Access to education has short and long term effects of people's lives, as education is one of the best ways to improve individual opportunities in life (Vasconcellos 1997; García-Aracil & Winter 2006; Parry et al. 2010). Insufficient access to education creates a vicious circle especially among ethnic groups. Indigenous people are often marginalized economically and socially compared to the mainstream population in many countries (García-Aracil & Winter 2006). Poverty, often hitting indigenous group living in rural areas, restricts educational opportunities; geographical isolation, socio-economic conditions and inadequate transport networks further reduces accessibility to school and other fundamental services (Vasconcellos 1997).

García-Aracil & Winter (2006) note that indigenous people in Ecuador living in rural areas are the most exposed groups to drop out from formal schooling. Post (2011) notes that opportunity costs, like the sacrifice of families encouraging their children to study instead of working to support the household, are the main barrier for achieving education. Ecuador has been slow in increasing the educational participation in comparison to its neighboring countries (ibid.), but has nevertheless been able to increase the numbers of the citizens getting primary and secondary education, as well as improving the average educational attainment of its indigenous population (García-Aracl & Winter 2006).

There is a worldwide trend of centralization of services, education being one of them. In 2005 Ecuador officially adopted the goals of the UN Millennium declaration that includes the objective to secure basic primary school education for all girls and boys and supports equality in all levels of schooling (II Informe nacional… 2007). The special object of the Ecuadorian Millennium project is to provide quality education, improve conditions of schooling and develop an education model to respond to local and national needs. Included in this strategy is the Millennium educational project, to be implemented through stronger and centralized establishments.

Ryder & Brown (2000) studied the growing urban centers in Ecuadorian Amazonia and observed a draining trend of young and educated people from the surrounding rural areas. Parry et al. (2010), in their studies on rural settlement of Brazilian Amazon and rural-urban migration, found that poor road networks reduce access to schools, and that one reason to migrate for households from poorly connected areas is to improve education opportunities for their children. These findings support the idea that improved access to education is a key condition to support rural areas, and that unless the challenges to provision of schools are removed, rural-urban migration would continue. In terms of favorable policies for the indigenous groups, a noticeable reform has addressed the establishment of intercultural and bilingual education systems, so that in 1998 the indigenous languages were recognized as official languages along with Spanish (Perreault 2003). However, despite declared governmental policies to empower indigenous, rural and poor communities, as confirmed by the study of Post (2011) about the constitutional reform of 2008, while political participation and freedoms of expression and organization have increased according to Yashar (1999) and Perreault (2003) studies, for García-Aracil & Winter (2006) ethnic inequalities persist, and neoliberal reforms have limited in practice some social services.

As stated by Broberg (2015), mobility and accessibility not only depend on distance but also environmental factors that determine route choices, and from the possibility to use different means of transport. Interesting comparison can be made also with studies in other geographical contexts. For instance in Sweden, Andersson et al. (2012) show how travel to school distances generally increased during 2000-2006, after a new regulation gave families

the freedom of school choice. One exception was in the case of families from ethnic minorities or using social assistance, for whom travelling distances were shortest. The study discussed how ethnicity and poverty is related to travel-to-school distances and school accessibility through school choice.

Vasconcellos (1997) studied rural children's schooling in Brazil and noticed that transport policy and planning are necessary in order to guarantee access to elementary schooling for all. The study underlines the importance of physical location and transportation system to secure access of rural children to urban schools. For rural people in developing countries, access to schools is critical and lack of mobility planning has serious consequences. A lack of public transportation inside rural areas and between urban and rural areas cannot be compensated by private modes, in poor socio-economic contexts.

3. Study area and methods

Our research is field based, using both qualitative and quantitative methods involving questionnaires, GIS analyses and interviews to public officers and teachers. The questionnaire provided data for the GIS analysis and included information on distances, time and transport used by students in their daily travels to schools and back home. The GIS analyses allow to relate the mobility to the physical characteristics of the areas, which are of particular importance for the contexts where Kichwa children can only walk to go to school.

The field work was conducted with the following schools: a) Santa Clara Bilingual Intercultural Unidad Educativa "Camilo Huatatoca"; b) Unidad Educativa Fiscal Técnica Experimental Del Milenio "Ahuano"; c) Colegio Unidad de Educativa Bilingual Intercultural Sarayaku; and d) Sarayaku primary school. Children come from extended areas including various villages, named *comunidades*. Some interviews and observations were also carried out in the primary school of Kali kali, a *comunidad* around Sarayaku.

The bilingual Santa Clara school includes 250 students, mostly Kichwa, moving from 15 different *comunidade*s. The school has 18 teachers, and 75 percent of them are also Kichwa. The school in Ahuano is a Millennium-project school, and it is the only school we visited that is not bilingual. Ahuano is a comprehensive school with 420 students from 3 to 18 years; 60 percent of the students are Kichwa speaking but the teaching is in Spanish. As for Sarayaku, all schools in the *comunidade*s are primary and bilingual. Only in Sarayaku center there is a secondary school, and two primary schools, with 380 students altogether. The Kali kali primary school has 42 children and three teachers.

We collected responses to the questionnaire from 78 pupils between 9 to 16 years of age. They gave us information about their place of residence, means of transportation, time of leaving home and arriving to school, difficulties and dangers on the school route, and the reason for the school selection. We also asked them to show their village on a map.

For the GIS analysis we could not include the responses from the Kali kali school, because of some technical difficulties in the field and a generalization of the answers because of relatively few responses. The primary school located in Sarayaku center was also left out, because of uncertain reliability in travel time answers provided by small children.

We also carried on expert interviews, mostly in Quito: with Pedro Cabascango, national director of the intercultural bilingual education, Ministry of Education; at the Secretary of Buen Vivir, with Freddy Ehlers (Minister), Santiago Rojas (legal advisor), Patricio Barriga (advisor), Rosa Ines Barahona (education analyst) and Angel Medina (Kichwa representative); and with Leo Cerda of Amazon Watch. Moreover, rectors and teachers in the schools of the three areas of study were also interviewed. Experts expressed their views on accessibility issues and on pros and cons of the school centralization plans.

In regards to the research practice, we need to consider our positionality in the study area and our capability to collect reliable data. Our group was composed by students from Northern Europe, quite far from the observed people of Amazonia; but some group members were from Ecuador. Asking information about daily travelling, although it is not the most personal question, still requires a certain sensitivity, especially when working with children. A problem also regards the reliability and accuracy of children's answers about travel time, especially when they leave their homes with family members of neighbors having other time schedules, and when they do not enter directly to the class after arriving to school but have (sometimes long) waiting time. Finally, there was occasionally some language barrier, since we used English, Spanish and Kichwa (in Sarayaku), for questionnaires and instructions had to be translated in different languages.

4. Results

4.1 Travel distances

Figures 1 (Santa Clara), 2 (Ahuano) and 3 (Sarayaku) show maps in which distances between schools and home points are represented by aerial of 2km, 5km and 8km. Physical travel distances in kilometers are the shortest in Sarayaku and the longest in Ahuano. However, accessibility problems in Sarayaku are not given in terms of aerial distance, but rather by the

difficult terrain, lack of organized transport and the need to go on long walks on hilly terrain, under difficult climate conditions, and also crossing rivers.

In Santa Clara (Figure 1) pupils reach their school from inside the 8km radius, and most of them from very near, inside 2km radius. However, the interviews with the rector and the teachers revealed that there were problems with the transport and also that schools in surrounding villages were closing, which was obliging some students to travel even for 20 km to arrive to school, and others to abandon school attendance. In Ahuano (Fig. 2) there were students coming from very near, but also from 8km or even further away. We were also told that 5 other schools were closed when the Ahuano Millennium School opened. As said, Sarayaku's (Fig. 3) secondary school collects students from the surrounding *comunidade*s. The Euclidean distances between the villages are not long, and pupils come no further than 5km away; however, the school paths are not straight and make distances longer.

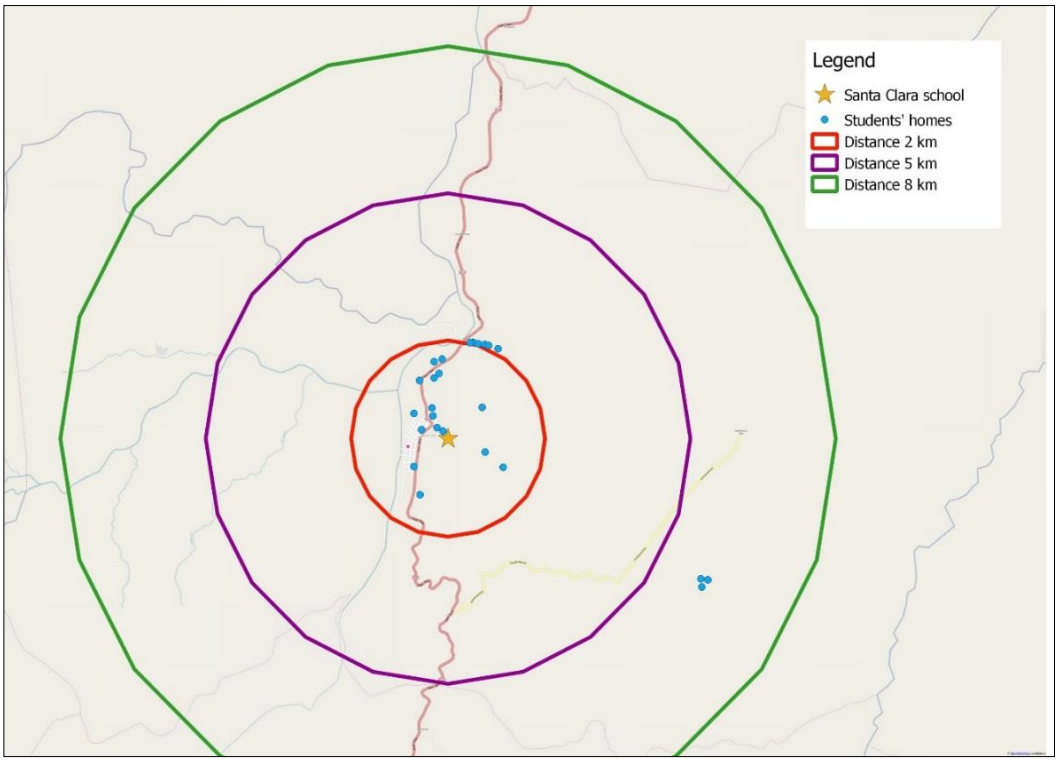

Figure 1. *Distances to Santa Clara school.*

Answers to questions about school choices involved two elements, i.e. school quality and location. As for the Santa Clara school, the major reason for families' choices is given by the teaching offer also of Kichwa language and culture, which is valued since bilingual

skills have become a requisite for employment in public offices. In Ahuano's Millennium school, interviewed students mentioned that the choice had been influenced by the good reputation (no matter the language), which will give them higher opportunities to access better jobs or high education. Moreover, the school location was seen as favorable. As for Sarayaku, the only reason that was mentioned was that the school was the closest one at the primary level, and the only secondary program available in the area.

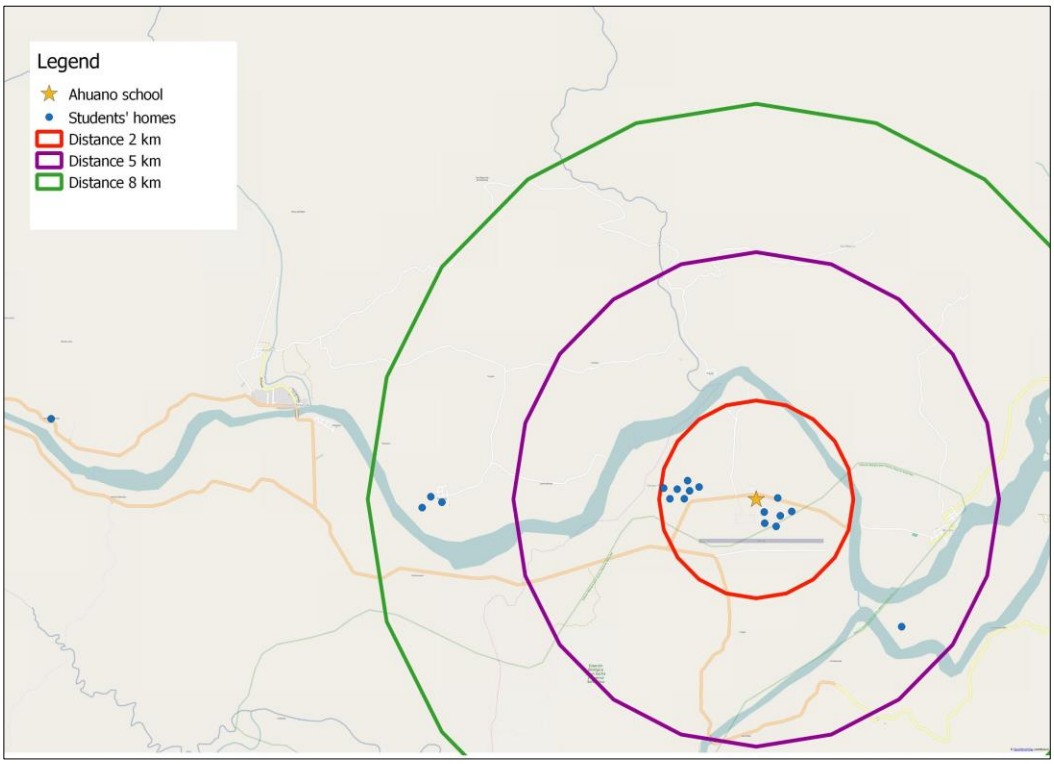

Figure 2. *Distances to Ahuano school.*

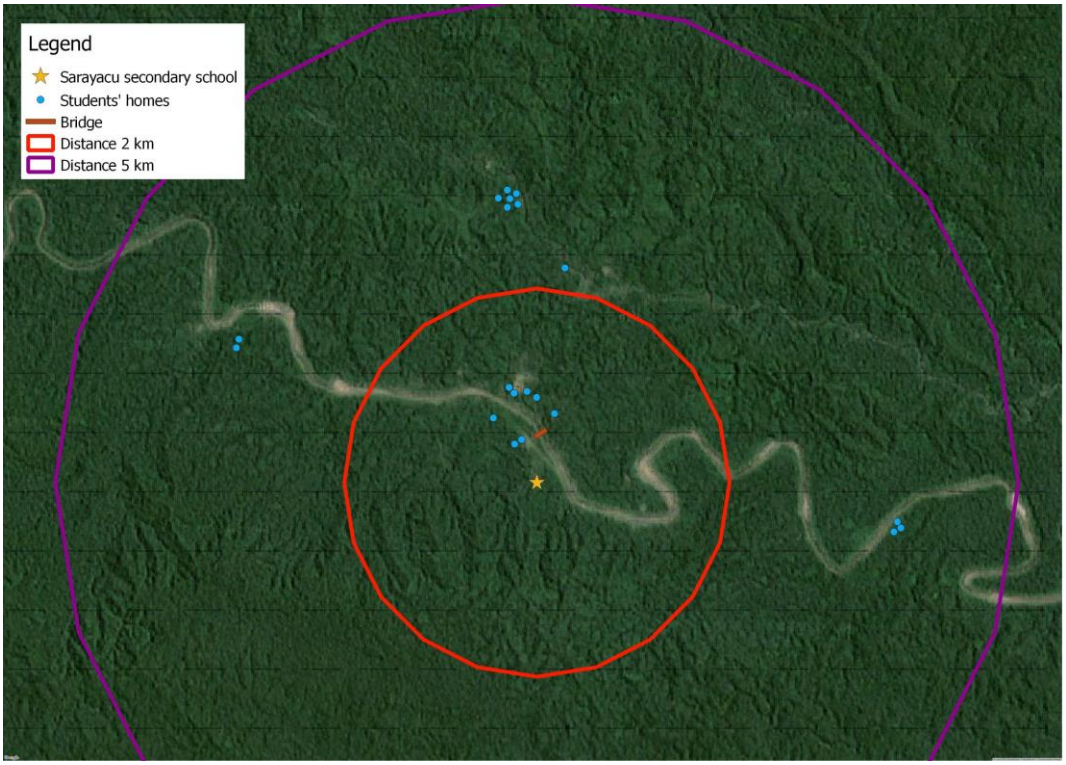

Figure 3. *Distances to Sarayaku secondary school.*

4.2 Travel time and type of transportation

Sarayaku secondary school experienced the longest median travel time between school and students' homes, even though it had the shortest distances to school (table 1). In Sarayaku, the travel time is increased by the difficult school path.

Table 1. *Median travel time between school and home*

School	**Median travel time (min)**
Santa Clara	30
Ahuano	40
Sarayaku	50

As for Santa Clara, interviews with the teachers revealed heavy transport problems: all *comunidade*s were covered by only one bus, which had to take students from the first

village even 2 hours before the school starts; while students might also have to wait for a long time at school (without any school canteen or available food near the school) before the bus takes them home. The schools starts at 7:30, but because of bus schedules some students have to arrive at school as early as 5:45. Ahuano had similar problems than Santa Clara. In both locations, the questionnaire confirmed that there is much variety inside the class with the time of arrival to school, probably due to bus schedules. This makes it difficult to calculate exactly the time needed from home to school and vice versa, plus children might have difficulties estimating the time of departure and arrival

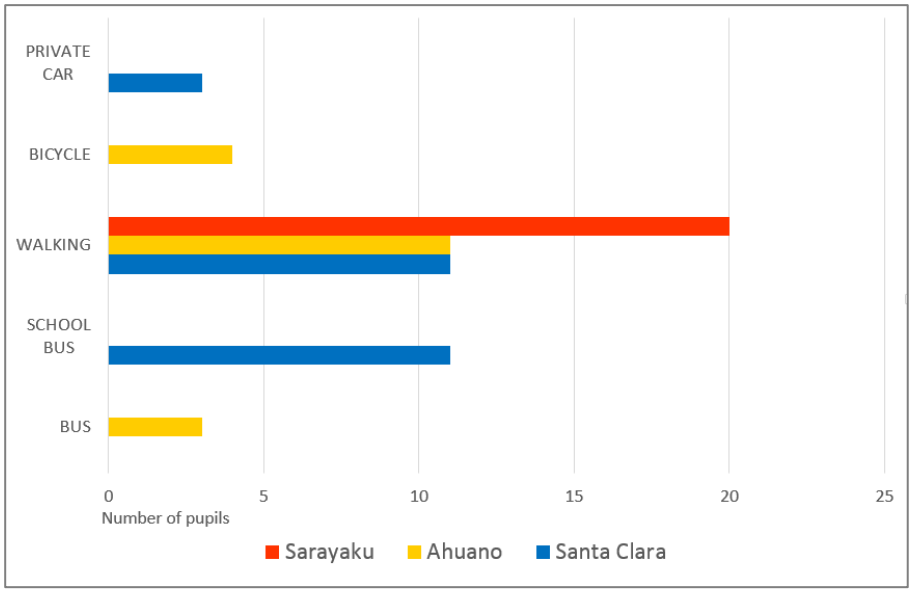

Figure 4. *The means of transportation to schools.*

It is visible from the graph (Figure 4) that walking is an important mode of transportation for all schools, but in Sarayaku it is the only one. In Santa Clara the school bus provided by the municipality is important, but has to be ensured year after year (and in fact, the rector was concerned about the risk of not having it for financial problems); private car transport is also used. In Ahuano children get to school by bicycle and also there, teachers said they were much depending on availability of buses.

