IWA-IDB INNOVATION CONFERENCE ON SUSTAINABLE USE OF WATER: CITIES, INDUSTRY AND AGRICULTURE

Peatlands reduction in water recharge areas in the Chimborazo Reserve (Ecuador)

Patricio Lozano Rodríguez

October 01, 2019

CONTENTS

INTRODUCTION

Páramo form an eco-region
Neotropical height, between the limit superior forest and perpetual snow

Páramo in South America form an ecological corridor from Venezuela (Mérida) to Peru (Huancabamba).

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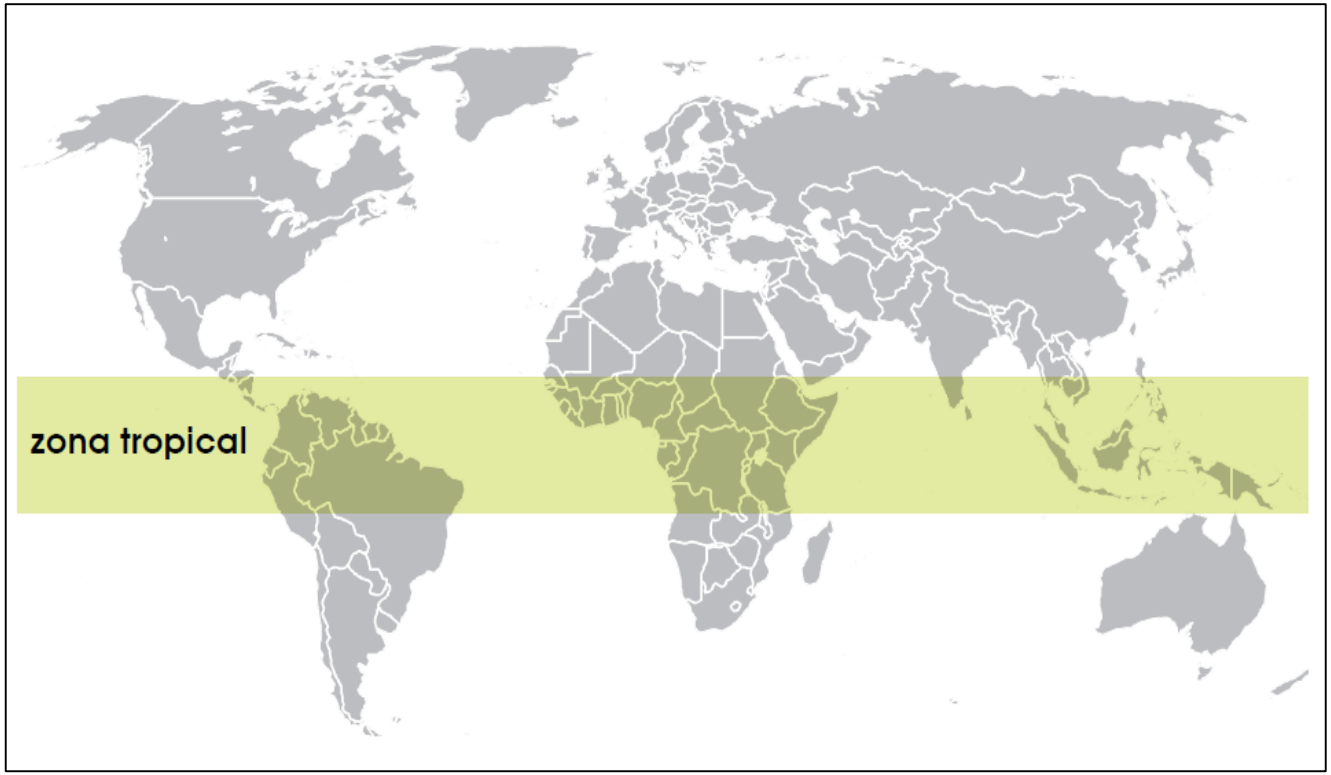

Source: Vargas & Velasco-Linares, 2011

Source: (Hofstede, Segarra, & Mena, 2003)

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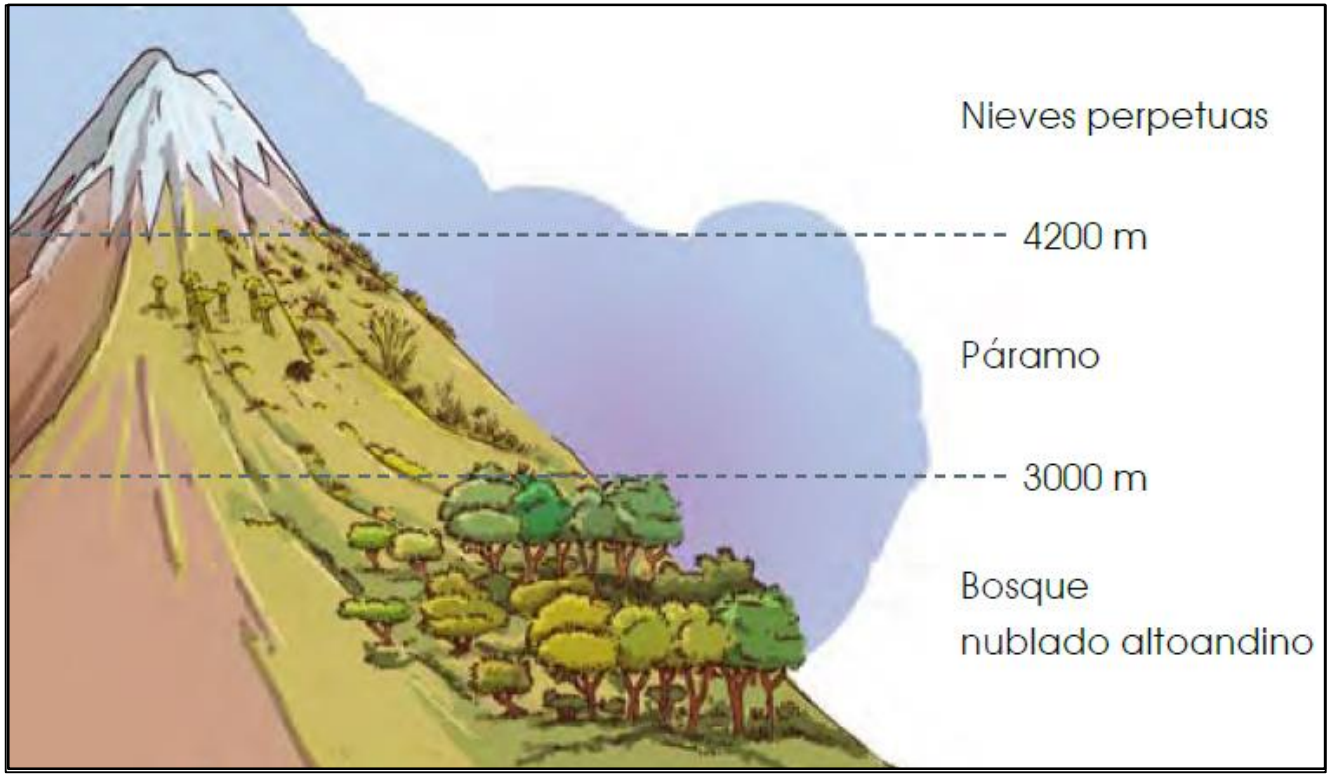