4.3 Dangers and difficulties on school journey

When asking about dangers and difficulties on school journeys, children in Santa Clara and Ahuano gave similar answers (table 2). Most students in both school did not mention any particular issue, while some mentioned dangers in the traffic, animals and difficulties related

to the bus time schedules: in Santa Clara bus come too late, while in Ahuano they are already full. The need to secure a school bus was also discussed with teachers and rectors. In Santa Clara they said there was a driver available but no a school bus (besides the one temporarily granted by the municipality); while Ahuano could have a school bus to use, but no driver; and there, the cost of school buses for families with many children has become a problem.

Table 2. *Risks and problems in the study areas according to questionnaires and interviews*

	Questionnaires to pupils	**Interviews to teachers and rectors**
Santa Clara	-no particular risks - animals, e.g. dogs - bus late or not possible to use - cars not respecting lanes - getting wet in the rain	- need for school bus - municipality lacks money to arrange good transportation - rural kids in danger on big roads
Ahuano	- no particular risks - fast cars - full buses - dogs	- school bus but no driver - kids use costly public buses
Sarayaku	- snakes mentioned by everybody - rain, flooding, mud - falling trees	- bridge is dangerous - kids walk with older students, teacher accompanies or parents pick up kids - need for better roads and more bridges

Problems in Sarayaku are quite different, since children walk to and from schools, usually accompanied by older brothers and sisters, or by teachers or parents. Snakes are mentioned by all students as the greatest risk on the way. Also other natural risks such as falling trees, rain, flooding and mud were answered by many. There is a policy in school to advice children to stay home in case of heavy rain. Teachers mentioned the need for improved roads and bridges, as crossing the rivers, particularly during rainy periods, is particularly dangerous for children.

5. Centralization of schools: pros and cons

The pros and cons of the school centralization program were discussed with experts in Quito and teachers and rectors in the study schools. Cerda from Amazon Watch mentioned that the Ecuadorian government strives for a knowledge-based society, through unified and

standardized education providing equal opportunities for everyone. Centralization of schools would enable to concentrate qualified teachers and better equipment, like teaching materials and computers with internet connections.

These points were also discussed in the schools we visited. While Ahuano Millennium school teachers were sufficiently qualified, Sarayaku schools had major problems with this, although some improvement occurred since an education project for teachers started in 2004. Sarayaku's problems also include lack of equipment, according to interviewed teachers. On the contrary, Ahuano had computers in classrooms with internet connection, laptops for teachers, a laboratory, a library and running water. Moreover, Ahuano had the capacity to offer full lunch for older students staying longer in school, while all other schools we visited were only able to distribute packed biscuits and juice.

Ahuano School was also part in various international programs aiming to raise the level of education. Sarayaku secondary school, on the contrary, had problems in getting graduated students to universities, as they would not pass entrance exams that are centralized. Local teachers are relatively unaware of the national demanded level of education and the city schools have comparatively better preparation for exams. "Having school next to your home does not guarantee the quality of education", states the Ministry of Buen Vivir in the interview, justifying the need to enhance excellence through school concentration.

However, as a teacher in Santa Clara said, "Centralization of schools with better standards is a wonderful idea but has its problems", since closings of nearest village schools make journeys to school even longer, more dangerous and more expensive in case sufficient transportation is not arranged. Long school days with long travels adds to the burden and nutrition problems for children. In Santa Clara, many children arrive too late home from school or even drop out from school because this issue becomes unbearable for families. Teachers of Santa Clara believe dropouts might increase in the future if school concentration increase without first solve the problem of transport. The Education Ministry tries to also introduce boarding schools to solve the issue; however this leads to other problems. Boarding schools, school closings and standardization of education are seen as potentially causing communities breaking and threating indigenous cultures. As said by the representative of Amazon Watch, indigenous schooling is only applied in *comunidade*s' schools.

In fact, while Ahuano Millennium school does not include Kichwa language in the teaching program, Sarayaku schools actively support Kichwa language and culture. However, a teacher in Sarayaku has criticized the materials provided by the government, for being inadequate and not considering the local conditions. Governmental plans also include changes in school buildings, but with no attention for traditional building style and for

climate conditions. In fact, classes built as close rooms along the central standard styles, get extremely hot in the Amazonian sun. Teaching staff in Sarayaku insists on the need to improving their old schools instead of building new compounds. In general, people from Sarayaku believes that Ecuador being a diverse country needs more teaching on community cultures and intercultural matters rather than unified programs. A local teacher said: "You have to know the native people and their culture to design a plan for them".

6. Discussion

The analysis shows that we cannot reduce the debate to the simple evidence that local schools are more accessible than centralized, since the emerged issues of physical accessibility have to be related to those on social accessibility to wider opportunities in terms of second and third level of education and potential employment.

Anyway, still focusing on physical accessibility, is it relevant to notice that closing of village schools and centralization does create new challenges to school attendance when transportation is not arranged. Problems are mostly related to financial availability of the public sector that according to various interviewees, is responsible to provide school busses. Interviewees in Santa Clara said that some children do not attend school because the time wasted in travel can be used for working at home. As it has been already argued by Vasconcellos (1997), access to elementary schooling should be guaranteed by adequate transport planning. García-Aracil & Winter (2006) stated that in Ecuador indigenous children are those at high risk of drop out; and our interviews suggest that centralization coupled with lack of alternatives to walking for remote areas like Sarayaku, could make the problem even more acute. Anyway, remote areas have also other structural problems affecting schooling, given the socio-economic situation of households, as for instance in Kali kali according to a local teacher, children have to work at home after school and thus, are too tired to study.
Remote areas and towns have different problems of accessibility: while children in remote areas face problems with natural hazards and difficult terrain, those going to centralized schools may be helped by proper transportation connections even when travel distances increase. There is a need for time-distance coordination between school locations and the connecting transport services (Nutley 2000). So far, according to the data collected in Santa Clara and Ahuano, there has not been enough of time-distance coordination, even between the bus timetable and the school's starting time. Having secured busses and drivers managed directly by the schools could improve this coordination.

As seen, travel time is affected by various factors, depending on modes of transportation and route choices (Broberg 2015). Even though the travelling distances in Sarayaku are shorter,

the travelling time can be longer, because of the demanding path to school. Sarayaku is really a special case, where the infrastructure of the community is not allowing cars or even bikes, so that the time distance is inevitably longer if the distance grows only by little. However, for other cases, while the common idea is that longer physical distances caused by centralized school would increase challenges to accessing schools, in reality this depends on the actual time and comfort of the journey.

For Sarayaku, improved programs and equipment as those proposed through the Millennium project, would be needed and welcomed but in local schools, since distances that are already too hard physically for small children cannot be further increased. For this and other similar cases, closer communication between *comunidade*s and the government should be enhanced, so to adapt the State programs to the local conditions.

7. Conclusions

The purpose of this study was to find out how the Kichwa pupils access schooling in different areas of Ecuadorian Amazonia and how local families and teaching personnel, see centralization as impacting accessibility and quality of schooling. Through questionnaires and GIS analysis we could find patterns of different time distances and hazards in school journeys; while interviews with teachers allowed discussions going more profoundly into national education policies affecting accessibility.

The main outcome of our study is that while schools in remote areas have both challenges of quality in education and also some accessibility problems, for schools in more central areas with better facilities, the quality seems to improve, but does not include indigenous languages or cultures, and with also some transport problems. So, quality schooling is surely crucial for the development of a functioning society; but adapted programs and infrastructures for all indigenous cultures are equally important, and so physical access to schools from any home settings; these planning components have to be taken in stronger consideration for a country with such a cultural and natural diversity.

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Resumen - Accesibilidad a establecimientos educativos para estudiantes de Santa Clara, Ahuano, y Sarayaku, en la Amazonía Ecuatoriana

Este estudio se enfoca en la situación de movilidad y accesibilidad física a establecimientos educativos en áreas rurales y semi-urbanas en la Amazonía Ecuatoriana. Particularmente se

enfoca en grupos de estudiantes Kichwas, ya que ellos muchas veces son marginados en cuanto a la accesibilidad a establecimientos educativos. La pregunta central fue de ver como los estudiantes Kichwas en la actualidad se trasladen a escuelas y colegios en la Amazonía, y de analizar los efectos potenciales de políticas educativas nacionales que implican la centralización de la educación y a veces el cierre de unidades educativas en zonas rurales. Estudios anteriores ya han demostrado la importancia de la accesibilidad física a los establecimientos educativos. El acceso a la educación determina las oportunidades de vida de las personas y, por lo tanto, un acceso deficiente puede crear un círculo vicioso, particularmente entre grupos étnicos minoritarios. En muchos países los pueblos indígenas son económicamente y socialmente marginados en comparación con los grupos mayoritarios. Pobreza, aislamiento geográfico, condiciones socio-económicas desfavorables y redes inadecuadas de transporte también contribuyen a reducir la accesibilidad a la educación y a los otros servicios fundamentales. Se ha mostrado que los estudiantes de pueblos indígenas en áreas rurales son los que corren más riesgo de abandono escolar. En el Ecuador se ha logrado un incremento en la proporción de la población que recibe educación primaria y secundaria, aunque a un paso más lento que sus países vecinos. También se ha mejorado el rendimiento escolar de la población indígena en el país.

A nivel mundial, hay una tendencia a la centralización de servicios, entre ellos la educación. Estudios de caso realizados en áreas rurales han mostrado que la elaboración de políticas públicas y planificación adecuada de transporte son un prerrequisito para poder garantizar el acceso a educación primaria para todos. La educación puede ser un motivo de migración, y en realidad, se ha observado que familias enteras migran desde las áreas rurales de la Amazonía a los centros urbanos para que los hijos tengan mejores oportunidades de estudiar. También hay una tendencia de que jóvenes preparados siguen migrando desde las áreas rurales a los centros urbanos. Varias reformas constitucionales y legales han mejorado, en teoría, la posición de los idiomas indígenas en el Ecuador, pero sin embargo persisten en la práctica, diversas causas sociales y económicas de segregación étnica. Este es el contexto en cual se realizó este estudio.

El trabajo de campo se realizó en los siguientes establecimientos educativos: a) Unidad Educativa Intercultural Bilingüe “Camilo Huatatoca” en Santa Clara, b) Unidad Educativa Fiscal Técnica Experimental Del Milenio “Ahuano”; c) Colegio Unidad de Educativa Bilingual Intercultural Sarayaku; d) Escuela Primaria de Sarayaku, y e) Escuela primaria de Kalikali, una comunidad cercana a Sarayaku.

La escuela bilingüe de Santa Clara tiene 250 estudiantes, en su mayoría Kichwas, de 15 diferentes comunidades. La escuela tiene 18 profesores, entre los cuales aproximadamente 75% también son Kichwas. La escuela en Ahuano pertenece al proyecto de Escuelas de Milenio, y es la única escuela que visitamos que no es bilingüe. Ahí hubo 420 estudiantes entre 32 y 18 años de edad. De ellos, un 60% son Kichwas, pero el idioma de instrucción es

el Español. En el centro de Sarayaku hay dos escuelas primarias y una secundaria, con un total de 380 estudiantes, mientras en la escuela primaria de Kalikali hay 42 niños y tres profesores.

La metodología usada ha combinado métodos cualitativos y cuantitativos, incluyendo encuestas, sistemas de información geográfica (SIG), y entrevistas de funcionarios públicos y profesores. La encuesta proporcionó los datos para el análisis de SIG, incluyendo información sobre distancias, duración, y medio de transporte usado por estudiantes en sus viajes diarios hacía la escuela y vuelta a la casa. Los análisis de SIG también permiten el poner la movilidad en relación a las características físicas de las respectivas áreas, lo que es particularmente importante en los contextos donde caminar a pie es el único medio de transporte posible.

Las encuestas han incluido 78 estudiantes de 9-16 años de edad, unos rectores y profesores. También se realizó entrevistas con expertos de relevantes ministerios y ONGs en Quito.

Los resultados del estudio indican que establecimientos educativos en áreas rurales confrontan varios desafíos para poder conseguir una educación de calidad. Sin embargo, la centralización de la educación, en cambio implica, para niños de áreas rurales, dificultades para poder llegar a escuelas centralizadas. El tiempo de viaje es afectado por varios factores, dependiendo de los modos de transporte y las rutas elegidas. En áreas remotas, a pesar de que la distancia desde los hogares a las escuelas pueden ser relativamente cortas, hay desafíos como la falta de infraestructura de transporte y la existencia de peligros naturales. Para familias en áreas rurales que envían sus hijos a escuelas en zonas urbanas tampoco es fácil organizar transporte, y estos problemas aumentan cada vez que se cierra escuelas rurales. Sin embargo, no se debe centrar el debate únicamente en la evidencia simple de que escuelas locales son más accesibles que las centralizadas, porque se debe ver el asunto de accesibilidad física también en relación con el de accesibilidad social a oportunidades amplias en cuanto a diversidad cultural, particularmente en el caso de los grupos indígenas. Diversidad e igual oportunidades deben reflejarse en los programas educativas, con el acceso a educación del segundo y tercero nivel, y también con la calidad de la educación y la capacidad de potenciar la empleabilidad de los alumnos luego de que finalicen sus estudios.

Hydropower development and community-based tourism in the Amazonian highlands of Ecuador

Maija Meri, Nina Miettinen, Mia Puttonen, Henna Puustinen [1]

Abstract

The purpose of this paper is to observe the link between hydropower development and community-based tourism in the Amazonian highlands of Ecuador. The relation is specifically observed from the local people's point of view. The data was collected by interviewing locals in three different locations: Santa Clara in the province of Pastaza, Puerto Misahuallí in the Napo province and the communities of El Topo and Azuay in the province of Tungurahua. The interviews were carried out as open thematic interviews. In addition, transect analysis was used as a supportive method for drawing a conclusion of different activities in the areas visited. The main finding of this study suggests that the relation between community-based tourism and hydropower development is manifold and involves several actors holding controversial information. At the national level, a strong will to develop both tourism and hydroelectricity exists. At the local level, opinions vary from seeing hydroelectricity as a threat to everyday life and tourism, to considering it as a possibility for infrastructure development and job creation. Generally, the locals were poorly consulted, could not take part in decision-making and tended to base their opinions on what they had been told to by a member of authority. As a conclusion, the lack of communication between different stakeholders needs to be filled in order to carry out both development plans successfully. After all, the very motive behind both tourism and hydroelectric development lies in creating better living conditions via economic activity. As the topic is little examined and our time in Ecuador was limited, we strongly encourage further studies to take place.

[1] In addition Edison Fernando Aldaz Vozmediano and Ronald Paul Grefa Alvarado participated in the fieldwork.

1. Introduction

The number of hydropower projects is increasing in many tropical countries due to growing demands for electricity caused by economic development. The projects may bring large societal benefits but also include a wide range of costs from economic, social and environmental viewpoints. Much of the remaining hydropower potential is in developing countries where energy consumption is expected to increase. Topography and climate provide great potential for hydropower development in Ecuador, where a number of rivers flow from the Andes mountain range to the Amazon basin.

Ecuador is a country with considerable natural resources. Amongst petroleum as well as agricultural and marine products, tourism has become one of the country's major sources of foreign exchange. Galapagos Islands is the principal attraction but more and more visitors find way to the Amazon region, where community-based tourism has a long history.

The construction of hydropower as well as other projects in natural settings from the viewpoint of tourism development and recreation interests is a complex and interdisciplinary theme. Dams might serve as multi-purpose facilities and are used for other purposes besides generating electricity. In several countries, dams have also become tourist attractions bringing more visitors and income to the area. On the other hand, the building of hydropower can endanger nature-related activities. The link between hydropower development and tourism has been little studied but provides a fruitful research subject especially in a country like Ecuador, where the majority of tourist activities relate to nature in one way or another. Although hydropower has extensive economic, political, social and environmental impacts, in our study we focus on the possible effects it has on tourism within the local communities.

This paper discusses the research conducted and results obtained during the field trip to Ecuador in October 2015. First we will introduce our research topic and problematics as well as the main research questions. Then we give a short introduction to previous research and to the main concepts of our research. We discuss the research area, the methods used as well as the challenges faced while conducting the research. In the end, we also give ideas for future research.

2. Background

2.1. Hydropower Development

Latin America and the Caribbean lead the world in the use of renewable sources of energy, particularly hydroelectricity and biofuels (Howe 2015). Rising energy demands and abundant potential in the Neotropics have led to rapid increase of hydropower projects especially in the wet and rugged Andean Amazon (Finer and Jenkins 2012). The demand for energy production across Latin America has more than doubled in the last 40 years and is

expected to grow in the upcoming years, guaranteeing solid markets for the industry in the future.

Considering these future prospects, new hydroelectric projects are at the center of Ecuador's regional governments' long-term energy plans. There are eight large hydropower projects and several smaller ones currently ongoing in Ecuador. One of them is the Coca Codo Sinclair hydroelectric facility, which is now being constructed, and is the largest energy project in the country's history. The project has been contested because it is estimated to affect Ecuador's highest waterfall, San Rafael Falls, as well as cause deforestation due to road constructions (Kable 2015).

Increased environmental awareness and concerns over human rights have generally changed conceptions of hydropower towards a more critical view, and the advantages and disadvantages of building hydroelectric power plants are more widely recognized (Koch 2002). In Ecuador, the country's new policies to promote investments in energy production have been argued to be fueled by fiscal interests (Howe 2015).

According to Santos & Andrade (1990), the main direct and indirect impacts of hydropower development in the indigenous areas of the Amazon are resettlement of communities (affecting the lifestyle of the people), flooding of areas, loss of hunting and farming land, loss in fishing as well as increase in infectious disease. Finer and Jenkins (2012) and Sousa and Reid (2010) further argue that building new dams have considerable ecological impacts. Dams alter natural habitats and block the water movement between upstream (Andean headwaters) and downstream (lowland Amazonia), interfering the distribution of aquatic life, creating isolation between both ecosystems. Sousa and Reid (2010) also remind that losses in water quality might increase the cost of water treatment to make it potable. Furthermore, majority of dams would cause deforestation due to new roads and transmission lines (Finer and Jenkins 2012).

The main benefit of hydropower projects lies in the generation of electrical energy. The need for more electricity to feed the economic growth is the main argument behind most of the hydropower projects. Hydropower can produce a significant amount of renewable energy with little amounts of noxious or greenhouse gas emissions. Other advantages include flood control, irrigation, urban water supply, improved navigation, improvement of roads and other infrastructure. For example, better accessibility can make these areas more reachable for new population groups and bring new types of visitors. Although generally projects face opposition among the local people, some local inhabitants are in favor of these projects expecting them to improve the quality of life by bringing jobs and creating more economic activities to the area. In terms of tourism, hydropower projects can create additional recreational facilities, for example, by generating a new lake. Successful hydropower projects may have a broad positive contribution to society as well as to the environment (Koch 2002).

However, the diversity of hydropower projects in terms of size, nature and location sets various challenges to their evaluation. There are some common misconceptions regarding the size of hydropower. For example, small projects are thought to be more benign and eco-friendly than bigger ones and therefore only small hydropower projects should be included in renewable energy programs. In reality, the impacts vary and each hydropower project needs to be judged in its own context. According to Koch (2012), it is impossible to make general estimates about hydropower projects, whether they are, for example, always profitable and should be encouraged, or problematic and should be avoided. In terms of location, some projects are planned on densely populated areas, while others in remote, sparsely populated areas. Obviously different social consequences follow. There are also often many different stakeholders involved in one project, which may cause controversy. Furthermore, electricity generation may not even be the priority in some multi-purpose projects. Irrigation, flood control or recreation may play a greater role in the creation of a dam (Koch 2002).

2.2. Hydropower and Tourism

There are relatively few studies linking tourism and hydropower development or they touch the subject superficially. Nearly no studies have analyzed the effects of hydropower development on small-scale tourism. In the following, we will nevertheless introduce some previous studies on the subject.

According to Teigland (1999), large projects, such as hydropower plants, in environmentally sensitive areas can be considered controversial due to the conflict between tourism and recreation interests. The main controversy is usually between environmental and economic interests. Teigland argues that there has been a strong disagreement about the effects hydropower development can bring to a local community, the environment, tourism and the interests of native inhabitants. The main concern is the possibility of new developments destroying or diminishing highly valued environmental assets that are central for the tourism industry, thus, reducing the number of visitors and the demand for tourist products (Teigland 1999).

Most of the effects caused by hydropower development in general relate to tourism either directly or indirectly. After analyzing various hydroelectric plants in tropical forest regions, Goodland et al. (1993) identified situations where such projects should be avoided. These include projects in pristine forests, places where local population would need to be removed, areas with a high amount of endemic species as well as areas, where biodiversity might be lost. In the analysis of the Belo Monte project in Brazil, Sousa and Cabral (2010) argue, that the costs of the dam will be much higher than the benefits it might bring.

Anderson et al. (2006) suggest that it would be vital to safeguard some rivers from hydroelectricity regarding the development of tourism in the future. The conservation of rivers has been compared to protecting forests and creating protected areas. Consequently, a same kind of protection series would be needed for rivers, as it already exists for terrestrial areas. For example in Costa Rica the conservation efforts have led to a significant flow of tourists and thus brought economic benefits to the country. Rivers with high biological diversity but low economic value could be designated as nationally important and therefore restricted to development projects.

Dams are generally seen as the emblematic installations of hydropower (Minoia 2012). However, the infrastructures needed for their construction and operation are just as present in the landscapes and affect the surrounding areas as much as the plant itself. Other installations beside the dams themselves include dykes, penstocks, transmission lines, surge tanks, sub-stations, paths and roads, huts, pylons, cable cars, walkways and underground galleries. In many places, especially in mountainous areas, tourism development has been considerably helped by the hydropower infrastructures for example in terms of accessibility. Negative impacts have included mass tourism and problems such as pollution and environmental degradation, waste and erosion. (Sousa & Reid 2010; Rodriguez 2012)

Finally, tourism has in part given a new meaning to hydropower development making dams popular attractions for visitors. Along with nature and other attractions, dams have become a source of admiration for tourists simply because of their size, their reason for existence and the efforts made to realize such projects (Rodriguez 2012). For example, no matter the massive destructive impacts they produce, mega-infrastructures such as Aswan (Egypt), Three Gorges (China), Hoover (United States) and Itaipú (Brazil and Paraguay) also serve as attractive tourist sites.

2.3. Community-Based Tourism in Ecuador

Community-based tourism is described as tourism that aims to ensure that local communities have a high degree of control over the tourism activities taking place (Scheyvens 2002). Also, significant proportion of the economic benefits should be targeted to the community. A key factor of community-based tourism is also the right to refuse tourism development (Hiwasaki 2006; Ruiz et al. 2008).

Studies of community-based tourism, ecotourism or responsible tourism in Ecuador are often related to the research of indigenous communities in the Amazonia, as tourism forms a considerable part of their income today (Reyes Vargas 2015). Some case studies combining tourism and environmental challenges have been conducted, but a connection between community-based tourism and hydropower development seems not to be studied. In our

research, we aim to connect the ecological, socio-cultural and landscape changes brought by hydropower development reflecting them on community-based tourism.

In Ecuador, community-based tourism was initiated by local level organizations to combat the inequalities of tourism (Beahm 2011). In a case study in the town of Tena, in the province of Napo, Beahm (2011) argues that the first waves of tourists in the 1980s concluded to unannounced visits from tourists led by non-indigenous operators, operating from the outside without community permission. As this offered little compensation to the residents of the native communities, small-scale tourism projects started to appear, for example by RICANCIE (Indigenous Community Network of the Upper Napo for Intercultural Exchange and Ecotourism). Today, there are several foundations promoting community-based tourism in the area as well as local families offering home-stays in their own communities. (Beahm 2011)

While the local communities are gaining rights in tourism, environmental changes might be threatening their development (Howe 2015). Economic benefits from tourism are being compared to the ones received from other industries, such as oil, logging, mining and hydroelectricity. Moreover, concern about environmental threats such as river pollution is growing among the indigenous communities (Beahm 2011).

2.4. Research Questions and Main Concepts

In our research, we study the link between hydropower development and community-based tourism in the Amazonian highlands of Ecuador. We focus on three different places: The area of Santa Clara in the province of Pastaza, communities around Puerto Misahuallí in Napo province and the communities of El Topo and Azuay in the province of Tungurahua. Our aim is to study how hydropower development projects might affect the communities that work, or have plans to work, within tourism industry, and what might be their assumptions, attitudes and experiences related to hydroelectric power plant development. The upper Amazon of Ecuador provide good case-study opportunities regarding this subject, since small-scale tourism is common and it is vulnerable to different economic activities such as hydroelectricity, which might pose several challenges to the environment.

Our research question is thus: How do local people perceive the relation of hydroelectricity development and community-based tourism in the Amazonian highlands of Ecuador and what are the possible effects of hydroelectricity? Main concepts used in our research are community-based tourism and hydroelectricity. In this study, we use hydropower, hydroelectricity and hydropower projects as synonyms. We focus on hydropower development as a phenomenon, and leave the technological issues aside.

3. Study Area and Methods

We conducted fieldwork in three different provinces: Pastaza, Napo and Tungurahua and within them, respectively, in the areas, of Santa Clara, Puerto Misahualli and El Topo (Figure 1). Pastaza and Napo are located in the region of the Ecuadorian Amazon while Tungurahua is more mountainous. All of the three provinces are very rich in biodiversity with many endemic species. There are several tourist attractions in these provinces ranging from thermal baths and cultural sights to adventure activities, such as white-water rafting, kayaking and hiking. There is a growing amount of smaller scale community-based tourism projects, many of them among the indigenous communities located in the more remote areas. Visitors can learn about the culture and habits of the indigenous by participating in different cultural activities and taste traditional foods.

In Pastaza, we focused in the area of Santa Clara and Rio Piatúa (Figure 2). In the Napo province, we visited four communities near Puerto Misahuallí along the river Napo (Figure 3). In Tungurahua, we visited the community of El Topo as well as Azuay, which are along the road from the town of Baños to Puyo (Figure 4).

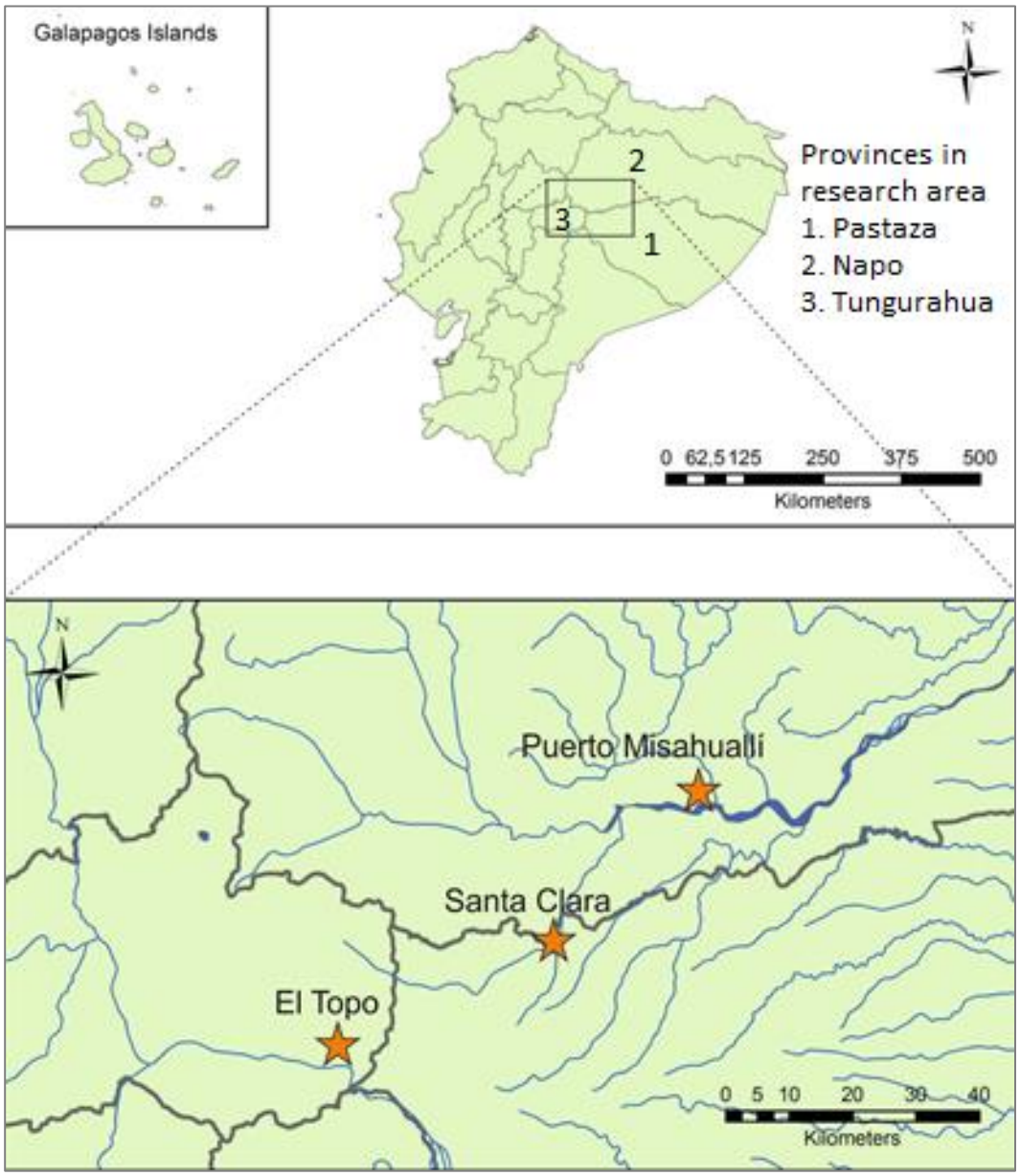

Figure 1. *Research area in the Amazonian highlands of Ecuador.*

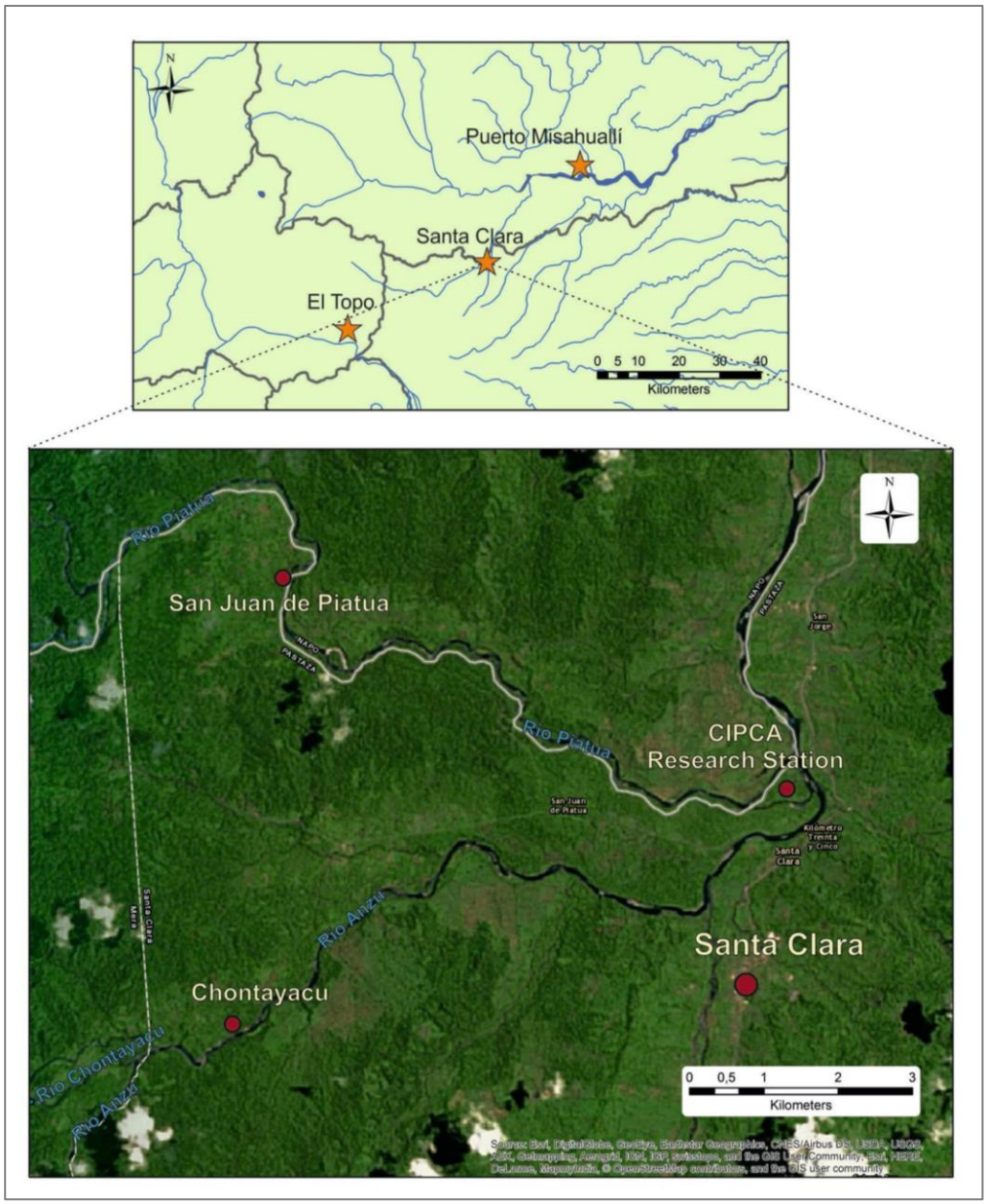

Figure 2. *Map of research area and communities visited in Santa Clara, Pastaza.*