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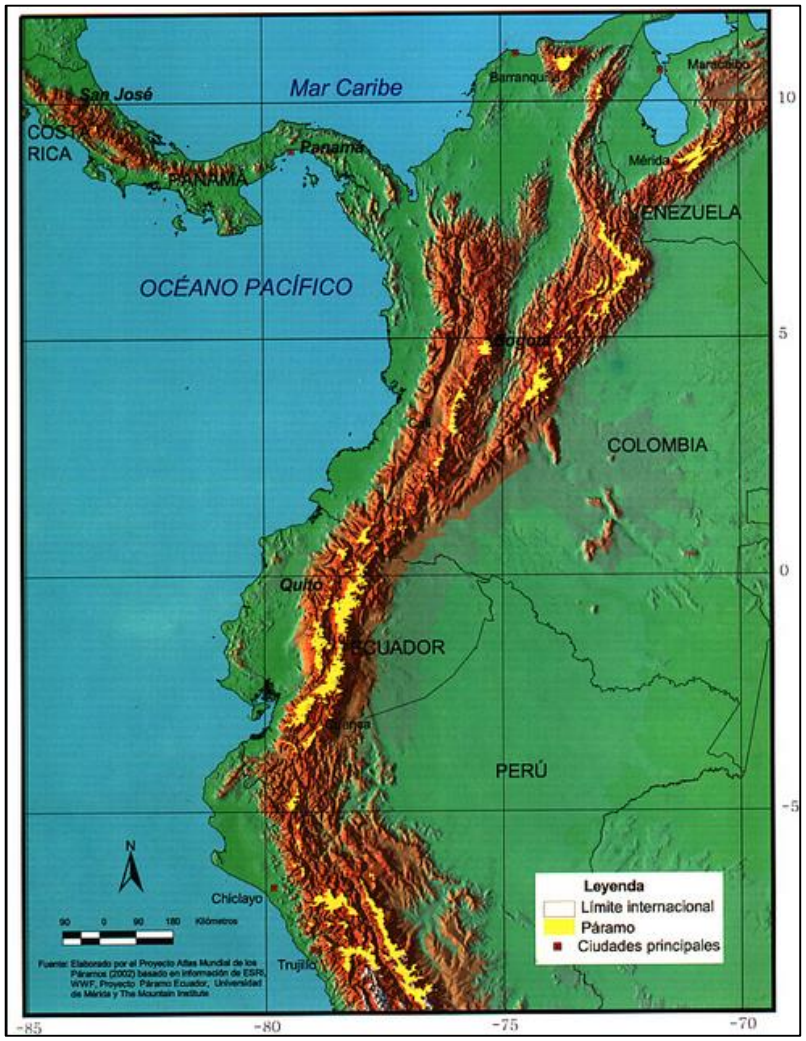

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INTRODUCTION

Created: 1987

Extension: 52,683 ha

69% community

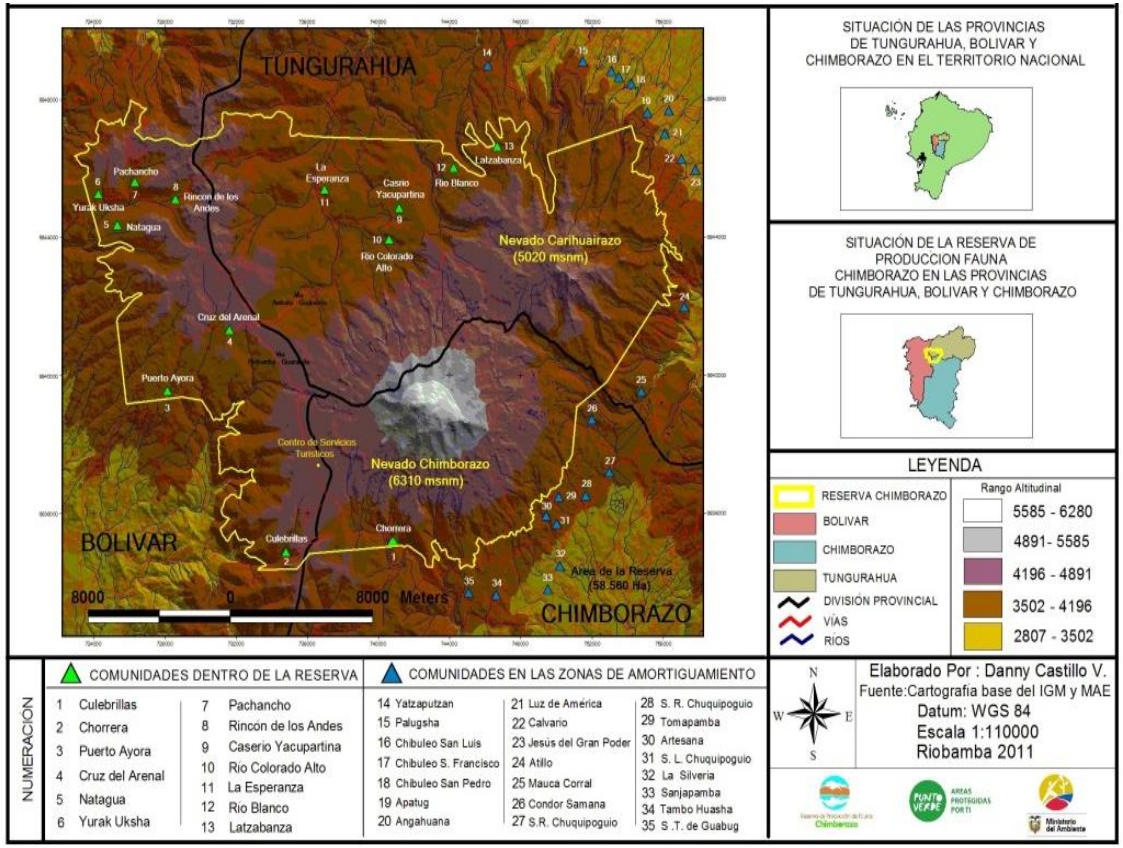
28% private

4% state

Villages: 3

8 ecosystems

Herbazal húmedo montano alto superior del páramo



Ecosystem services:

Provide: Water

Regulation: Weather, Water

Support: Biomass

Cultural: Investigation, tourism
Sense of identity

- Source: ESPOCH, 2015

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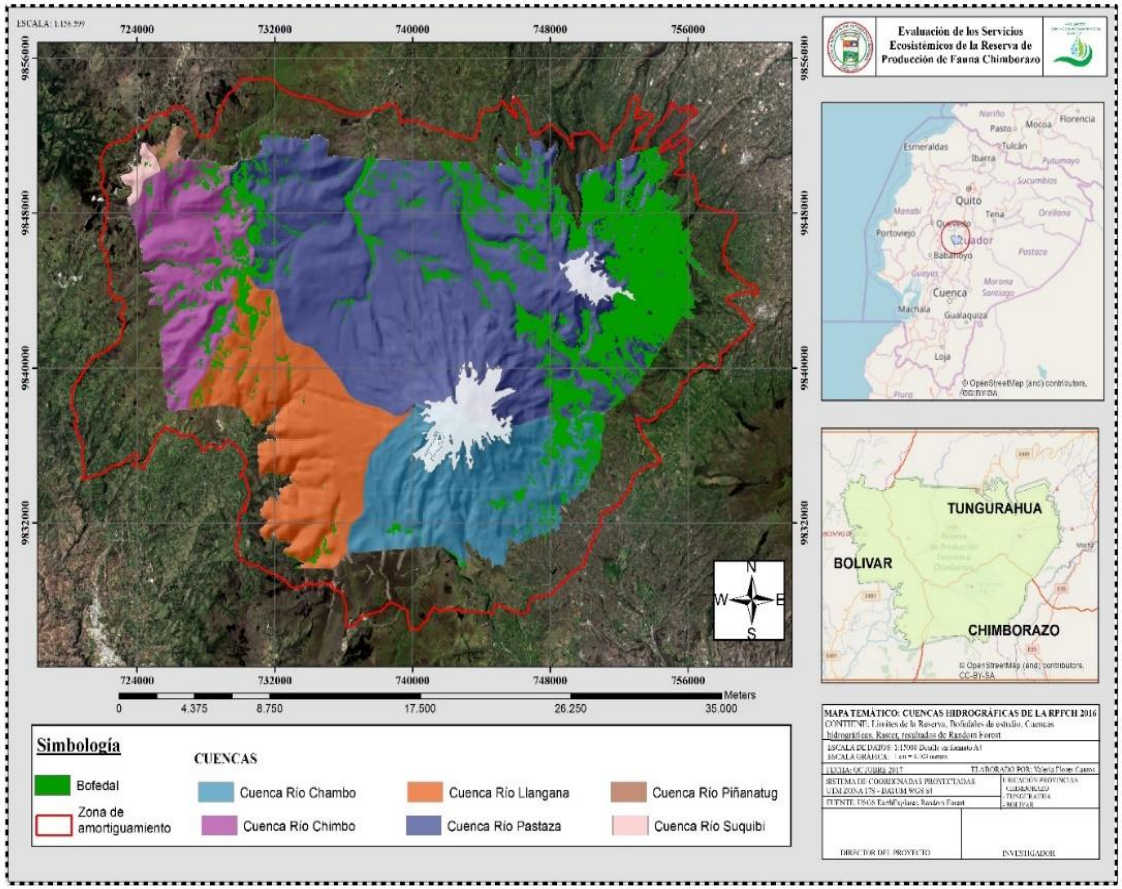

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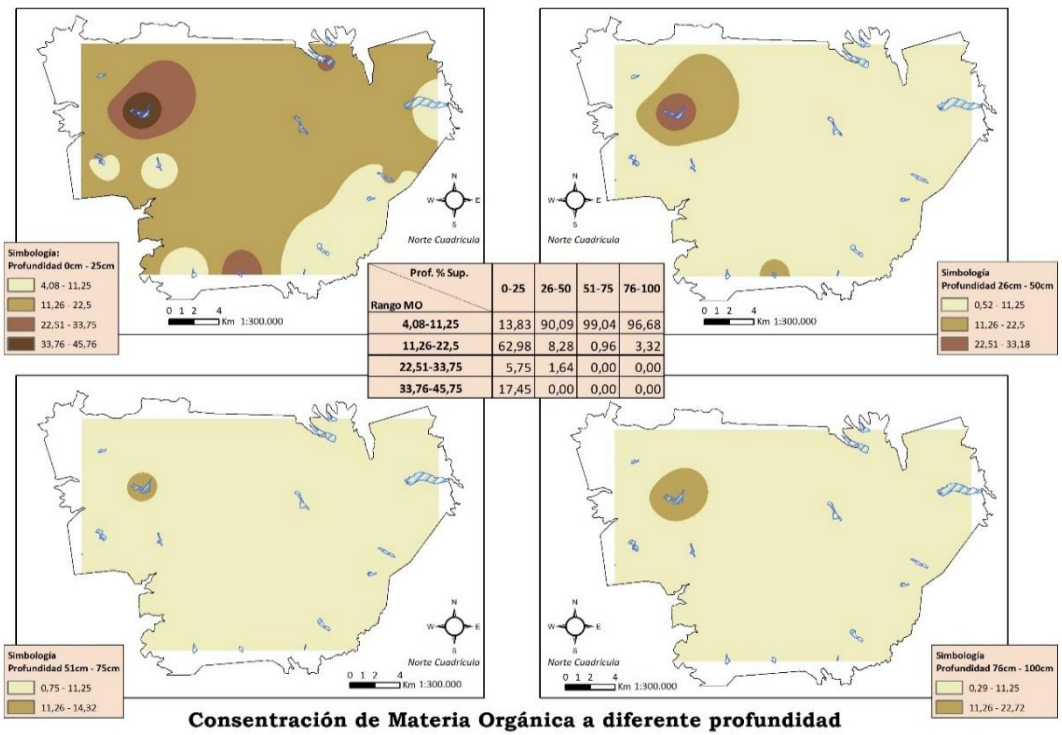

Rango MO \ Prof. % Sup.	0-25	26-50	51-75	76-100
4,08-11,25	13,83	90,09	99,04	96,68
11,26-22,5	62,98	8,28	0,96	3,32
22,51-33,75	5,75	1,64	0,00	0,00
33,76-45,75	17,45	0,00	0,00	0,00

Consentración de Materia Orgánica a diferente profundidad

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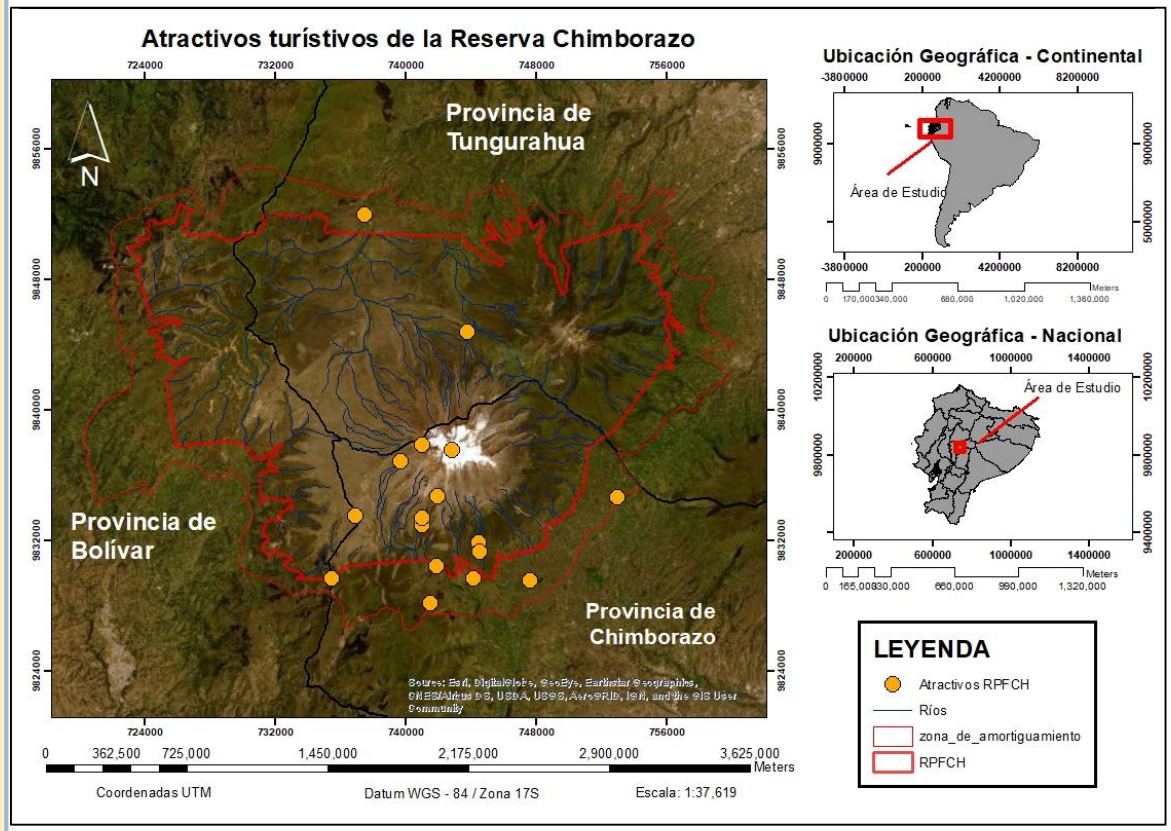

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- Source: ESPOCH, 2015

INTRODUCTION

Hydromorphic or udic water regime (75%)

Mesic or ustic hídrico water regime (25%)