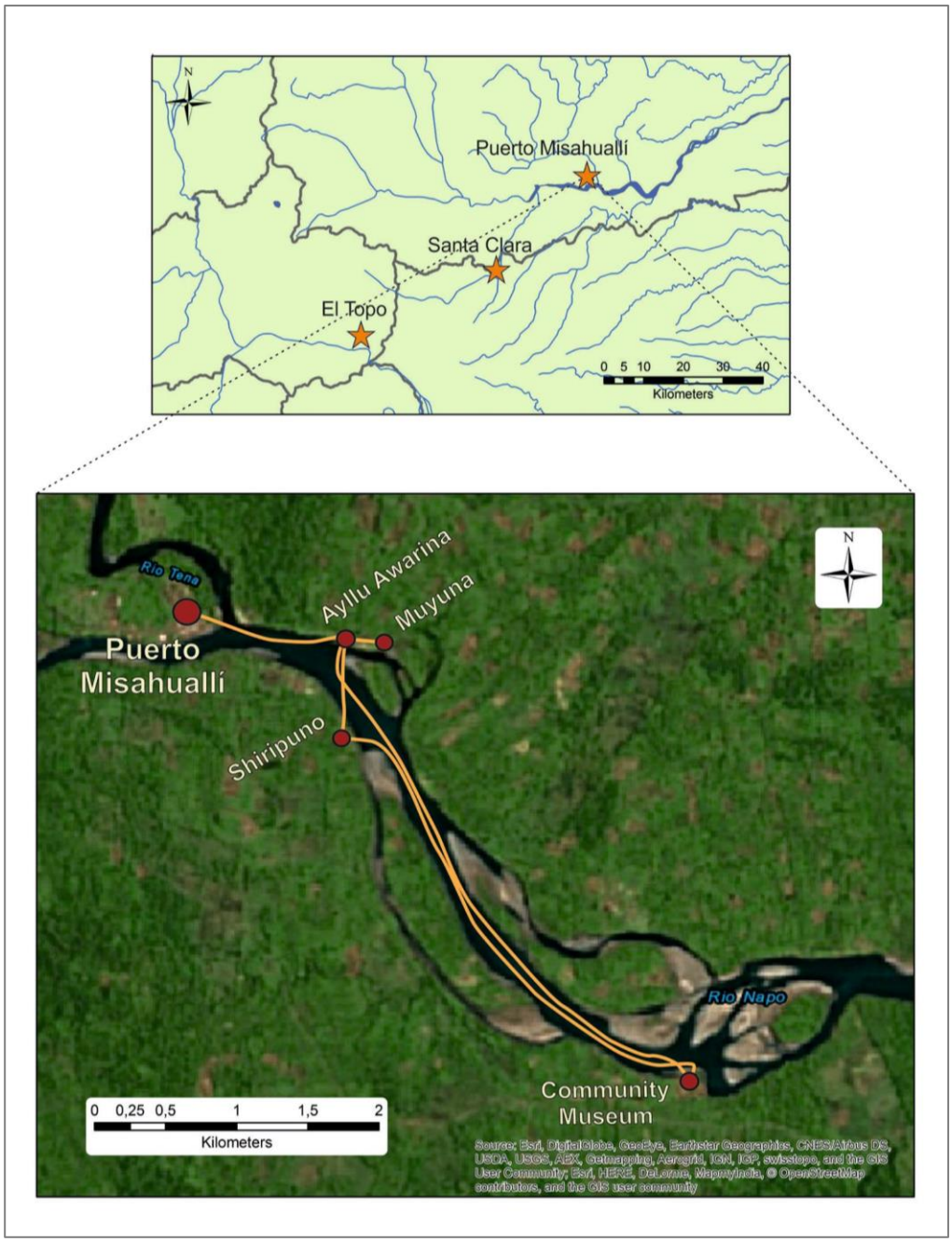

Figure 3. *Map of research area and communities visited in Puerto Misahuallí, Napo, along the river Napo.*

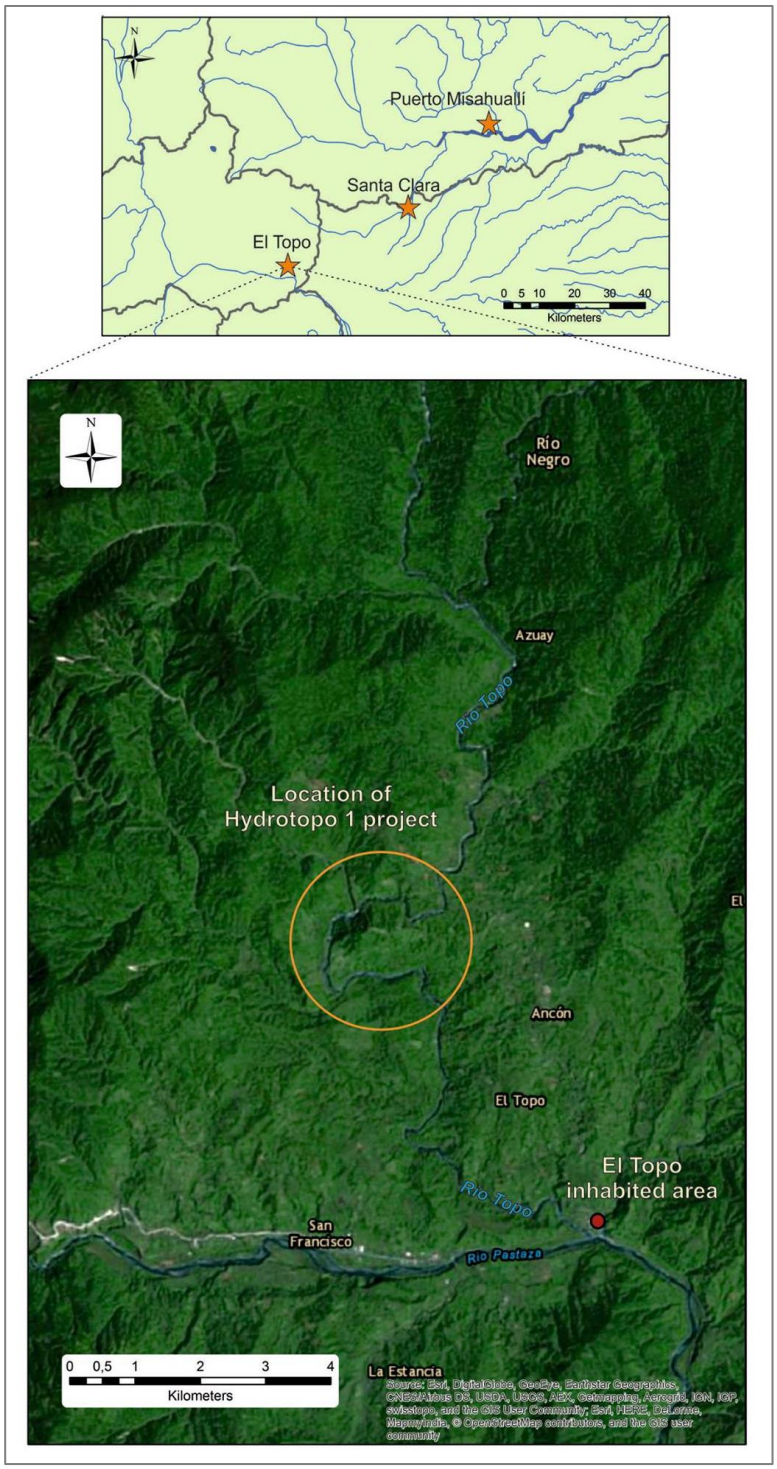

Figure 4. *Map of research area in El Topo, Tungurahua.*

These provinces as well as our research sites differ from each other in terms of tourism and hydropower development (Table 1). In Santa Clara and in El Topo tourism is still at an early stage when compared to Misahuallí. Therefore, also economic benefits gained from tourism vary between the three sites. Also hydropower development exists on different levels on each of the research sites. In Santa Clara, there are some plans for developing hydropower, in Misahuallí there is one dam under construction nearby and in El Topo there is one project that is almost finished and another one for which construction will start soon.

Table 1. *The research sites and stages of tourism, and hydropower.*

	Santa Clara	**Puerto Misahuallí**	**El Topo**
Tourism	• Early stage • Community-based and municipal initiatives • Few cabins and recreational activities	• Community-based tourism well established • Several communities engaged in touristic activities	• Barely any touristic activities at the moment • Previous initiatives failed
Hydropower	• Plans at early stage	• One project under construction in the area	• One project almost finished, another planned
Economic activity	• Tourism brings little income • Commercial farming • Other sources of income	• Several communities depend on tourism • Subsistence farming	• Tourism does not bring income • Commercial farming • High unemployment rate

We used two different methods in our research: transect analysis and interviews. The methods supported each other, and helped to get a comprehensive overview of each place we visited. The purpose of the transect analysis was to get to know the communities and their activities better. The transect walk model given by Thomas (20.9.2015) was used as an example, but modified for our purposes. The main focus was in tourism activities and their relation to hydroelectricity. If there were not any activities, the focus was on the tourism potential or the previous activities that did not exist anymore. Other activities were also observed to understand the situation of each community more fully. A matrix was created from each place, including five topics to be observed, such as: land use, facilities/resources, tourism activities or potential, and challenges to tourism and/or relation to hydroelectricity. The last two topics were partly overlapping, so a dashed line was used to not fully separate them.

The interviews were carried out as open thematic interviews, as it was not possible to ask all the same questions from each interviewee. The themes of each interview remained the same, however, and some questions were the same for all of the interviewees. We completed 26 interviews during 7 days. Interviewees can be divided to four categories: administrative representatives, NGOs, local villagers and others.

Five of the interviews were with representatives of different ministries or municipality administration, and three were with NGOs. Most of the interviews (12) were with people in the local communities where community-based tourism and hydropower development linked at some level. Most of these interviews were with the leaders of the villages, as they were the spokespersons in the communities. Six of the interviews fall in the category "Others", which includes for example taxi drivers and shopkeepers along the way.

4. Results

4.1. Perceptions from the central level

In Quito we interviewed representatives of three institutions. Two of them were national public administrations: the Ministry of Environment and the Ministry of Buen Vivir, and one was a non-governmental organization (NGO), Amazon Watch, active on issues concerning environment and indigenous people.

In the Ministry of Environment, hydropower was considered a more sustainable alternative to oil, although still presenting various environmental challenges. Hydropower development as a sector, overlaps with other ministries; the Ministry of Environment being in charge for only those projects located in protected areas. Still, according to the representative we met, hydropower is a huge sector developed through 83 projects, in which 80% of the used waters originate from protected areas; also for him, hydropower development necessarily causes heavy impacts on local flora and fauna, evictions for the local people and therefore also displacement.

Our visit to the Ministry of Buen Vivir was focused around the governmental strategy aiming to promote quality of life and happiness over pure economic development. According to the minister and other representatives we met, community-based tourism is coherent with this national development strategy, mostly because it benefits the indigenous populations in the Amazonian region. Napo Wildlife Center in the Napo area was mentioned as the best example of how to organize a territory of an indigenous community through tourism. The center is 100 percent owned and managed by Kichwa Anangu community and offers quality tourism services to different types of visitors, in a way that is sustainable and respects the surrounding Yasuni national park. For example, hunting and fishing are forbidden there. A Kichwa community member working in the Ministry also said that tourism is generally

beneficial for local communities. He felt that tourism could bring development and generate income possibilities to the communities by, for example, creating jobs as guides. However, he informed that communities are not consulted in case of projects of hydroelectric development, and that only information about benefits is handed out. Nevertheless, other representatives confirmed that hydroelectric power plants are the only alternative to oil production in Ecuador today, and suggested that opposition to them arise mostly because of confusing messages in the political debate.

Amazon Watch representative pointed on many challenges on tourism development within communities. For example, security is a problem, norms are lacking, and hygiene and the quality of tourism services is poor, especially in the protected areas. However, he noted that community-based tourism is a sustainable way for maintaining the biodiversity of the Amazonian areas. Overall, for him community-based tourism and hydropower development are both fundamental for sustainable development, if projects are limited to a small scale. He especially criticized big hydroelectric plants, and he considered that for instance, in the case of Coca Codo project, only one turbine out of four will work given the small flow capacity in the river. Compared to the high environmental damage that mega-projects produce, he questioned whom they would actually benefit, since they do not seem to profit the locals: in fact, the national strategy is to produce energy for export, and even the work force is recruited from abroad; moreover, large scale projects appeared to be largely affected by corruption.

4.2. Perceptions from the local levels

4.2.1. Santa Clara

In Santa Clara area, we visited the municipality and two local *comunidade*s (villages), Chontayacu and San Juan de Piatua. We interviewed municipal representatives and several community members and visited the premises of Chontayacu with more detail, using transect analysis (Table 2).

Tourism development in Santa Clara is at an early stage. According to the municipality, the department of tourism of Santa Clara does not hold enough funds to invest much in tourism in the area, although it is one of their main interests. The only recreational area developed so far is mostly for local visitors is by the river Piatua, with a restaurant, toilets, sport field and possibilities to swim. For community-based tourism activities, the municipality and Chontayacu community are in co-operation. In the newest official tourist guide of Santa Clara, Chontayacu is marked as a community-tourism destination, although, as of now, accessibility is poor and lacking basic infrastructure and services, such as accommodation possibilities. One of our interviewees mentioned that better roads, bridges and signs are being planned.

People we met in Chontayacu declared their willingness to develop tourism and to have already concrete ideas for the purpose. For them, the biggest potential lies in the clear warm river Anzu and its sandy beach area they could utilize for recreation, swimming, tubing and the admiration of a large rock split in half. The river is reached through a forest path, where some pre-Incan petroglyphs also exist. Here, the community would like to offer guided tours.

There are currently no hydroelectric power plants in Santa Clara, but one dam project is being planned in Rio Piatúa, and possibly another one in the close by river Anzu. In general, different stakeholders have contradictory information regarding the projects. Where more information is available such as in Santa Clara and in San Juan, a strong opposition towards hydropower projects exists. On the contrary, in the further rural community of Chontayacu, hydroelectric development seen positively, as people see new job opportunities, improved infrastructure, electricity and Internet in the school as potential outcomes. However in practice, neither communities have been consulted. In general, the conflict between hydroelectricity and tourism is strong in Santa Clara. The municipality has a strong will to develop tourism along the Piatua River, which would be directly affected by the future hydroelectric power plant, decreasing its potential for tourism. The municipality and the San Juan community have expressed their opposition to the national level by writing a formal pledge, but so far without an answer. Rather than hydropower, tourism is seen as a good alternative for economic development in the area, as the municipality itself cannot offer enough employment to the locals.

4.2.2. Misahuallí

In Misahuallí we conducted interviews in four different *comunidade*s: Ayllu Awarina, Chichico Rumi, Shiripuno and Muyuna (Figure 3) and also interviewed two shopkeepers in Puerto Misahuallí. In order to get familiar with offered tourism activities and services, we participated in a guided tour in the community museum of Chichico Rumi and in three different activities proposed in Muyuna: making of the traditional chicha drink, traditional dance performances, and visit to different Ecuadorian animals such as pythons, turtles and parrots. We stayed overnight in Ayllu Awarina and familiarized with the services offered there.

Misahuallí is the most touristic place of the three research sites (table 3), and in fact tourism is the main economic activity in the area, creating more revenue than agriculture for many households. Apparently, foreigners were the first to start tourism in Misahuallí and still outsiders seem to have an important role in developing tourism there.

According to local people, tourism development has had a positive impact in terms of decrease of deforestation. Furthermore, the economic gains from tourism allow families to send their children to school. In Ayllu Awarina, on a single day there may be 500 visitors,

mostly from nearby areas. The amount of visitors vary significantly with peaks during weekends and holiday seasons. Tourism has changed people's lives considerably and the communities receive economic benefits by selling handcraft, food and services like accommodation, performances and boat rides.

In general, the river plays an important role in Misahuallí in terms of tourism and people's everyday lives, as communities are practically accessible only by boat, while fishing provides everyday nourishment for them and tourists alike. Many tourism activities are related to river such as tubing, rafting and swimming. It might even be justifiable to question whether there would be any tourism in Misahuallí if there was no river or if the river got contaminated or affected somehow. The river has also a great landscape value. As a young interviewee in Ayllu Awarina said, the river is crucial for local people.

One dam project is currently under construction in Pusuno River, near Misahuallí. According to most interviewees, it should not affect Misahuallí directly; however, some were concerned for the potential contamination and other ecological impacts that could endanger the river flow and supported habitats. Some were concerned that the dam will disturb peacefulness and quietness, and others were certain that hydropower project would have negative environmental and social impacts.

However, in general people were in favor of hydropower development, as they believed Misahuallí River not to be affected severely. People also thought that building of hydropower would strengthen the energy capacity and overall development in the area. According to the interviewees there was no local consultation related to the building of a dam in the Pusuno River, and only one interviewee mentioned that the energy generated from the dam would not contribute to Misahuallí as it would be exported.

In Misahuallí there is a common will to develop tourism in the future. Hydropower development was not seen as challenge for tourism development even though there were some concerns related to hydropower. A couple of informants thought that mining is a bigger problem than hydropower. According to a shopkeeper, economic development is people's main interest, and described local people's attitudes as liking money and not caring about the rest. Only one person believed that lack of tourism management and long term planning are even more problematic than hydropower plants; for them, tourism entrepreneurs should work together and tourism should be more focused in general. According to the same informant, boat drivers have too much power, as they are responsible for transporting tourists to communities. Hence, transporting tourists to communities should be coordinated and controlled better.

4.2.3. El Topo

During our visit in the community of El Topo (table 4) we interviewed 6 people and a biologist of the foundation Oscar Efrén Reyes. We also talked to one couple in the nearby community of Azuay, which is located upstream closer to the Hydrotopo 1 dam. Unfortunately we could not visit the dam site, which is strictly closed to the public by security guards and fences.

The building project started in 2011. Hydrotopo 1 dam is nearly ready and beginning to function. There are also plans to build another dam, Hydrotopo 2, closer to the village, which would, according to the biologist, would affect the community through fish population and vegetation changes. In general, there is strong opposition against hydropower in El Topo. Locals are familiar with negative experiences from other dam projects in the area, such as the San Francisco project in the nearby city of Baños, where the dam caused drought of waterfalls, pollution and contamination of waters. Moreover, two people died in the construction of the Hydrotopo 1 project. In 2011, the opposition in El Topo grew into strikes and manifestations against the government and the hydropower building company. People from other communities also took part in the strikes; locals blocked the transport of the building equipment by bursting tires. The media presence gave initial visibility to the concerns over the hydroelectricity project; however, videos were used against the people involved in the demonstration, and ten are being prosecuted on the basis of that visual evidence.

Interviewed people in El Topo only mentioned few minor benefits from the hydropower project: limited job creation and symbolic compensation offered to the locals, such as a playground built for the children, teacher financing, computers donated to the school, candies for children and other small donations. However, these small grants contributed to the frustration of the locals. A community member that received direct donations from the company felt that they could not take a stand on the issue anymore and would rather just keep quiet. Some locals considered these compensations as a mere token and even said that the computers donated were old and not really working; that the teachers would eventually leave after the project completion, and that the jobs offered to the locals were only temporary.

In the case of El Topo the community members feel that existing regulations asking for local consultation do not work in practice and that they are not asked for their opinion at any stage. Before the Hydrotopo 1 project started, a local representative was sent to the community assuring that the project would not be executed, and this broke the trust of local people toward the governing institutions. One person mentioned: “In the end, the government's interests will always win the local interests”.

Tourism development in El Topo is at a very early stage. There was a community-based tourism initiative (where an American volunteer was involved) before the hydropower project started, but because of the tension caused by the hydropower project it was discontinued. Nowadays it seems like there is not enough will or active members within the community to continue community-based tourism development. The interviewees felt that the bureaucracy needed to create a tourism enterprise is complicated and requires a lot of time and money. Many people receive their income from agriculture but at the same time, unemployment seems to be a common issue in the area. As of now, tourism activity has evolved only around the local orchidarium that people seldom come to visit. Problematically, there are no accommodation options in the community, although the surroundings provide good opportunities for tourism. There is a potential, though, for rafting, hiking, exploring a rock pyramid close by and creating accommodation options.