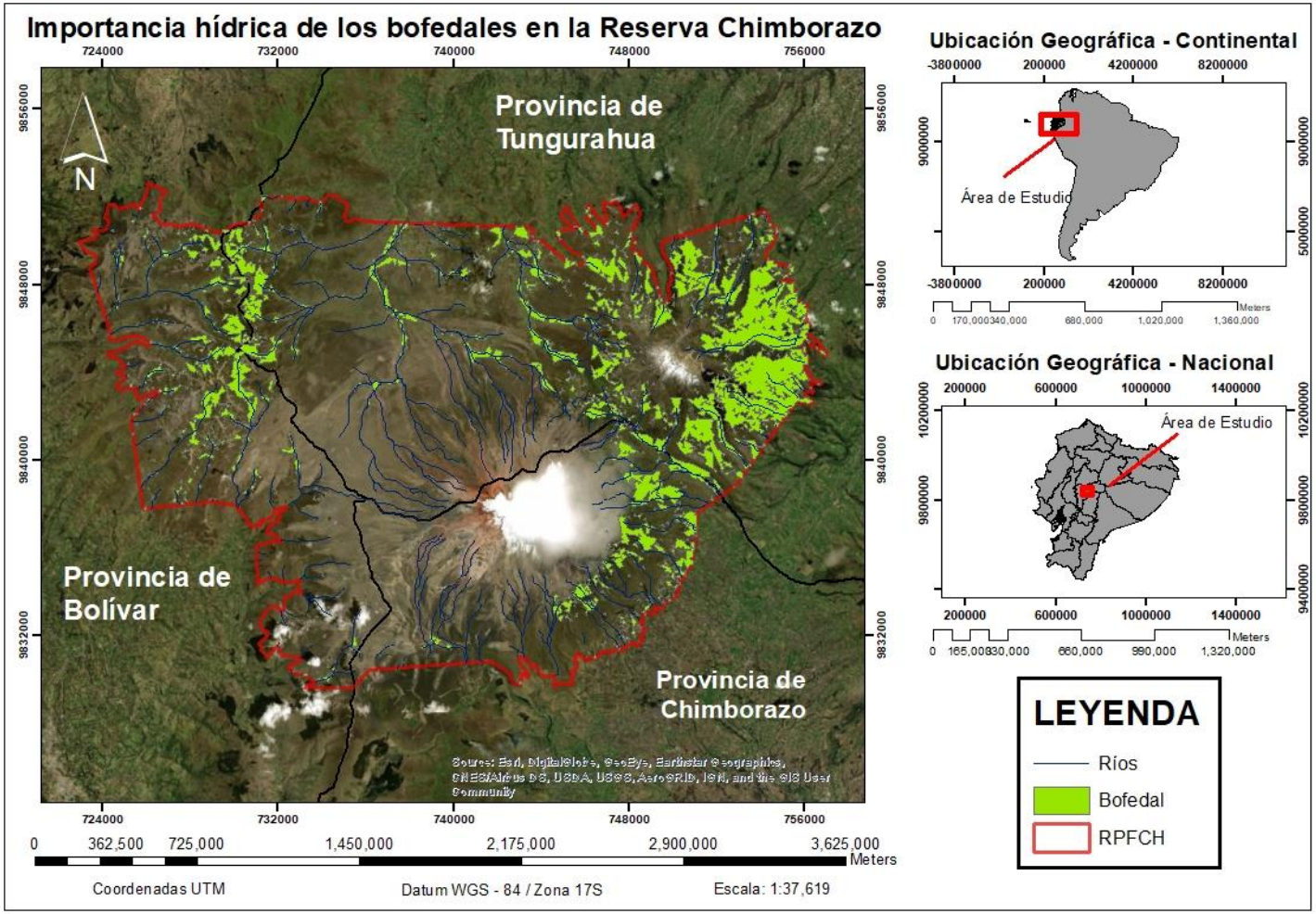
- Source: ESPOCH, 2015

INTRODUCTION

The hydrological complex is born in the glaciers of the snowy Chimborazo and Carihuairazo

90% of the water in the reserve are tributaries of the Pastaza River that feed the Amazon basin

Water is used for human consumption, agriculture, livestock production, and hydroelectric

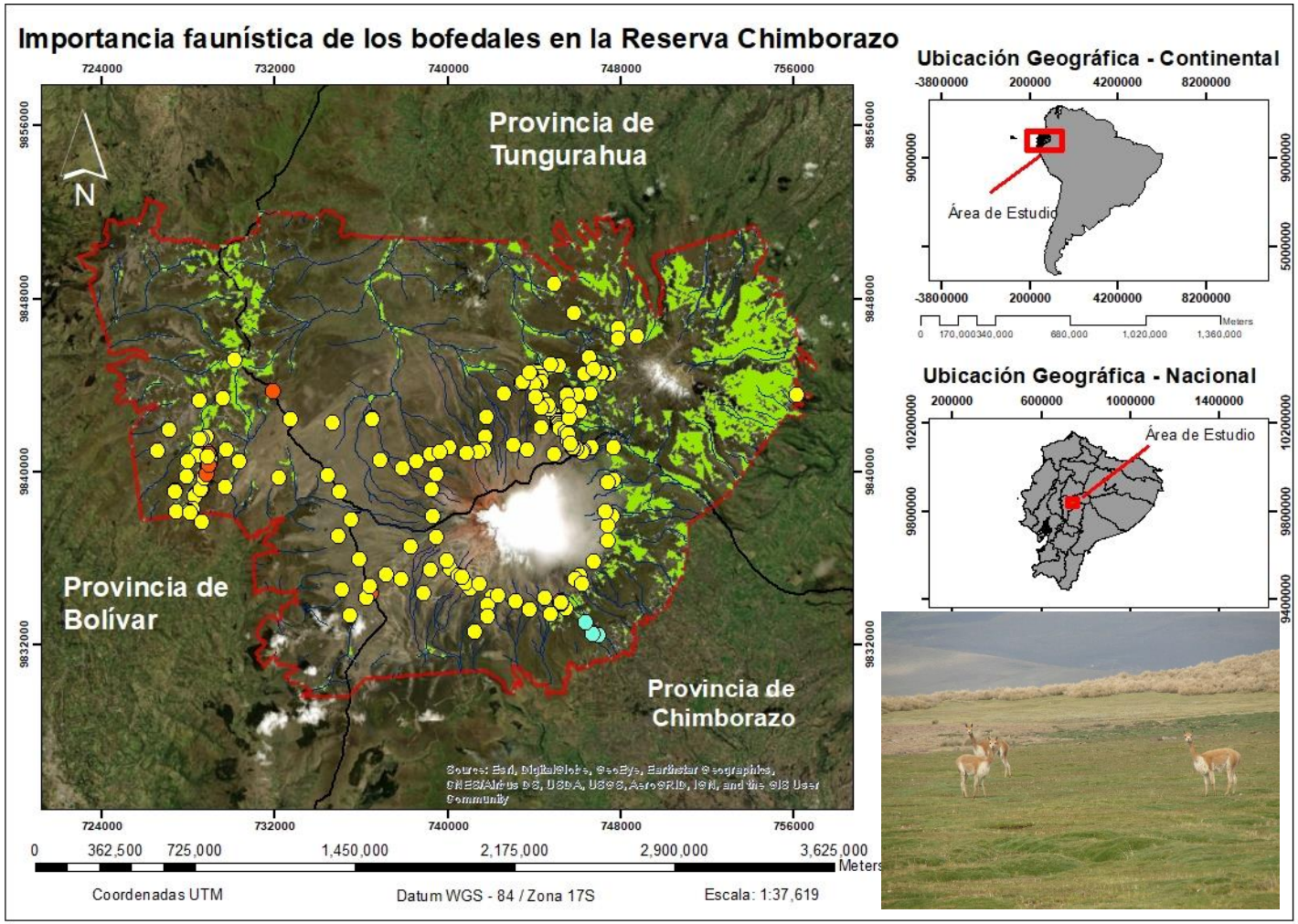


Source: ESPOCH, 2015

INTRODUCTION

<u>Birds:</u>
Taxa_S: 32
(N) Individuals: 596
(1-Lambda')
Simpson_1-D:
0,9494
(H'(loge))
Shannon_H: 3,248
(d) Margalef: 4,851

<u>Mammals:</u>
Taxa_S: 6
(N) Individuals: 332
(1-Lambda')
Simpson_1-D:
0,6905
(H'(loge))
Shannon_H: 1,34
(d) Margalef:
0,8613



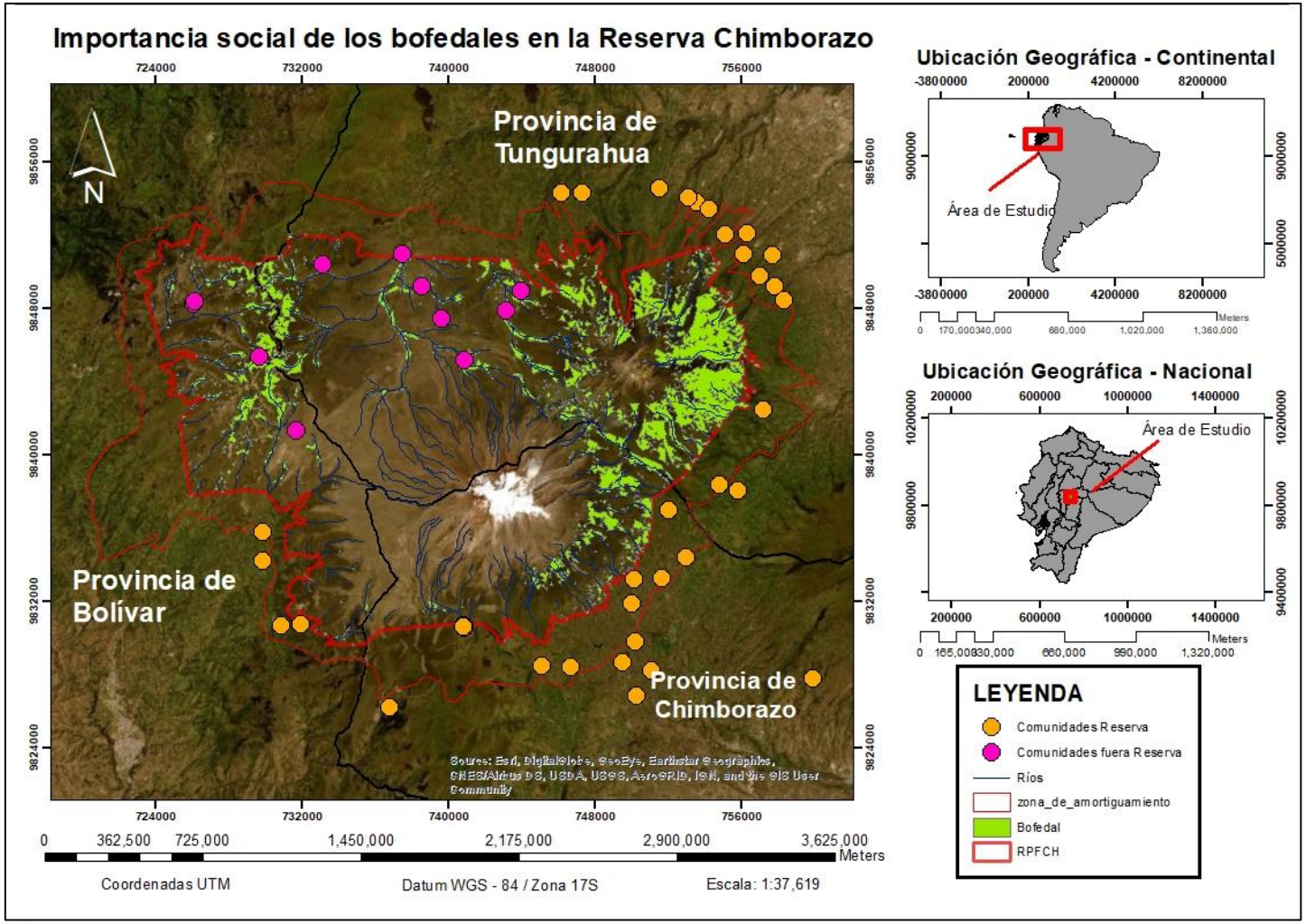
Source: ESPOCH, 2015

INTRODUCTION

There are 15 communities in the reserve and 35 in the area of influence

There are 689,426 inhabitants that are located in Guaranda, Ambato, and Riobamba

70% do not know the origin of the water they consume



Source: ESPOCH, 2015

OBJECTIVES

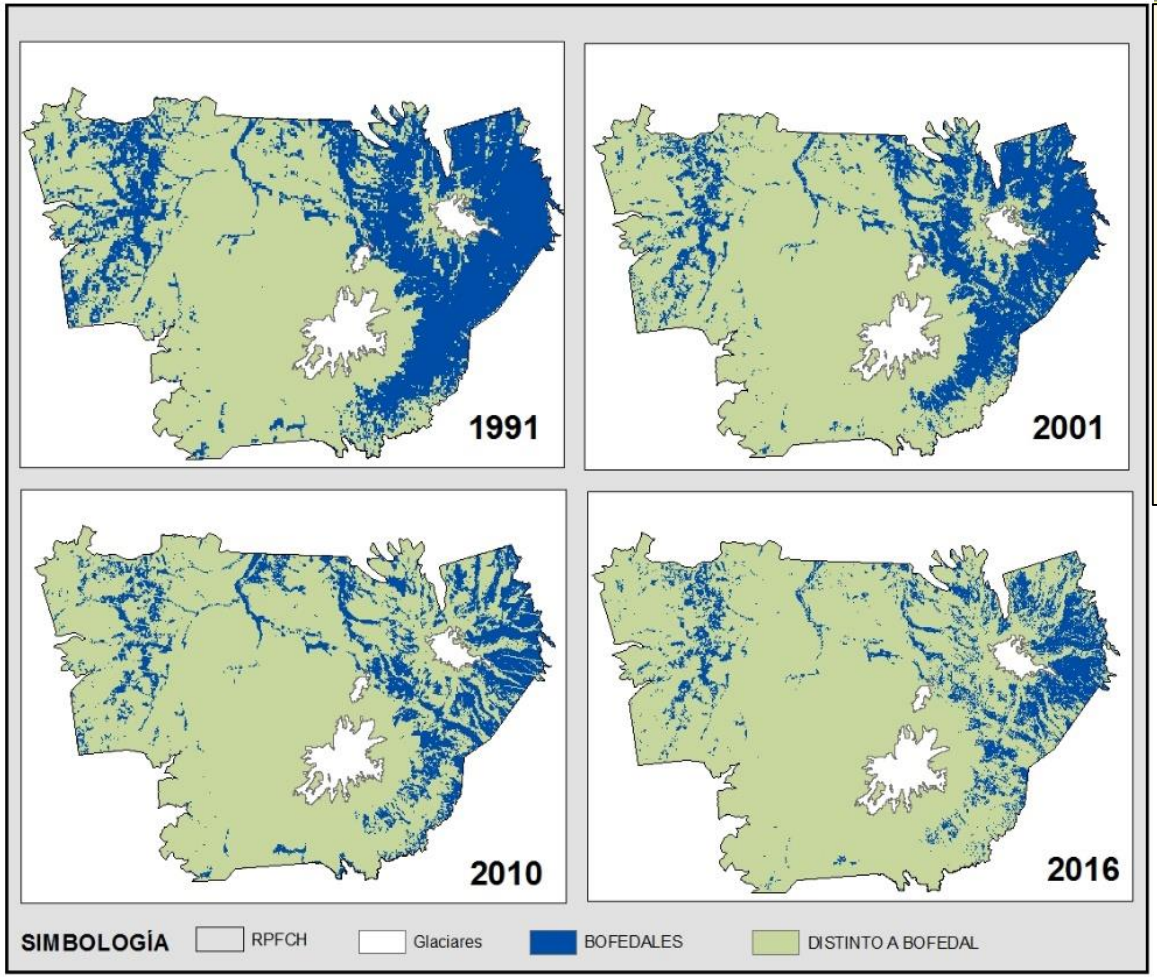
Determinate the peatlands reduction in water recharge areas in the Chimborazo Reserve