The effects of the hydropower project in El Topo are still uncertain as the process is yet unfinished. It was mentioned that the impacts do not seem to be as big as expected, for example in terms of river flow, drought and possible inundations. Toxics needed to clean the tunnel when it is opened would still most likely cause contamination of water. However, it was said that the benefits can never compensate for the overall negative impacts; moreover, fears against the second project were much bigger because it would be located closer to the community. One interviewee pointed out that maybe the hydropower project is good for the benefit and development of the whole country at a national level, but at the community level long-term benefits do not really exist.

The close by community of Azuay was in general in favor of the hydropower project, unlike El Topo. It already created job opportunities for some people and the hydropower company built a new playground and a new roof for the school. The company also gave food for the children in the school. Furthermore, the road is supposed to be paved in the near future. According to the interviewee, however, there is a lot more traffic going through the community now, and it is in the own interest of the hydropower company to pave the road. Like in El Topo, residents from Azuay were not consulted before the project, but were only informed about it, once decision to start the project was officially made.

It was also stated that Hydrotopo 1 has caused tension between these two communities because of their distinct attitudes towards hydropower. It was argued that job opportunities should have been given first to the people of Azuay rather than to the people in El Topo for their closer location to the construction site. In this community, some ideas for tourism development have started to be discussed, but nothing concretely planned, as they were hoping for some kind of support from outsiders.

Table 2. *Transect analysis in Chontayacu*

	Inhabited area	**Río Chontayacu**	**Petroglyphs**	**Forest path**	**Río Anzu**
Land use					
Facilities/ resources	Sports field 15 wooden houses School Communal house	Cold, clear water	Cleared forest area around the rock	Dense vegetation Cultivated areas Path for walking	Warm, clear water Big rock split in half Sandy beach and open area
Tourism potential	Restaurant Lodges/camping	Tubing, canoeing Landscape value (bridge)	Viewing pre-Inka petroglyphs	Trekking Compact, attractions close	Swimming Camping Tubing
Challenges for tourism	Accessibility No accomodation possibilities No services	Rocky So far only for bypassing	Accessibility Guiding, language	Muddy, badly maintained road Management	See below
Relation to hydro-electricity	Possible jobs Enables new technology such as lighting, internet and TV	Will not be affected	Will not be affected	Hydroelectric plant as a possible attraction	Decreasing the quality of water Limits the potential for tourism

Table 3. *Transect analysis in in Puerto Misahuallí*

	Río Napo	**Ayllu Awarina**	**Community museum**	**Shiripuno**	**Muyuna**
Land use					
Facilities/ resources	River Beach Canoes Only way to beach communities along the river	Volleyball field Lodges more uphill Houses of the locals near the river Place for eating Few shops Hut in a tree	Garden Ethnographic museum Animals Artisan shop Houses further away, not visible	Lodges Restaurant Gold panning Shops Local homes separated from the lodges Tourism managed by women only	Animals Place for eating Multiple shops Houses of the locals in the center
Tourism activities	Canoe tours Tubing Swimming Sunbathing Rafting Visiting communities	Talking parrots, Dance & music performance Shamanism Artisan products Typical kichwa food Accommodation Swimming	Guided tour about the history and culture of the community Small zoo Artisan products	Dance & music performance Artisan products Shamanism & sacred stone Walks Typical food Gold panning Making of chocolate Accommodation	Dance & music performance Artisan products Shamanism Learning how to make chicha Holding animals for $1 Accommodation in the local houses Three activities for $10

Challenges for tourism	Competition between communities Lack of management and long-term planning	Competition Disturbs occasionally peace	Accessibility Need of volunteers Mining seen as a problem No government funding	No challenges mentioned, place well-managed	Money-issues: confusion with prices and motorists demand too much money
Relation to hydro-electricity	Planned project would disturb activities	Would disturb peacefulness/ nature	Communities have difficulties connecting the two issues, Accept the construction	No knowledge about it	Contaminates the water Project in Río Misahuallí would be bad: too close to the village and tourism would decrease Would bring energy security

Table 4. *Transect analysis in El Topo*

	Inhabited area	**Orchideario**	**Rio Topo**	**Area reserved for hydropower**
Land use				
Facilities/ resources	Homes of villagers School Shop Sports field	Garden attached to owners house	Cold water	Hydropower tunnel
Tourism activities	Orchideario Sleeping with matresses in community house	Looking, learning and smelling of flowers for $1	Kayaking Hiking Pyramid rocks Waterfall chocolate, Accommodation	-
Challenges for tourism	Accessibility No advertising No services No organization within the community	Only activity in town Hard to find No other services e.g. bathroom	Kayaking has decreased Fears: drying of river	Not accessible
Relation to hydro-electricity	Compensation: playgrounds, computers to school, small kiosk	-	One hydroelectric plant built, another planned Ecological impact	Only for this purpose

5. Discussion

Like any research process, ours included several challenges. The biggest of them was to find localities where community-based tourism and hydroelectricity come across. The short amount of time dedicated to the fieldwork further restricted our possibilities. If the research was continued in the future, we would know better on which areas to focus.

We did not face much cultural differences nor prejudice during our research. We were able to communicate in Spanish and the majority of people were willing to contribute. We always told the purpose of our research, highlighted the anonymity and maintained confidence with the interviewees. Receiving contradictory information from different people was, however, occasionally confusing.

The relation between hydropower and tourism is complex. A lot of controversial information and divided opinions exist regarding hydropower projects and tourism development in Ecuador. There are a number of different actors involved in the process: the government, multinational and national companies, private and public companies, NGOs and other organizations, local people and landowners. As noted by Sousa & Reid (2010), hydroelectricity projects normally involve conflict with various actors, which makes the analysis of these projects challenging.

At the national level, there is strong will to develop both community-based tourism and hydroelectricity production; however, at the local level, these appear as contradictory interests. Rivers play an important role in all of the communities, for tourism and for everyday life, as it was seen in Santa Clara. However, the strongest negative impacts to tourism caused by hydroelectric development would be seen exactly in the rivers.

In contrast to previous studies about negative impacts, hydropower was also seen as positive by the locals, mainly due to infrastructure improvements or job opportunities and as an alternative to oil production. Opposition to hydropower development was apparent in places where a concrete threat of hydropower plant existed and where active, knowledgeable local actors took charge of the problem. However, our interviews showed that local communities in general lack knowledge about the effects of building a hydropower plant to their everyday life, surrounding nature, or tourism development. For the local people, it is difficult to see and understand the relation between the two sectors.

The lack of local consultation explains the limited understanding over hydropower. Even though the constitution of Ecuador requires local consultation, in reality there are little concrete possibilities for communities to participate in decision-making. Also, information is mostly given by hydropower companies who emphasize potential positive effects, in a way that helps selling the project to the public opinion, also by offering compensation. Local people do not receive essential information about the process, for instance about the building phases and final project outcomes, so they have to trust or fears for the rumours they hear.

The interviews show in fact, that there is good awareness about potential benefits rather the negative impacts.

Based on our results, community-based tourism serves first and foremost as a source of income to the communities. It is perceived to creating development not only economically but also socially and through infrastructure development. However, there is a lack of long-term planning and management within the communities. Both in El Topo and Puerto Misahuallí, the interviewees mention that community-based tourism activities started by foreigners that were in the area as volunteers, are abandoned soon after they leave, for their failure as they fail to engage the local community. However, also Santa Clara started community-based tourism development as a municipal project. These facts question the very concept of community-based tourism: to what extent is it a community-led activity? What are the actual motives and justifications for its existence?

Our research shows a lack of communication between different actors and different levels, especially between the national and the local level. A lack of coordination and management is noted in both tourism and hydropower development. Furthermore, it is not certain that the benefits of hydroelectricity would stay in the local area. Controversies regarding community-based tourism and hydroelectric development can be avoided with better communication and distribution of information. Involving locals in the decision-making process could widen their perceptions. Actually, the motives behind both tourism and hydroelectricity development lie in the same idea of better living conditions. There is potential to develop both community-based tourism and hydropower in the area, if applied correctly.

As there is a lack of studies that relate tourism and hydroelectricity, future research is highly recommended. Since community-based tourism, hydroelectricity and consultation processes are needed, the subject offers many possibilities for going deeper into the topic.

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Resumen - Desarrollo hidroeléctrico y turismo comunitario en la Amazonía alta del Ecuador

El número de proyectos hidroeléctricos está creciendo en muchos países tropicales, debido al incremento de la demanda de electricidad que es un resultado del desarrollo económico. El Ecuador, en particular, tiene un gran potencial de desarrollo hidroeléctrico, debido a su topografía y clima, particularmente en la zona donde los ríos bajan de la sierra de los Andes hacía las tierras bajas de la Amazonía. El desarrollo hidroeléctrico es un componente central en los planes energéticos a largo plazo del gobierno del país, y en la actualidad ocho proyectos hidroeléctricos grandes y varios proyectos menores están en marcha.

Proyectos de desarrollo hidroeléctrico pueden resultar en beneficios sociales considerables pero también implican una amplia gama de costos, de carácter económico, social, y ambiental. Pueden también tener varios impactos en el turismo, tanto positivos como negativos. Este tema ha sido relativamente poco estudiado, pero se ha observado que en algunos casos las represas y las lagunas artificiales represadas se vuelven atractivos turísticas, mientras en otros casos los impactos ambientales negativos también implican un impacto negativo al turismo.

Se ha propuesto que sería importante salvaguardar algunos ríos de explotación hidroeléctrica, de la misma manera como se protege los bosques en áreas naturales

protegidas, y que ríos con bajo valor económico pero alto valor biológico sean designadas como de importancia nacional para la conservación.

El turismo comunitario es un turismo donde comunidades locales mantienen un alto grado de control sobre las actividades, y donde una proporción significativa de los beneficios económicos quedan con la comunidad. En las comunidades indígenas de la Amazonía Ecuatoriana, las primeras olas de turistas en los 1980 consistían en visitas no anunciadas, lideradas por personas no indígenas quienes daban poca compensación a los residentes de las comunidades indígenas. Como respuesta a esta situación empezaron a surgir proyectos para turismo comunitario en pequeña escala. Hoy día hay varias fundaciones que promueven el turismo comunitario en la Amazonía Ecuatoriana, y muchos pobladores de las comunidades ofrecen posadas en sus casas. Al mismo tiempo que pobladores locales están ganando control sobre el turismo, sin embargo, esta misma actividad posiblemente está amenazada por cambios ambientales como explotación maderera, minería, y desarrollo hidroeléctrico.

En el Ecuador se ha realizado varios estudios sobre turismo comunitario, más que todo entre las comunidades indígenas de la Amazonía. Algunos estudios se han enfocado en las conexiones entre turismo y desafíos ambientales, pero no se ha estudiado antes las conexiones entre turismo y desarrollo hidroeléctrico.

Este estudio se enfocó en la conexión entre desarrollo hidroeléctrico y turismo comunitario en la Amazonía alta del Ecuador, en tres diferentes sitios: El área de Santa Clara en la provincia de Pastaza, las comunidades alrededor de Puerto Misahuallí en la provincia de Napo, y las comunidades de El Topo y Azuay, en la provincia de Tungurahua. Específicamente la pregunta de investigación fue cómo los pobladores locales perciben esta relación entre desarrollo hidroeléctrico y turismo.

Se usó dos diferentes métodos: caminatas de transecto y entrevistas. Para cada sitio estudiado se creó una matriz que incluía los cinco tópicos principales para ser observados: uso de tierra, recursos e instalaciones, potencial turístico, desafíos para el turismo, y relación a la hidroelectricidad.

En el área de Santa Clara se visitó dos comunidades locales y representantes del municipio. El turismo en el área se encuentra en una etapa temprana. El municipio tiene un gran interés en desarrollar el turismo, pero no cuenta con suficientes fondos para invertir. En la actualidad hay solamente un área de recreación en el Río Piatúa, principalmente para turistas nacionales, con un restaurante, baños, cancha deportiva, y posibilidades de nadar en el río. En cuanto a turismo comunitario, la comunidad de Chontayaku tiene una cooperación con el municipio, por ejemplo la comunidad es indicada como un sitio de turismo comunitario en la guía oficial de turismo del municipio, pero aún el acceso a la comunidad es difícil y faltan servicios básicos tales como de alojamiento. El potencial turístico principal es, según

los pobladores, el agua caliente y cristalino del Río Anzu, y sus playas de arena, que se podría usar para natación y recreación. También hay una roca gigante partida en la mitad, y el sendero por el bosque que conduce a la playa también pasa por unos petroglifos pre-incáicos, a donde la comunidad quisiera ofrecer visitas guiadas. En la actualidad no hay plantas hidroeléctricas en Santa Clara, pero existen planes para hacer una represa en el Río Piatúa y posiblemente otro en el Río Anzu. No ha habido un proceso de consulta de los pobladores locales. En Chontayaku, la comunidad percibe el desarrollo hidroeléctrico de una manera más favorable, viendo que podría resultar en oportunidades de trabajo, mejoras de la infraestructura, electrificación y acceso al internet en la escuela. En cambio, el municipio y la gente en la comunidad de San Juan se oponen a estos planes, y han formulado su posición al respecto en una carta formal. Según ellos, el turismo es una alternativa mejor para desarrollar el área.

En los alrededores de Misahuallí se realizó entrevistas en cuatro comunidades: Ayllu Awarina, Chichico Rumi, Shiripuno y Muyuna, y también a dos tenderos en Misahuallí. De las tres áreas visitadas, esta es la más turística, y en realidad el turismo es la actividad economíca principal en el área, para muchas familias dando más ingresos que la agricultura. En Ayllu Awarina puede haber hasta 500 visitantes en un solo día, aunque la cantidad de turistas en general varía mucho, con picos en fines de semanas y vacaciones. Muchas actividades turísticas dependen del río, como natación y rafting, y también por su belleza paisajística. Una represa hidroeléctrica se encontraba en etapa de construcción, en el Río Pusuno, cerca de Misahuallí. Los entrevistados manifestaron que no ha habido un proceso de consulta, y algunos expresaron temores sobre contaminación o alteraciones al flujo del río, y otros impactos sociales y ambientales negativos. Sin embargo, en general la gente estaba a favor del desarrollo hidroeléctrico, ya que consideraban que no iba a afectar directamente al Río Misahuallí, y pensaban que iba a fortalecer el desarrollo del área en general.

Las entrevistas incluyeron 6 pobladores locales en El Topo y también un poblador de la comunidad cercana de Azuay. Hace unos años hubo un proyecto de turismo comunitario, pero fue suspendido por las tensiones que se creó cuando empezó la construcción de la represa hidroeléctrica Hidrotopo 1, en el 2011. En la actualidad hay planes de construir una segunda represa, Hidrotopo 2. En El Topo hay una fuerte oposición contra el desarrollo hidroeléctrico. Los pobladores conocen los impactos que han causado otros proyectos hidroeléctricos en áreas cercanas, como el proyecto San Francisco y otros en la municipalidad de Baños, y refieren a impactos como cascadas secas y contaminación. Los beneficios, dicen, han sido mínimos, por ejemplo un campo de juegos para niños, computadoras donadas a la escuela, sueldos para profesores, y caramelos para los niños. Los entrevistados manifestaron que el proceso de consultación que era requerido por la ley no había funcionado en la práctica. En el 2011, los pobladores de El Topo realizaron huelgas y protestas contra el gobierno y la empresa constructora, impidiendo el transporte de

materiales de construcción, y gente de otras comunidades también se sumaron a las protestas. Todavía diez personas enfrentan cargos judiciales por su participación. En la comunidad de El Azuay, en cambio, la gente está, en general, a favor del desarrollo hidroeléctrico, por lo que ha generado oportunidades de trabajo, y porque se prevé que se va a pavimentar la carretera. Estas posiciones distintas también han generado tensión entre las dos comunidades.

En conclusión se nota que la relación entre proyectos hidroeléctricos y el turismo son muy compleja, involucrando varios actores diferentes. Al nivel nacional hay un fuerte deseo de desarrollar tanto el turismo comunitario como la producción de energía hidroeléctrica que en muchos casos se tratan de intereses contradictorios. Sin embargo, tanto el turismo comunitario como el desarrollo hidroeléctrico por lo general tienen el mismo objetivo, que es el mejoramiento de las condiciones de vida de las poblaciones.

El estudio subraya la importancia que los ríos desempeñan en todas las comunidades, para el turismo y para la vida cotidiana. No obstante, la energía hidroeléctrica se ve como algo bastante positiva por los locales, debido principalmente a mejoras en la infraestructura o las oportunidades de empleo y como una alternativa a la producción de petróleo. La oposición al desarrollo de energía hidroeléctrica era sólo aparente en los lugares donde existe una amenaza concreta y donde los actores locales tenían suficientemente conocimientos del tema. Las entrevistas mostraron que las comunidades locales en general carecen de los conocimientos necesarios relacionados a los efectos de la construcción de hidroeléctrica a su vida cotidiana, la naturaleza o el desarrollo del turismo. Esto se debe en gran parte a la falta de consulta local, aunque está exigido en la constitución del Ecuador. En realidad hay pocas posibilidades de que las comunidades participen en la toma de decisiones y la información esencial no está en el alcance de los locales. También existe una falta de planificación y gestión a largo plazo al nivel comunitario.

Nuestra investigación muestra una falta de comunicación entre los diferentes actores y diferentes niveles, especialmente entre el nivel nacional y el nivel local. La falta de gestión se observa tanto en el turismo y en el desarrollo hidroeléctrico. Por otra parte, no es seguro que los beneficios de la energía hidroeléctrica se quedarían en el área local, ya que las empresas extranjeras poseen muchos de los proyectos. Para evitar controversias se recomienda que se mejore la comunicación e información y que se involucre más los pobladores locales en la toma de decisiones. Se exige más transparencia en la toma de decisiones entre todos los actores. Existe un potencial para desarrollar tanto el turismo comunitario y la hidroeléctrica en la misma zona si aplicado correctamente. La relación entre el turismo comunitario y el desarrollo hidroeléctrico ofrece muchas posibilidades para futuros investigaciones y hay necesidad para más estudios ya que no existe un modelo común adecuado para todos los lugares.