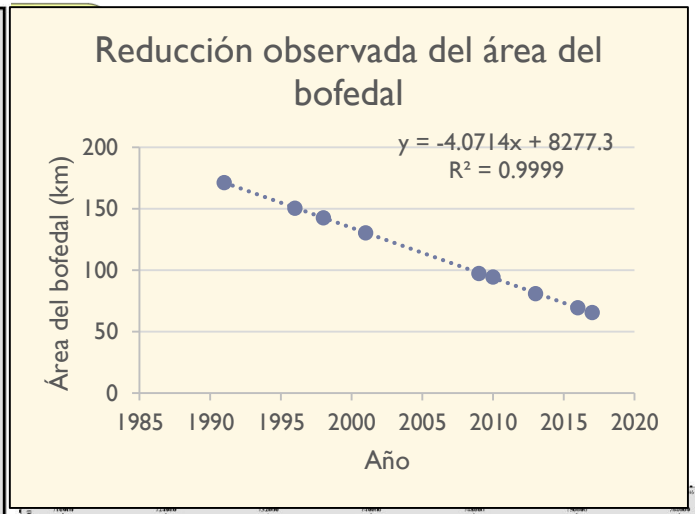
Analyze the temporary decrease of peatlands in the Chimborazo Reserve.

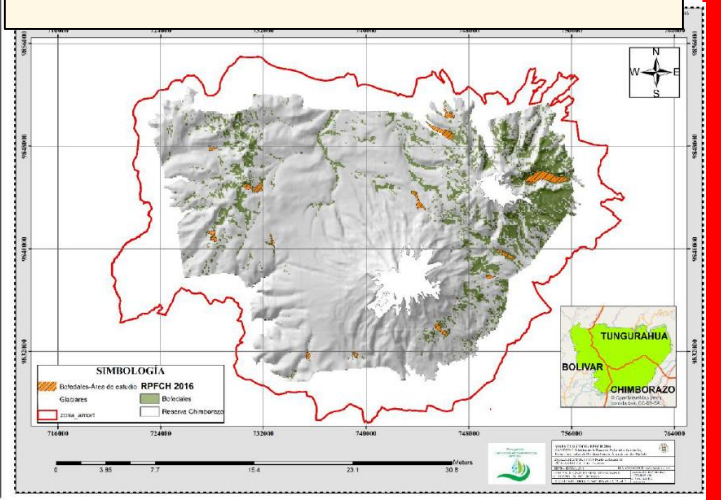
Identify peatlands areas in the Chimborazo Reserve

- Source: ESPOCH, 2015

OBJECTIVES







- Source: ESPOCH, 2015

METHODOLOGY

Identify peatlands areas in the Chimborazo Reserve

- Obtaining information in territory
- Information structuring
- Generation of predictor trees
- Application of the predictive model

Source: ESPOCH, 2015

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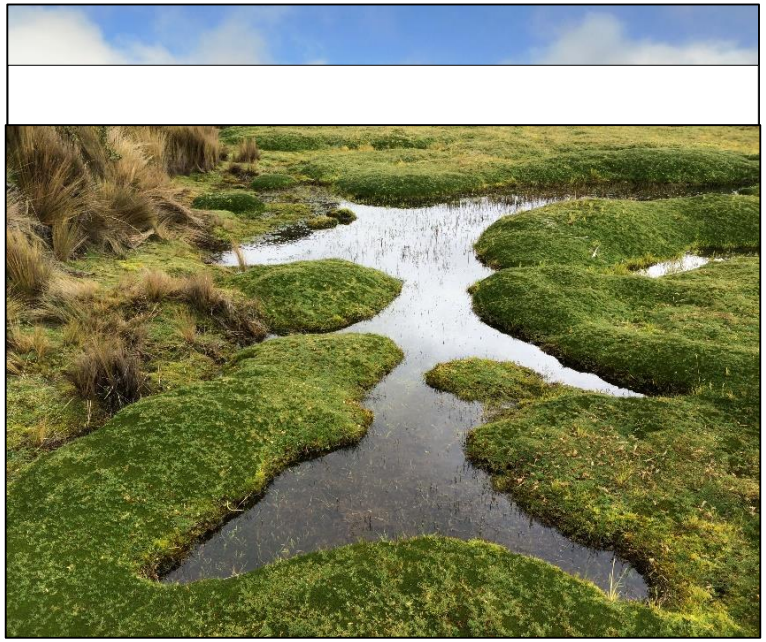

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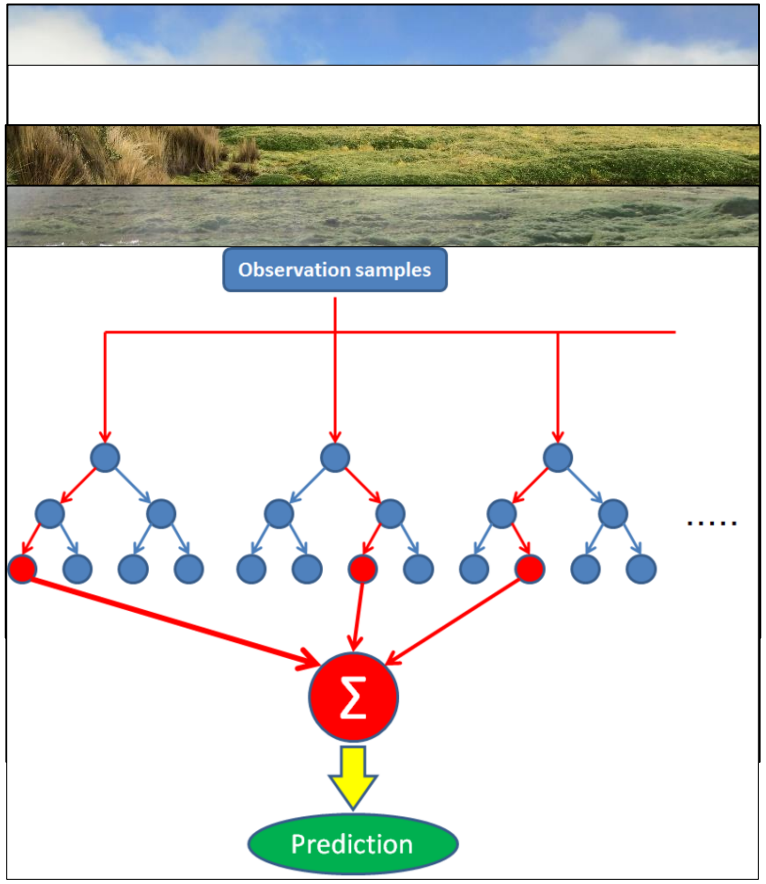