Land use and cover changes in upper Amazonia region in Ecuador

Joona Koskinen, Meri Lindholm and Inka Voutilainen[1]

Abstract

The aim of this study is to investigate if NDVI-analysis is a reliable tool for detecting changes in forest growth in satellite pictures. Deforestation is a continuous problem in Ecuador Amazon and government has taken actions to create reforestation. Therefore, it is important to investigate to which degree the reforestation campaign has helped to recover the lost forest area. As a method we used Landsat satellite images and in situ collected GPS points in different land use classes to see if free of charge remote sensing data can be used to detect changes. Data was collected from area around the town Santa Clara in Napo, Ecuador. In this specific area there has been reforestation campaign called Socio Bosque and also local municipality runs government program to reforest riversides. As a result we found that NDVI values were highest in primary forest, but there were some difficulties to extract intense agroforestry from secondary forest. During the study, NDVI-analysis proved to be somewhat accurate tool when separating the different kinds of vegetation from each other. Using NDVI as a tool it should also be possible to monitor the development of a reforested area from afar. This might prove to be very useful for the municipality to be able to monitor if the reforested area continues natural succession towards secondary forest without need for massive field work.

1. Introduction

Ecuador is one of the South American countries that have managed to decrease their deforestation level. This is achieved by nationwide reforestation campaign, Socio Bosque. The action model of the program, maintained by the government, is to pay money for the forest owners when they agree to protect their property (de Koning et al. 2011). However, the deforestation has been going on for a long period of time and it has influenced a considerably large area in South America. Therefore, it is important to investigate to which

[1] In addition Joselyn Michelle Pullugando Guevara and Marlo Xavier Grefa participated in the fieldwork.

degree the reforestation campaign has helped to recover the lost forest area. Reforestation rate is based on government officials' estimations and national forest database is on planning phase (Municipality of Santa Clara 2015). Remote sensing might prove to be valuable reliable way to map changes with low costs. In order to see the differences in land use and cover, it is necessary to familiarize oneself with deforestation as well as reforestation in the area during the years.

Our research question is: "Is NDVI-analysis a reliable tool for detecting changes in forest growth in satellite pictures?" This is a methodological study and the aim of the study is to test the usefulness of NDVI as a tool for observing the growth of forests. If NDVI proves to be a usable tool and makes it possible to identify secondary and primary forest areas, it would make observing of forest growth from afar very easy. If detecting different forest type based solely on a satellite image is possible, then keeping an eye out for large forest areas becomes cost and time effective. Also with NDVI as a tool it should also be possible to follow up the growth of a reforested area. With NDVI as a tool, one wouldn't only get information about the current situation, but it would also be possible to look back in the years with a help of older satellite pictures.

The study was conducted near CIPCA-station (Centro de investigación y promoción del campesinado), because it is in the proximity of an area that has been a subject to deforestation and reforestation cycles during the last few decades and thereby provides an excellent location for this kind of research. Data collecting was done in different areas around CIPCA with the help of local people who know the area best.

In this paper, we first briefly look into previous studies about the reforestation and deforestation in Ecuador and in the Amazon in general. Then we will continue to discuss the land use changes in the above-mentioned areas. We will move on to our methods and results, concluding this article with a discussion and conclusions.

2. Deforestation

Latin America and the Caribbean face great challenges with rapidly growing population and the deforestation will likely continue to make space for agriculture, ranching and plantations (Eva et al. 2004). Cattle ranching seems to be linked most strongly to high deforestation rates (Mena et al. 2006). There are many reasons why deforestation in Ecuador is happening, some of which are internal and some of which are external (Aide et al. 2012). The increasing global population and greater demand for agricultural products are important external reasons for land use changes. Amazon is deforested for new pasture lands when old pastures are taken over, for example, by soybean or sugar cane.

In the year 2005, 39 % of the land area 10,8 million ha was covered in forest, according to Mosandl et al. (2008). Before human impact on Ecuador the forest land cover has been over 90%, so the decrease has been remarkable. According to a study conducted by Mena et al. (2006) in Ecuador, the overall forest area has dropped from year 1986 to 2002, giving way to pastures and agriculture. Even though the deforestation hadn't stopped, it was found out, that the rate of deforestation had dropped for years 1996-2002 in comparison to years 1986-1996 in all study areas. The lesser rate of deforestation was especially explicit in conservation Patrimony Forest areas when compared to private lands. Holland et al. (2014) see that drop in coffee production and decrease in oil production are two major factors associated with slowed deforestation rate.

According to a deforestation study by Aide et al. (2012) in Latin America and the Caribbean, South America accounted for 80 % of the deforestation in the whole area during the observed time between 2001 and 2010. Major areas of moist forests were replaced by agricultural species in northwestern Ecuador, whereas there was a large gain of woody vegetation in Andes of Ecuador. Even within Ecuador there are great regional differences. One of the most highlighted findings, when observing land cover changes in South America, is the rapid advance of an agricultural frontier into forests. Anthropogenic activities, such as deforestation and harvesting of animals and plants, threaten many Amazonian ecosystems (Castello et al. 2013). Yet, many local communities are dependent on exactly these decreasing resources and there is a conflict between nature conservation and livelihood of the local populations, especially isolated populations.

Selective logging, such as are many illegal loggings, doesn't seem to affect the landscape as dramatically and causes less damage to forests' structure than more mechanical logging (Salo et al. 2014: 175-177). However, often there is a clear change in the forest's structure, created by gaps and openings in the canopy, which in turn changes the microclimate, soil characteristics and species composition.

Communities in Amazon are highly dependent on wild resources, but this dependence has declined during the years even when the population of the communities has increased (Clark et al. 2015). However, timber harvesting remains an exception to the trend. According to a study conducted by Clark et al. (2015), hunting, fishing and harvesting of non-timber forest products have declined from year 2001 to 2012 among indigenous communities of the Amazon Basin, whereas households harvesting timber have increased within given time frame. It was also reported that there was a decline in high quality timber sales and valued species cedro (*Cedrela sp.*) dropped from second-most harvested to rarely harvested. In many households cedro was stated to become rare, or even extinct in the area. All in all, regarding timber, there has been a clear decline in resources along the years.

Clark et al. (2015) state that the study communities have expanded in size during the years and nearby forests have slightly decreased in total area. In Amazon Basin region the

indigenous communities' populations are increasing, and therefore, there may be more pressure on environment accordingly (McSweeney et al. 2005). There was a clear trend of higher participation in timber sales the closer the communities were to markets (Clark et al. 2015). Participation was lower among off-farm employed households and among households exposed to conservation programs. Deforestation seems to be lower in areas, where farmers are maintaining an off-farm job, such as oil related work or an informal sector employment in towns (Mena et al. 2006) For conservation purposes, it is highly important to find a way that is satisfactory for the local societies as well as conservationists (McSweeney et al. 2005).

Many forested areas in Ecuador are protected, but these areas face numerous challenges due to imperfect initial design of the area, exclusion of key stakeholders and conflicting governmental interests in the area (Mena et al. 2006). The tenure of lands is often complex and overlapping in Ecuadorian Amazon (Holland et al. 2014). Overlapping land areas are often contested with unclear rules of access. In many areas the communal lands of indigenous peoples overlap with protected or restricted forest areas. Deforestation rate is much higher in areas where land tenure is uncertain or unclear. In 1964 a law claiming large portions of Ecuadorian Amazon as unsettled was executed. The law was redefined in 1994, but even after that many settlers still consider forest cuttings as improved security for land tenure (Morales et al. 2010, cited by Holland et al. 2014). Clearing of the forest for commercial use in indigenous communal areas is only permitted with a MAE (ministry of the Environment) approved forest management plan and only on unprotected areas (Holland et al. 2014). According to analysis by Holland et al. (2014), rate of deforestation was lowest in protected areas, the second lowest in restricted areas, followed by areas with overlapping tenure and being highest in indigenous areas.

3. Reforestation and land use changes

In Oriente, many indigenous communities have sought to include their lands within protected areas in order to defend them against exploitation by extractive industries (Holland et al. 2014). This is aided by the government's Socio Bosque program, in which landowners and land-owning communities are rewarded for not performing loggings in forests owned by them.

In his study, Balthazar (2015) analyzed land cover maps from 5 different decades in Central Ecuador in order to study the effects of both deforestation and reforestation to the ecosystem services, respectively. Balthazar (2015) found that turning natural grassland into a pine plantation, perhaps unsurprisingly, decreased the ecological value of the area. He concluded that while all reforestation doesn't necessarily improve the value of ecological services gained from land, turning of abandoned farmlands into commercially used forest actually

led to a rise in ecosystem services. Therefore, reforestation in itself isn't necessarily the desirable situation, but can be means to an end. Balthazar (2015) emphasized that it is important to survey the change of ecosystem services on a larger time scale in order to determine the impacts of reforestation to them.

Aide et al. (2012) didn't find a clear connection between population change and forest change in their study area in South America and the Caribbean. Therefore, a change in population doesn't seem to be a good predictor for forest change. Mena et al. (2006) also see that less deforestation is connected with relatively high population densities in farms, perhaps because smaller plots make people more dependent on off-farm employment. However, there was an explicit connection between forest change and elevation. Most of the deforested areas were located < 250 m, whereas most of the reforesting occurred at elevations between 300 – 1000 m. The population was also found to be generally higher in reforested areas than in deforested areas. This is, at least to a degree, explained by the fact, that in higher populated area there has occurred more deforestation and, in turn, larger reforestation is possible in the area.

When settling to a new area, colonizing peasants first use the cumulated resources of the area, for example harvesting natural timber and farming without the need to use any fertilizers (Rudel et al. 2010). During the span of a few years, the land loses some of its usefulness, since its nutrients deplete while the pests usually proliferate. The smallholder then either moves to the next farming site, abandoning or selling his land. The abandoned land sometimes develops into a forest, sometimes its succession is aided. In this process, wide areas of secondary forests are formed. Reforestation starts more easily in remote areas less desirable for cultivation. However, Rudel et al. pointed out that small time-scale reforestation can happen near the roads due to anthropogenic reasons, e.g. when huge areas of land were abandoned when naranjilla (*Solanum quitoense*) farming experienced devastating pest problems in the early 1990s.

4. Data and methods

We studied an area around the town Santa Clara in Napo, Ecuador. The size of the area is approximately 2000 square kilometers. This specific area was chosen due to its location near CIPCA station and easy accessibility from the station. In this area it was also possible to distinguish both deforestation and reforestation patterns in the high spatial resolution spot images. There is also different kind of reforestation campaigns in this specific area.

Areas in Napo were first deforested in the 1960's when government started colonisation of the area. Nowadays logging for invasive purposes is no longer allowed. On national level, the aim of the municipalities is to reforest areas 50m from river, to control river erosion. On

river bars, pedogenesis is in early stage which is why there is only thin soil and therefore planting trees can be challenging. Municipalities are using planting cycle with increasing amount of sun for acclimation of seedlings and improving soil. For the seedlings only few weeks dry can be detrimental so planting is very problematic on this area. Seminars are arranged between municipalities in which they share knowledge and report regularly. However, the reports are often left unread (Municipality of Santa Clara 2015). Problem with national level programs is that they lack local aspect and easily lead to useless effort if area is naturally bleak and there has not been time for natural succession of bare rocky ground. Government of Ecuador plans to establish a national land use database based on evaluations of the officials (Municipality of Santa Clara 2015). Problem with this kind of database is that maintaining it up to date is very expensive if it's done in situ.

Private landowners can request municipality to reforest their lands. Municipality provides information about importance of reforestation and education to plant trees successfully. Reforestation progress is slow because logging and maintaining pasture are often the only livelihood of the people and only about half of the people participate to information meetings. There has been some incidents where local people logged newly reforested pasture lands near river bank. According municipality's office, many don't want reforestation, because compensation is paid only after three years. Compensation is usually paid in the form of fish ponds or other alternative means of livelihood. Municipality considers compensation to be fair because owners of the land don't have to do anything in the process (Municipality of Santa Clara 2015).

Socio bosque -program is also active on study area. Socio bosque seemed to be efficient for maintaining primary forest because local communities are paid to patrol their forests weekly and report any questionable action. Communities considered socio bosque better than nothing, but compensation was said to be small in comparison for logged value of the forest (Municipality of Santa Clara 2015).

All data and methods were chosen so that those are free of charge and straightforward to perform with open source softwares. We wanted that this study could be done again by local people or municipalities without any extra costs. To study if normalized difference vegetation index (NDVI) is accurate for identifying different land cover types, we calculated NDVI for atmospherically corrected Landsat 8 satellite image. The main criteria for satellite image was the lowest possible cloud cover in 2015. We performed atmospheric corrections for radiometrically calibrated images with dark-object method (Liang 2004). We also selected relevant minimum values for red and NIR bands and the minimum values were subtracted from pixels with raster calculator. NDVI is used to identify fast vegetation growth and chlorophyll-a so we will be able to recognize fast growing secondary forest from primary forest. NDVI is useful because it is normalized (Figure 1) index from near infrared and red channels. Vegetation’s reflectance is high in near infrared band (NIR, band 5) and there is a

gap in vegetation reflectance in red band (band 4) while bare soil and built up area has stronger reflectance. All the NDVI values are between -1 to 1. -1 means usually deep water and +1 fast growth (ArcGIS help 2015).

$$NDVI = \frac{(NIR - RED)}{(NIR + RED)}$$

Figure 1. *NDVI calculation function.*

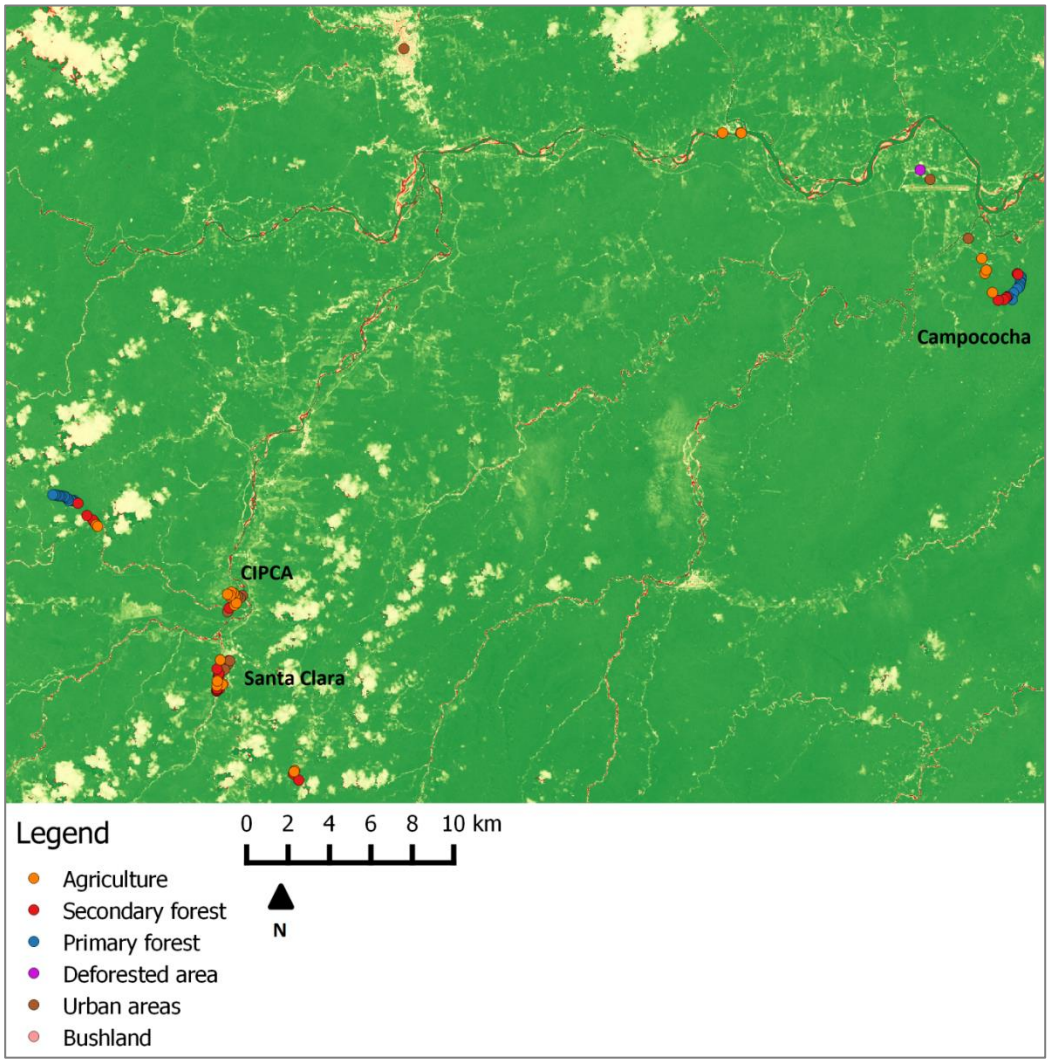

Figure 2. *Study area and the reference points.*

In situ we collected hundred GPS reference (Figure 2) points from following classes which are explained in table 1: bushland, agriculture, urban areas, deforested area, primary forest and secondary forest. To identify land cover in each point we used visual observation and interviewed local guides for reference information. We identified NDVI value for each GPS point in all classes to sort out typical values.

Table 1. *Descriptions of land use classes in this study.*

Primary forest	**Secondary forest**	**Deforested areas**
		
Old forest without recent human impact and present of key timber species	Older reforestation area that can be referred as forest or forest that lack relevant amount of primary species because of logging	Areas with barren soil because of human impact
Bushland	**Agriculture**	**Urban areas**
		
Newly reforested area that can't yet to be referred as forest or area with rich undefined bushes	Currently cultivated area or pasture. Also includes agroforestry	Areas with housing or roads.

5. Results

The results show a difference in mean NDVI-values of primary and secondary forest (Figure 3). However, the difference in these means is only 0,03 units on NDVI-scale, and there is a certain amount of overlap on values from different categories: the primary forest values varied in between 0,84 and 0,93, while secondary forest values varied from 0,73 and 0,92. This means that, while the NDVI-values from primary forest were higher by average, the greenest secondary forests were practically as lush as the greenest primary forests. The lowest NDVI-values from secondary forest category came from younger forests. This means that the growth of the forest can be monitored from NDVI-pictures: when the secondary forest develops, its NDVI-value increases until it reaches primary forest levels.

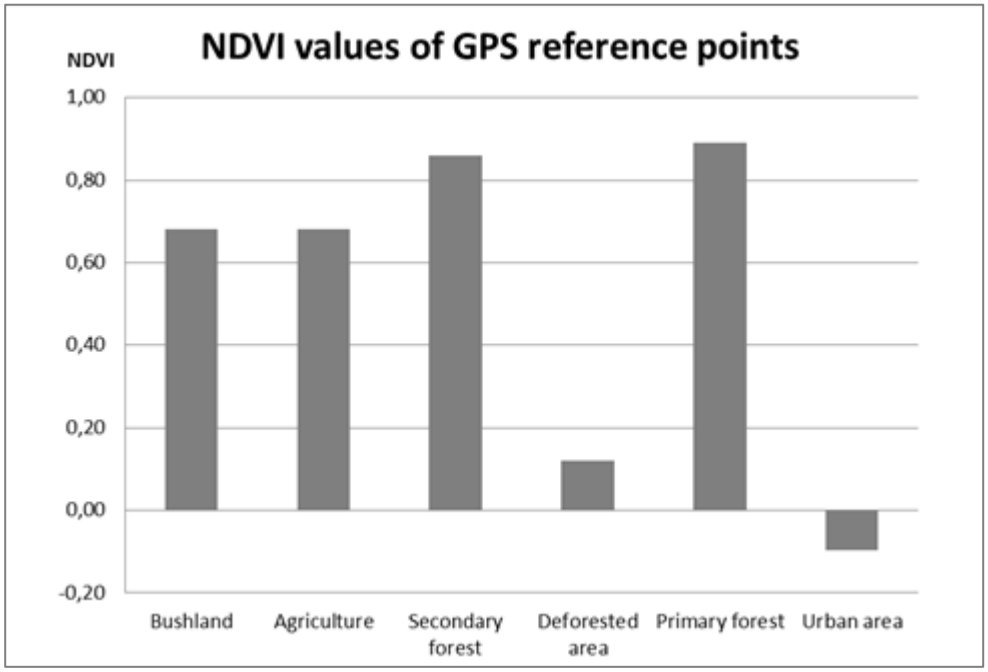

***Figure 3**. Mean NDVI values of collected GPS reference points.*

The shrubland and cultivated areas (average value of NDVI 0,67 and 0,68, respectively), deforested area (0,16), urban areas (0,10) and water were all easily distinguishable from each other and from both forest types. Cultivated areas consisted mainly of corn, cassava, cacao and bananas. These areas had NDVI values very close to those of shrubland, mainly because the vegetation was also rather similar in these two land use groups: tall (1-2 meters high) grassy plants with occasional short (less than 5m high) trees with only little cover.

Interviewing local people (municipality of Santa Clara, 2015) revealed that the municipalities in the area don't maintain a database about reforested areas. They also don't have tools for monitoring forest growth. There are, however, monthly conventions of persons in charge of reforestation in different municipalities in the area. In these conventions, people discuss different reforestation mechanisms and share news about reforestation in their respective municipalities.

There is an ongoing reforestation project in which the municipality nurtures saplings for private landowners. These saplings are then planted in order to speed up the reforestation process. Santa Clara also provides necessary information for landowners on the subject. In Campo Cocha community, the results of national Socio Bosque were promising: the timber cuttings were discontinued after the community joined the program.

6. Discussion

NDVI is generally used to analyze changes in vegetation, but it is not flawless, for example, NDVI value is affected by the relative height of the place which might be the reason why secondary and primary forest did not have more clear difference in NDVI. Most of the primary forest points were collected from hills for practical reasons. Use of NDVI is debated because it does not provide any further information about why vegetation varies in the area. For example tasseled cap conversion provides lot more information (brightness, wetness, greenness) than NDVI, but it is more challenging to analyze visually on account of multiple bands.

There were several challenges and complications along the way with the study, given the short research time and the new environment. Our study area was rather small, and therefore one has to be very careful when generalizing the study results over to a larger area. The time spent on collecting data was relatively short as well. More time would have been needed for collecting larger amount of reference points, which in turn would have decluded some inevitable inaccuracies. The longer study period would also have allowed separating the land use groups even more. Subgroups in cultivated area would have provided more information, since the group as whole contained a lot of variety from low-growing graminoids to trees.

Working in a multicultural group in a foreign environment did prove to be a challenge, however, even greater challenge proved to be the lack of time. Also due to communicational problems within our study group, the note taking was variable and partly inaccurate. During our field work in Napo, we also came to learn that there is no accurate or reliable data about deforested or reforested areas since nobody actually keeps records of them. So to a large part we simply had to rely on numbers and figures that are at best based on good estimates.

7. Conclusions

During the study, NDVI-analysis proved to be somewhat accurate tool when separating the different kinds of vegetation from each other. However, the method struggled when interpreting which area was secondary and which was primary forest. Using NDVI as a tool it should also be possible to monitor the development of a reforested area from afar. This might prove to be very useful for the municipality to be able to monitor if the reforested area continues natural succession towards secondary forest without need for massive field work. With NDVI as a tool, one wouldn't only get information about the current situation, but it would also be possible to look back in the years with a help of older satellite pictures.

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Resumen - Cambios en la cobertura y uso de la tierra en la región de la Amazonía alta del Ecuador

El Ecuador ha sufrido altas tasas de deforestación durante todo el siglo XX, pero últimamente la tasa de deforestación ha disminuido, según un estudio que comparó los periodos 1986-1996 y 1996-2002. En particular, la tasa de deforestación ha sido menor en áreas de patrimonio forestal que en tierras privadas. También hay iniciativas del gobierno para dar incentivos a dueños de tierra para proteger sus bosques, o para reforestar sembrando árboles.

Este estudio fue un estudio metodológico, donde la pregunta de investigación fue: "Es el análisis de NDVI una herramienta confiable para detectar cambios de cobertura forestal en imágenes satelitales?" Si el NDVI se demuestra como una herramienta factible para identificar bosques secundarios y primarios, se facilitaría la observación de la dinámica de la cobertura forestal, mejorando la eficiencia, en términos de tiempo y dinero, del monitoreo de áreas extensas. Sería también posible analizar cambios anteriores, con la ayuda de imágenes satelitales históricas.

Se realizó los estudios de campo en los alrededores de la estación CIPCA, y el pueblo de Santa Clara, en un área de aproximadamente 2000 kilómetros cuadrados. Se recolectó aproximadamente cien puntos de referencia con GPS, basados en observación visual y entrevistas con guías locales, y clasificándolos en las siguientes categorías: áreas agrícolas, áreas urbanas, áreas deforestadas, matorrales, bosque primario, y bosque secundario.

Calculamos el Índice de Diferencia Normalizada de Vegetación (NDVI por sus siglas en inglés) para una imagen de Landsat 8, corregida por efectos atmosféricos. El NDVI se usa generalmente para detectar clorofila-a y crecimiento rápido de vegetación, por lo que considerábamos que sería posible distinguir bosque secundario de bosque primario. El NDVI es útil porque es un índice normalizado basado en las bandas roja e infrarroja cercana. La reflectancia de vegetación es particularmente alta en la banda infrarroja cercana. Los valores del NDVI pueden variar entre -1 y 1, donde valores cerca de -1 típicamente representan aguas profundas, y valores cerca de 1, en cambio, áreas de rápido crecimiento de la vegetación.

Los resultados indicaron una cierta diferencia entre los valores de NDVI para bosques primarios y secundarios, respectivamente, pero la diferencia fue pequeña y hubo un solapo entre las dos categorías. Para bosque primario los valores de NDVI variaban entre 0.84 y 0.93, mientras para bosque secundario variaban entre 0.73 y 0.92, y la diferencia de los promedios era solamente 0.03. Entre los bosques secundarios, los valores menores representaban bosques muy jóvenes, lo que significa que ellos pueden ser distinguidos de bosques primarios más fácilmente que los bosques secundarios más maduros. Las áreas sin cobertura forestal tenían valores de NDVI mucho más bajos, como indican los siguientes

promedios: 0.68 para agricultura, 0.10 para áreas urbanas, 0.16 para áreas deforestadas, y 0.67 para matorrales. Así, tales areas eran fáciles de distinguir.

PART 2: TRAVEL JOURNALS

Photo: Anu Häkkinen 2015

WORKING GROUPS IN THE FIELD

In the field the students worked in four separate working groups focusing on different themes. Each group had also local students from the Amazonian State University helping out with practical issues, such as language, in the field.

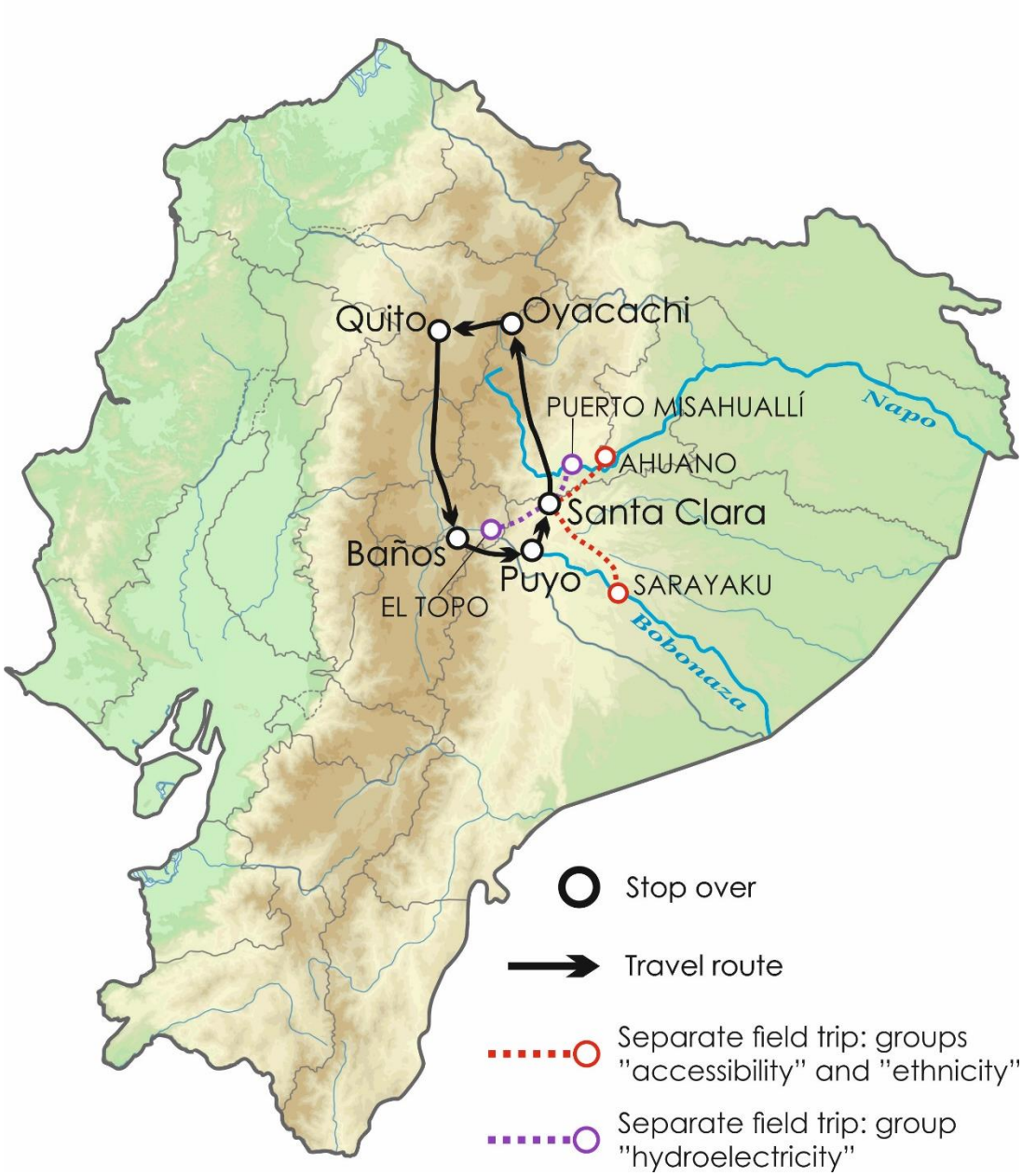
Group 1: "*Ethnicity*"
Nora Fabritius, Anu Häkkinen and Soili Laurila *(University of Helsinki)*,
Lorena Eliza Mamallacta Cerda and Diana Estefanía Lozada Ramos *(Amazon State University)*.

Group 2: *"Accessibility"*
Olga Hagström, Aino Ropponen, Marika Rönnberg and Elli Saari *(University of Helsinki)*,
Danny Javier Guevara Llerena and Wilmer Andres Shiguango Yumbo *(Amazon State University)*.

Group 3: *"Hydroelectricity"*
Maija Meri, Nina Miettinen, Mia Puttonen and Henna Puustinen *(University of Helsinki)*.
Edison Fernando Aldaz Vozmediano and Ronald Paul Grefa Alvarado *(Amazon State University)*.

Group 4: *"Environment"*
Joona Koskinen, Meri Lindholm and Inka Voutilainen *(University of Helsinki)*,
Joselyn Michelle Pullugando Guevara and Marlo Xavier Grefa *(Amazon State University)*

FIELD TRIP MAP



TRAVEL ITINERARY 18.10 – 31.10 / 2015

Day 1 – Sunday 18.10. Gathering in Quito.

Day 2 – Monday 19.10. Quito. We visited ministries of Education, Environment and *Buen Vivir* and the Amazon Watch. In the evening we drove to Baños.

Day 3- Tuesday 20.10. Baños. In the morning we visited hot springs and the Fundación Oscar Efrén Reyes. After we drove to Puyo and visited waterfalls and dams on the way. In Puyo we met with the local students of UEA. In the evening we arrived to Santa Clara to *CIPCA*[1] research station.

Day 4 – Wednesday 21.10. Research day in Santa Clara

Day 5 – Thursday 22.10. Research day. Accessibility and Ethnicity groups head to Sarayaku for two nights. Group hydroelectricity headed for Misahuallí for one night. Environment group stayed in Santa Clara area.

Day 6 – Friday 23.10. Research in Sarayaku, Santa Clara and Misahuallí.

Day 7 - Saturday 24.10. Day off at the research station. Accessibility and ethnicity groups return from Sarayaku.

Day 8 – Sunday 25.10. Day off at CIPCA and hiking in the forests.

Day 9 – Monday 26.10. Research in Santa Clara and surroundings (Tena, El Topo)

Day 10 – Tuesday 27.10 Research day at CIPCA. Going through data and results and preparing for final seminar.

[1] Centro de Investigación, Posgrado y Conservación de la Biodiversidad Amazónica;
Center for Amazonian Research, Postgraduate studies and Conservation

Day 11 – Wednesday 28.10. Final seminar in Puyo, after which we drove to Oyacachi for the closure of the field trip.

Day 12 – Thursday 29.10. Taking walks, bathing in thermal waters and enjoying the mountainous Oyacachi.

Day 13 – Friday 30.10. Scenic mountainous ride, spotting volcanoes on the way back to Quito from Oyacachi. In the evening we had our last dinner together in Quito downtown.

Day 14 – Saturday 31.10. Field trip over. Some travel back to Finland, some stay exploring Ecuador and the Latin America.

DAY 1. Sunday 18.10.2015

Elli Saari

The purpose of this course?

After few days touristing in Quito surroundings, it felt hard to think that now is time to start working for the course itself. First meeting in Quito was held in our hostel. It was great to see everybody finally. At least I, was excited to hear what was going to happen in following 11 days.

At first, it felt hard to orientate myself to "real business" and think that now were days to start literally doing research. I guess we all had different motives to attend the course; travelling and new experiences ad few examples. In addition to those for me, and I believe for others too, the opportunity to do research in totally different environment was major reason.

But after personal motives, I started to think, what is the purpose of field trip? We have ambitious task ahead of us. 11 days of time to capture something from new and different culture. I am sure that we will learn how is researching in various kinds of contexts. But I started wondering are we really capable to do reliable academic research in this limited time and with these academic skills we have so far? Do we have something to offer for locals and for geography as a discipline in general?

Lot of questions that we cannot answer yet. Let see! I believe we will be able to combine all interests, from new adventures to scientific efforts, in purpose to make field course as rewarding as possible. Looking forward all that!

View from the terrace of our hostel Casa Bambu in Quito (Anu Häkkinen 2015)

DAY 2. Monday 19.10.2015

Nora Fabritius

We started our first day of fieldwork with several appointments with representatives in Quito. Our first meeting was with Leo Cerda, representative of the non-governmental organization Amazon Watch which fights for human rights and the environment. The second meeting was held at the Ministry of Environment with the sub-secretary and the third with the national director of the Intercultural Bilingual Education program. Last but not least, we had a meeting with representatives of the Ministry of *Buen Vivir*, an ideological project of the Government aiming to influence the philosophy and spirit of the people and the people's approach to the government and also the Government's policies in general.

During this day of intensive fieldwork we learned a few central lessons. First of we learned to always keep in mind what position the informants hold. Not only critically reviewing what is said, but also by who and in what kind of context. We could clearly see how all the representatives were keen on giving us a certain picture of their activities and attitudes, which later on often seemed quite contradictive to the what we learned visiting our study areas.

The second lesson of the day was learned by watching how Dr. Siren used every meeting to get in contact with new possible informants. This seems to be a central skill in fieldwork, to use your connections to get connected. All in all, the day was filled with interesting meetings from morning to evening. We also got a lesson in how to deal with a big group on a tight schedule in a country where time is quite a relative concept compared to what we were used to. When the sun had already set, we jumped on the bus and headed down the mountain hills towards Baños and the Amazonas.

Visiting the Buen Vivir ministry (Anu Häkkinen 2015)

DAY 3. Tuesday 20.10.2015

Maija Meri

This morning we woke up in the town of Baños. Some of us went to the hot springs early in the morning and then we had a nice breakfast at the top floor of the hostel enjoying a nice view over a waterfall. Then we went to the Fundación Oscar Efrén Reyes, where Juan Pablo Reyes gave us an interesting presentation of the area of Baños from a biological point of view. Tourism has developed a lot in the area of Baños after the eruption of Tungurahua volcano in 1999. After that we passed by the Agoyan hydroelectric dam and saw different waterfalls on the way to Puyo. The highlight of today was definitely meeting the local students at the Universidad Estatal Amazónica. It was also interesting to see the University building and campus itself. After that, we bought some rubber boots from Puyo and in the evening finally arrived to CIPCA.