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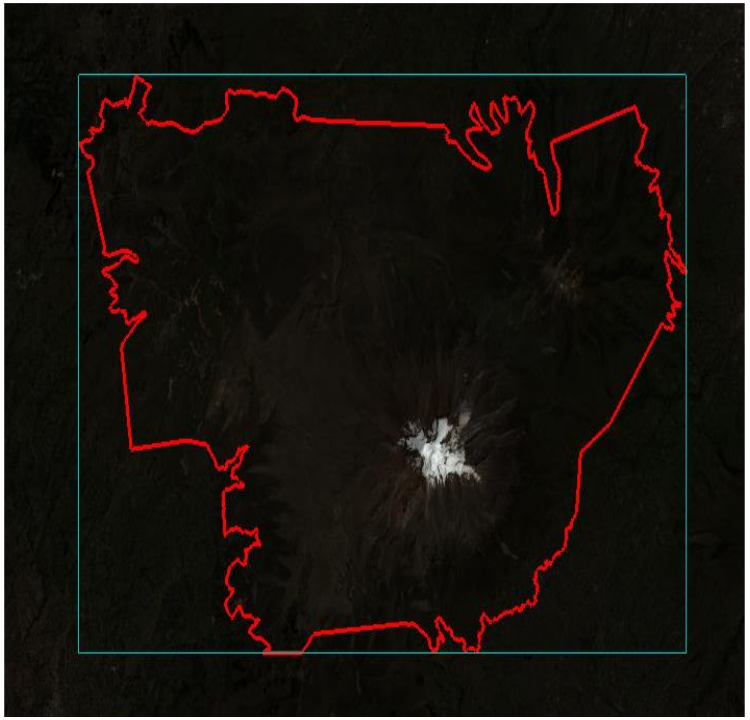
Analyze the temporary decrease of peatlands in the Chimborazo Reserve

- Obtaining satellite images
- Satellite image treatment
- Application of the predictive model for each year of analysis (26 years)
- Reduction analysis observed and projected



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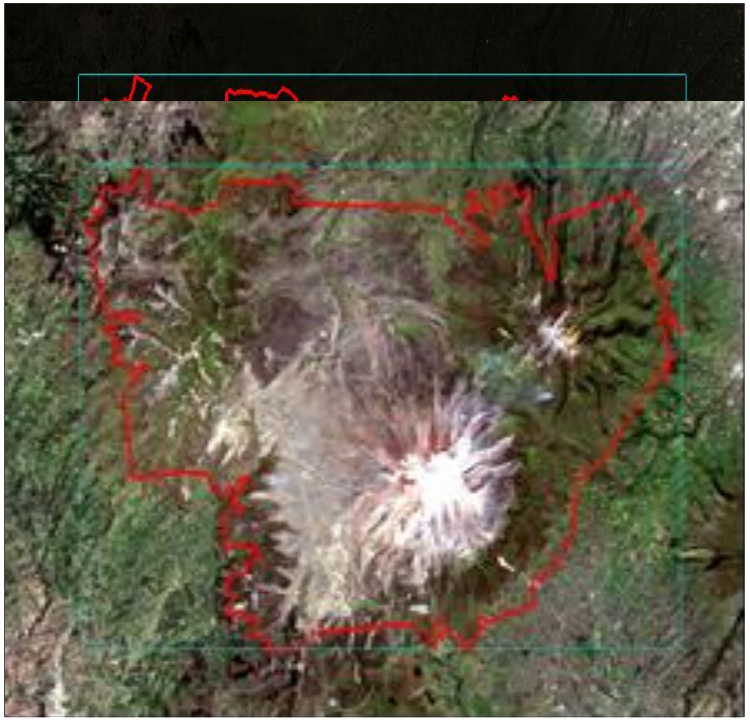

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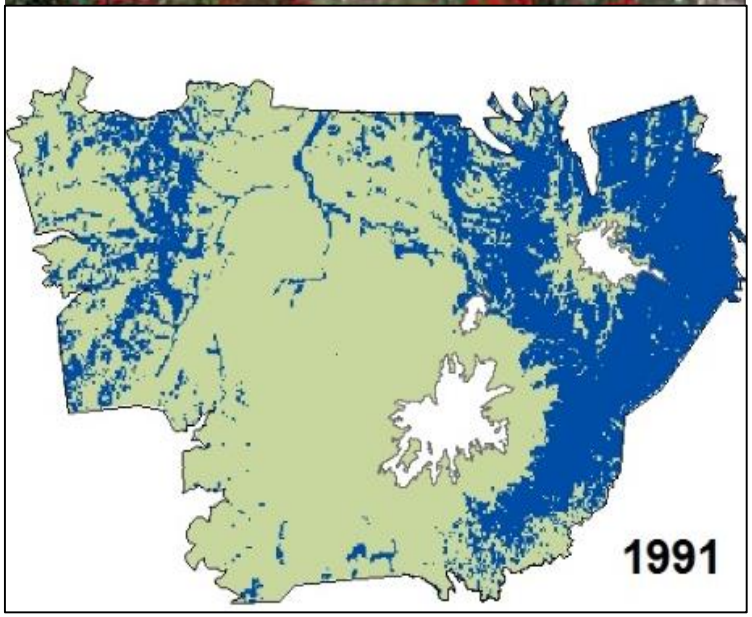

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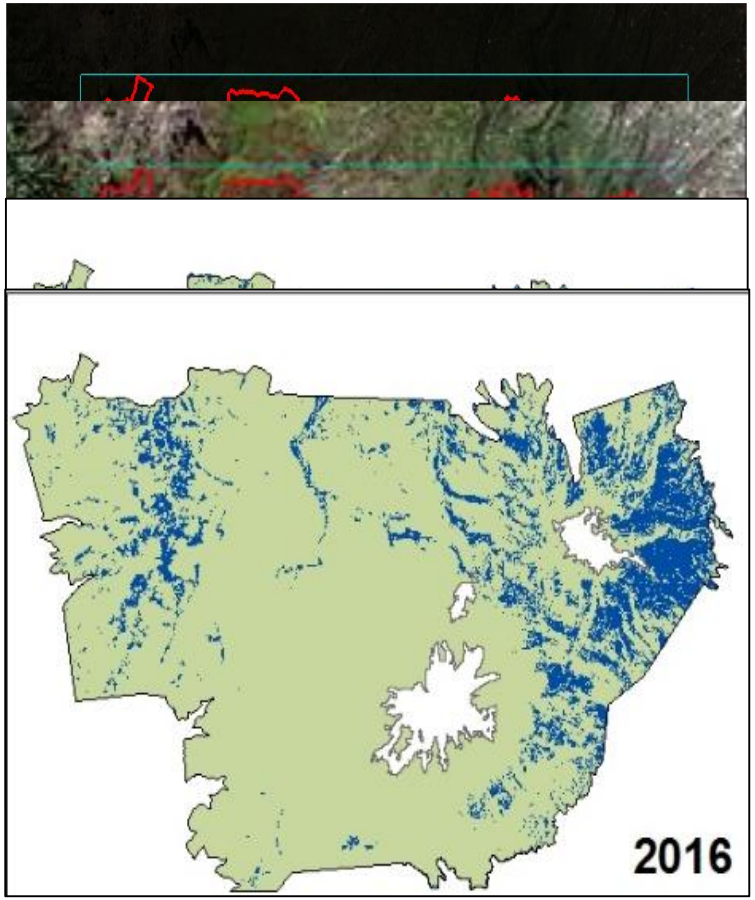