For our group, today created controversial feelings. It was really interesting to see in practice a bit of the relationship between hydroelectricity development and tourism in Baños, for example how the Agoyan dam has diminished the river flow in the Pastaza River. At the same time, we are still worried whether we will find a good place to do research near CIPCA. Including local students in the research is very important in terms of international collaboration as well as getting different point of views and new ideas. I believe all of the groups are relying quite much on the students in terms of local knowledge and ideas about field work places. It was important to take into account also the interests of the Ecuadorian students in order for them as well to make the most of this experience. There were some language barriers in the beginning but hopefully every group will get it going. At least our group got along very well and we are very much looking forward to see how the research goes further.

A river valet on the way from Baños to Puyo (Maija Meri 2015)

DAY 4. Wednesday 21.10.2015

Henna Puustinen

At CIPCA (Henna Puustinen 2015)

Today we woke up and had our first breakfast at Cipca research station. It was the first official fieldwork day. The day included a short welcome meeting by the Cipca staff and after that our group had a meeting with Santa Clara municipality. Our group got good information from the municipality and our research topic and focus became much clearer. Later, as a surprise, our group got a chance to visit Chontayacu community where we also got our first experience with the Amazonian rainforest as well as with travelling in the back of an Ecuadorian pickup truck.

All in all the day was long and full of ups and downs. In the morning our group felt quite lost trying to figure out the research site and focus in general. Luckily at the end of the day we hoped that maybe today was the day when everything finally starts to ”flow”. From a personal view, today was filled with both frustration and satisfaction. It was surprising to notice how frustrating it was when you could not follow the interviews because of the lack of your Spanish skills. It is frustrating because you would really like to understand the talk but you just simply cannot. Accordingly, the importance of translation in interview situations got a whole new meaning today. I also realized that those students who can understand Spanish will probably get slightly more out of this whole experience than we who cannot. At least when considering the research itself. On the other hand, Spanish-speaking Finns will have to work a bit more, as they are partly responsible for making sure that those who do not speak Spanish will understand what is going on. Or maybe the experiences will just differ, in good and in bad. At least I know that this experience will definitely boost my aims to learn fluent Spanish someday.


A bridge close to CIPCA (Henna Puustinen 2015)

DAY 5. Thursday 22.10.2015

Mia Puttonen

This was the day our research group (hydroelectricity) hopped on a local bus with bags on our backs with a simple goal in mind: meeting a community that is involved in tourism and that would let us stay in them for the night. We were stoked.

When in Tena, we went to visit the tourism information point (run by the Ministry of Tourism) to ask about community-based tourism in the area. They, as well as other ones before, recommended to stay in a community by Rio Napo, since they have been involved in community-based tourism for decades. However, they told us that many organizations working there were illegal.

Our trip to Ayllu Awarina (Mia Puttonen 2015)

We managed to organize a meeting with one of the first community-based tourism organizations in the area called RICANCIE (Red de Turismo Comunitario de Napo). Our talk did not give us much information on environmental challenges in the area, but at least they are licensed and work legally. We left pondering how to find a solid base for our research; where to find enough data to build up a proper research? Luckily, over delicious *cebollados* (fish soup), we got a new idea; there had been a hydroelectric plant proposal listed on the website of the Ministry of Environment, to be built in the Rio Misahualli, close to the communities. In a local cybercafé, we were able to contact their side office in Tena and make an in-depth interview with an expert in charge of hydroelectric development in the area. We got our hopes up again, but at the same time we felt confused, as the person did not know many facts about the specific project and we received controversial information about the location of the new hydroelectric plant.

Finally, being already late in the afternoon, we were able to catch a boat to the community Ayllu Awarina that was ready to accommodate us for a modest price. The community was exactly what we had been looking for in terms of community-based tourism. We started talking with the community members over dinner and already received interesting points. Overall, today showed again what a rollercoaster of feelings research can be. Surely we learned not to take every word for granted, to be critical and to trust our own capabilities as young researchers.

DAY 6. Friday 23.10.2015

Anu Häkkinen

Today was the field work day in the remote village of Sarayaku. After sleeping in a communal hut with a natural soil flooring, we were naturally woken up by loud roosters in the early morning. Just a day before, the working group of accessibility and my group of indigenous culture, had taken a 10 hour journey with bumpy a car ride and a canoe on the Babonaza river, to reach the remote indigenous village of Sarayaku. At eight o'clock in the morning when we started our fieldwork we could already feel the Amazonian heat building up. We divided our groups in two so that both groups would have people from both, ethnicity and accessibility research groups. After all, since we had only one day to conduct all the material we needed in this particular village, we had to make it efficient. The other group headed towards the more remote community of Kali Kali by foot and my group stayed in the main town. The schools we visited in the town of Sarayaku were almost all built according to the local standards: open huts made out of natural materials. We also got to chat with a local English teacher who had come to Sarayaku for a 2-year project, and he was able to give us some insightful information on the educational matters of Sarayaku.

After a morning of conducting materials we all met again for lunch. The group which had taken the 3 km walk on the bumpy and hilly paths to Kali Kali and back, was with no claim exhausted. They had really gotten some perspective on the journeys the local children have to take to school every day. After lunch we headed to a village assembly which we had been invited to. In such a small community like Sarayaku with little amount of visitors it is crucial that the villagers are aware of who is in the town. In the assembly we were able to ask the village leaders some questions on the matters we were interested in, and to have another perspective for our research. During our day in Sarayaku we were fortunate enough to be able to talk with and get information from so many different representatives. We really could start noticing the contradictions in researched issues between many different-scale actors. To conclude, the trip to Sarayaku prove out to be really essential for our understanding not only about the educational situation, but also about the matters of ethnical diversity within' Ecuador in whole.

Our accommodation at Sarayaku (Anu Häkkinen 2015)

DAY 7. Saturday 24.10.2015

Joona Koskinen

Saturday was the one free day I had a day off. So I did nothing. This could provoke me to write on the subject of how sharing areas of responsibility accordingly greatly increases the effectiveness of a study group, but I choose to write about how resting is important when conducting field work.

I woke up late, since the field work had been rather exhausting. After some breakfast, me, Inka and Nina decided we would spend our free day by going town by taxi, spend some time there and then walk back.

On the evening, we went to the river Piatua to swim. We also decided to collect some diatom samples for Professor Janne Soininen while we were there: The environmental geographer can find a study anywhere! We used a toothbrush to brush off some diatoms living on the river rocks and put them into a plastic bottle for keeping; they would be microscoped later in Finland.

All in all, the day was relaxing change for a hard work conducted in the field earlier on the course.

The river next to CIPCA (Anu Häkkinen 2015)

DAY 8. Sunday 25.10.2015

Inka Voutilainen

Trekking in the forest (Meri Lindholm 2015)

Today was our second day off and to be honest, rest was much needed. We all went for a pre-planned walk through CIPCA station's and near-by located community's primary and secondary forests, setting off at 10 o'clock. Before setting off we visited Santa Clara, where we had breakfast, visited local market and also bought some snacks for the upcoming walk. From Santa Clara we took a taxi to the starting point of our walk.

Early on, we were divided into two separate groups, as some people felt they didn't want to walk for quite so long as was originally planned. Both groups had local guides to show them around. During the walk our local guide introduced us the most important trees for medicine, building and other uses. We also got to hear stories about local's beliefs associated with certain plant species. For the environment group the walk was especially useful, since the guide told us about the main differences between primary and secondary forests. The main differences that can rather easily be detected are the size of trees, the composition of different species and, naturally, signs of logging. With local guide's knowledge it was possible for the environment group to collect reliable primary and secondary forest GPS points.

In the end, both walks prolonged quite a lot, and given the difficult terrain, the day turned out to be tiresome for many of us. However, even after the walk, for many groups it was still work in the evening back at CIPCA – going through the collected data and preparing for the upcoming seminar. I think many of us would have needed an additional day off, to be able to rest up properly.

Aino crossing the river (Joona Koskinen 2015)

DAY 9. Monday 26.10.2015

Soili Laurila

After the day off it was time to get back to work! Today was an important day for us (ethnicity group) as we were going to conduct interviews in the Millennium School of Ahuano. We have been visiting the same schools with accessibility group and today was no different. To be honest, our research group has become quite reliant on their cooperation as we are not skilled in Spanish and everything needs to be translated for us. It can be quite frustrating sometimes, but we had to come terms with this from early on.

Our plan was to interview a cosmovision teacher to learn more about the subject, but it turned out that this school was not part of the intercultural bilingual education system and neither cosmovision nor Kichwa was taught. Apparently this was known by the others already the night before, but for our research group it came as a surprise! This meant that the interview questions that we had formulated were no longer relevant and we had to improvise. During the time spend on the field we have learned that adapting to new situations quickly is an absolute necessity and that's what we did.

In the end, we had a successful day. Once again we had a chance to visit a new school and interact with the pupils. The taxi ride there and back had gone smoothly and having the lunch together was a perfect way to end our little day trip. However, the day was not over yet as we worked late with the transcript. The next day was going to be equally busy as it was time to complete our analyses and put together the final presentation.

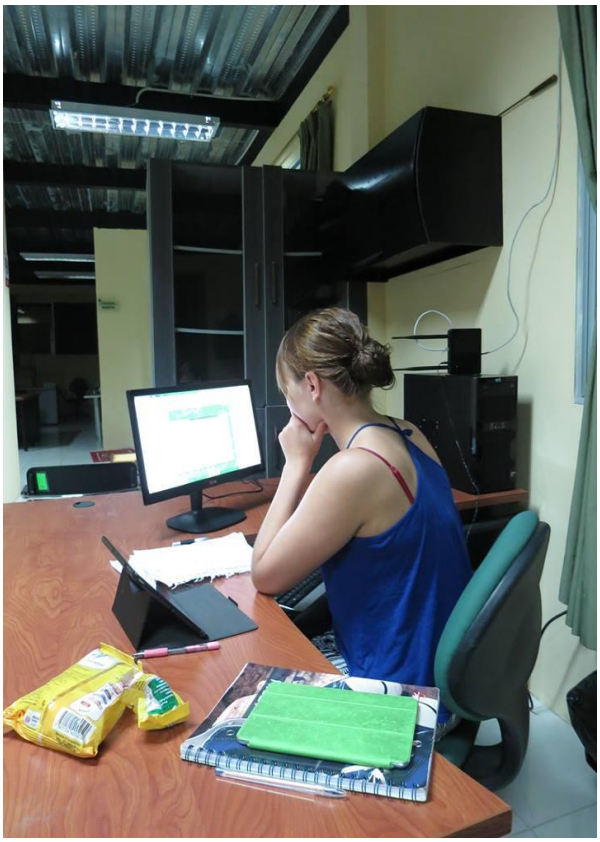
A school building in the Ahuano Millennium School we visited (Anu Häkkinen 2015)

DAY 10. Tuesday 27.10.2015

Meri Lindholm

Time to prepare our presentations! Tuesday was a very long day. We had lots of data and only short time for analysis. We also had to prep our group about our study's basic concepts once again. All the groups started early in the morning as soon as the students from UEA arrived and worked until midnight, some groups even longer. We had rehearsal seminar in the afternoon which proved to be valuable for getting feedback to improve our presentations. After hours of work it is easy to become blind for your own writing. I think that without practice and actual must to speak out loud the presentations we would not have performed so well next day.

This day was really about good group dynamics and communication. Every group managed to prepare presentations without a common language. It was gratifying to see how well group can perform just with google translator, good humor and long nerves. Ability to laugh for mistakes was really needed, because we came by many misunderstandings that led to useless work done. Some of the students were also ill which gave a nice touch. Still the hardest part of the day was not communication. The most difficult thing was to decide when the presentation was good enough to be ready.



Working hard for the seminar at CIPCA (Joona Koskinen 2015)

We also found that taking a creative pauses really help with motivation and improves quality of work. Our group's choice was to go fishing. We didn't really catch any fish, but we spent few hours joking in the river bench and watched sunset before last night's dinner – and before long night of work!

DAY 11. Wednesday 28.10.2015

Olga Hagström

This was the day we're all been preparing for the whole course, the final day of the fieldwork phase and the day of presenting the outcomes of our research! In the morning we headed to the Universidad Estatal Amazónica for the seminar. First we thought there wouldn't be lot of people, but then the auditorium started to fulfill with students, teachers and guests. I bet every one of us was quite nervous. I personally was a lot, not the least for the reasons of still preparing the presentation until the last minute.

Every group's presentation was dazzling good! It was great to hear what people has been doing the whole week and to realize how much everybody had accomplished including ourselves. It felt also nice when the commentators told how good job we had done and how important our themes were. It's a pity that again here we collided to the language barrier and most of us don't have any idea what the commentators said. I was so exhausted that I couldn't really follow all of it either. There was some critique too, but luckily we had Paola to explain the parts we couldn't bring forward in the presentation. The commentator for our group was Lineth Fernández (academic director), for the culture group Rosaura Gutiérrez (university professor), for the hydroelectricity group Ruth Arias (university professor) and for the forest group Elisa López (relations management for community). Additionally, Jacob Aguila from the audience made many comments. Because of the time constraints we had to keep our talks reduced; and because of the language difficulties, we could not respond to comments as much as we would have liked to. On the other hand in retrospective I bet the audience would have fallen asleep if the presentations were longer, especially with all the translations.

After the seminar I bet everyone was as relieved as me and after saying goodbye to our fellow group members from the Uni Amazónica we headed to have some vacation time in Oyacachi. We were lucky and got the bus from the Uni to take us near Oyacachi and from there we continued with the bumpy *camionettas* to the destination. When arriving everyone was tired and already ready to bed.

Final seminar at UEA (unknown photographer)

DAY 12. Thursday 29.10.2015

Marika Rönnberg

Everything looks different in the morning with sunlight. That was the first lesson of the first day in Oyacachi. We had arrived there the night before when it was already dark, and we didn't really know what to expect. The morning was damp and cold but the sun came up eventually, although the day remained somewhat rainy and cloudy.

Oyacachi is located in the mountain region and the elevation was around 3200 meters above the sea surface. The altitude had a big impact on the physical performance, climbing up a hill felt a lot more difficult than few days ago in Santa Clara. The place looked slightly central European, mainly because of the mountains and the wooden huts. The trees had some sort of beard moss or lichen in their trunks. There were also a lot of cows and come calves, and metallic jugs on the sides of the roads, presumably for collecting the milk.

Views from Oyacachi (Marika Rönnberg 2015)

There were several landslides around the village, a big one had taken place in summer 2015 right in the center of the village, and there were several marks of it. A small group of us were living in the center of Oyacachi, which was about two kilometers from the others' cabins. Right next to our cabin there was a large scar from the big landslide of the summer. A few houses were also being rebuilt. The actual course was over and the time in Oyacachi was used in other ways than studying, because as we had learned, field work can be quite consuming. After almost two weeks of intense (brain) work everybody was quite tired. One of the biggest attractions was the thermal spa, which had two pools open. The water was fairly hot and that was really excellent as the weather was quite the opposite. Most of the group went to swim around noon, but some went hiking and saw some alpacas among other things. The day ended with some card playing.

DAY 13. Friday 30.10.2015

Aino Ropponen

We woke up to an absolutely gorgeous morning in Oyacachi and started our way back to Quito. The visibility was great and we had stunning, and apparently also rare views to Cayambe and Antisana volcanoes from the pick-up van on which we were travelling. The views reminded of the landscapes many of us had seen before around the Alps, in China, or even in Lapland. This was an interesting contrast to the confusingly rugged and lush terrain we had seen before in Quito-Mindo or in Puyo-Oyacachi travels.

We then stopped to the "real" GNSS (Global Navigation Satellite System) measured Mitad del Mundo. I had shivers going through my body when I realized I was standing one leg on the northern and one leg on the southern hemisphere. I had not known that the equator is the only place to observe the whole of the starry sky. We were told about the importance of the equatorial location to the Ecuadorians, but it makes a lot of sense considering how much Finns emphasize the importance of the northern location to their identity. It is also interesting how much the sun's "movement" has had part in many religions. We also discussed about the possibility of using east oriented maps especially in teaching the seasons. Would be quite radical if as a grandma I could tell the confused kids that in my time we used north oriented maps with Europe in the center!

In the evening we went for beers and a small group of us ended up in a really nice small live music bar. I spent my night dancing and chatting with a local boy who is graduating to be a music teacher and wants to support the kids learning indigenous music! As the last member of our group I walked with him and his two friends back home. This evening made me think about the safety issues and the importance of consideration in possibly dangerous situations. So far acting smart and trusting people has only led me to nice situations and getting to know good and interesting people, which was luckily the case also this time in Quito.

Views on the amazing Cayambe volcano spotted on the way from Oyacachi to Quito (Anu Häkkinen 2015)

DAY 14. Saturday 31.10.2015

Nina Miettinen

Few days ago we already lost few members of our group as they started heading towards Peru. Today is the last day of writing the travel journal, as the course officially ends and the rest of the group starts spreading to different directions. It feels comfortable writing this journal in Quito, after the first warm shower in two weeks. We have travelled from the Andean mountains down to the Amazon and back, always surprised of something on the way.

Market in Quito (Nina Miettinen 2015)

In my opinion, we have learned a lot about Ecuador but also about the research process, and group travel. In all three of them, flexibility is one of the key words. In Ecuador, timetables are flexible, as three hours can end up being seven. In a research process, one has to be able to change plans if there is new, controversial information being found. When travelling as a group, all the group members have to be ready to give up something for the benefit of the whole group. But money – that is not flexible. Receipts have to exist and match exactly everything that has been done. It was a relief to hand them all in this morning.

Last day at Casa Bambu in Quito (Nora Fabritius 2015)

During the field trip we faced some difficulties, especially in the beginning of the journey when the environment was new every day. Sometimes the amount of complaints combined with hunger and a long day felt unbearable. But in the end, during the last days in the CIPCA research station it seemed like everybody started to understand how things work in Ecuador. We were adjusting.

We have traveled as a group but in the end everyone had their own experience of Ecuador. Everyone will bring back home their own memories. As today was spent in the artisan market in Quito, everyone will also bring home some souvenirs, such as alpaca sweaters. Those will keep us warm, as we leave the equator and return to Finland.

GEOTIETEIDEN JA MAANTIETEEN LAITOS C12, HELSINGIN YLIOPISTO

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