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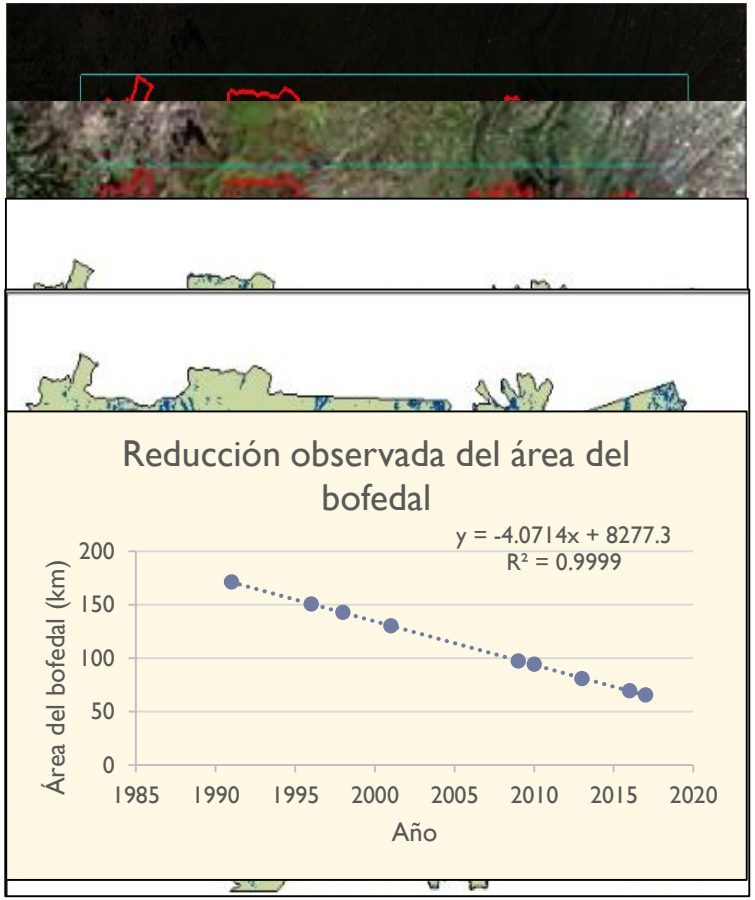

Source: ESPOCH, 2015

RESULTS

Identification peatlands areas in the Chimborazo Reserve

DESCRIPTION		Prediction – Category			
CATEGORY	LEVEL	1991	1996	1998	2001
Peatlands [1]	Peatlands	41	39	178	178
Different from peatlands[2]	Different from peatlands	30	30	168	97
TOTAL PIXELES		71	69	346	275
Average correct percentage		95.89%	94.49%	98.55%	100%
Overall percentage of correct		95.77%	94.20%	98.55%	100%

DESCRIPTION		Prediction – Category			
CATEGORY	LEVEL	2009	2013	2016	2017
Peatlands [1]	Peatlands	170	178	178	178
Different from peatlands[2]	Different from peatlands	70	157	106	97
TOTAL DE PIXELES		240	335	284	275
Average correct percentage		99,29%	97.64%	98.21%	98.81%
Overall percentage of correct		99.58%	97.61%	98.24%	99.33%

- Source: ESPOCH, 2015

RESULTS

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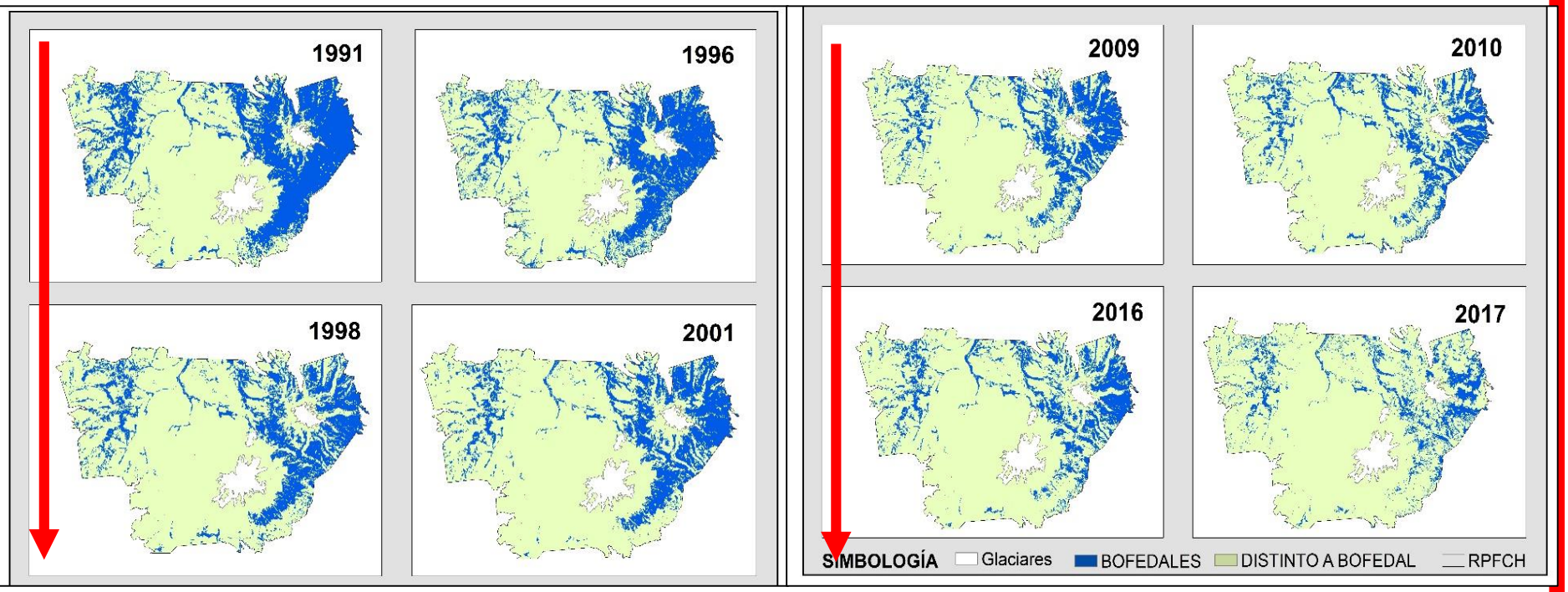

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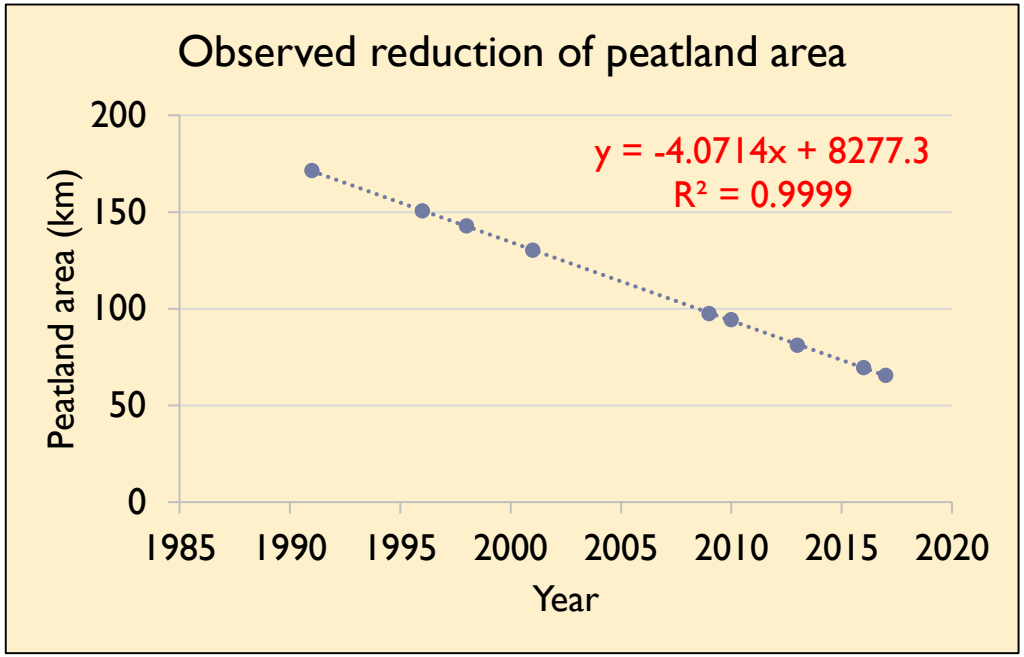

Estadísticas de la regresión	
Coeficiente de correlación múltiple	1,0000
Coeficiente de determinación R^2	0,9999
R^2 ajustado	0,9999
Error típico	0,3826
Observaciones	9

Reduction: 4,0714 km per year (aprox.)

- Source: ESPOCH, 2015

RESULTS

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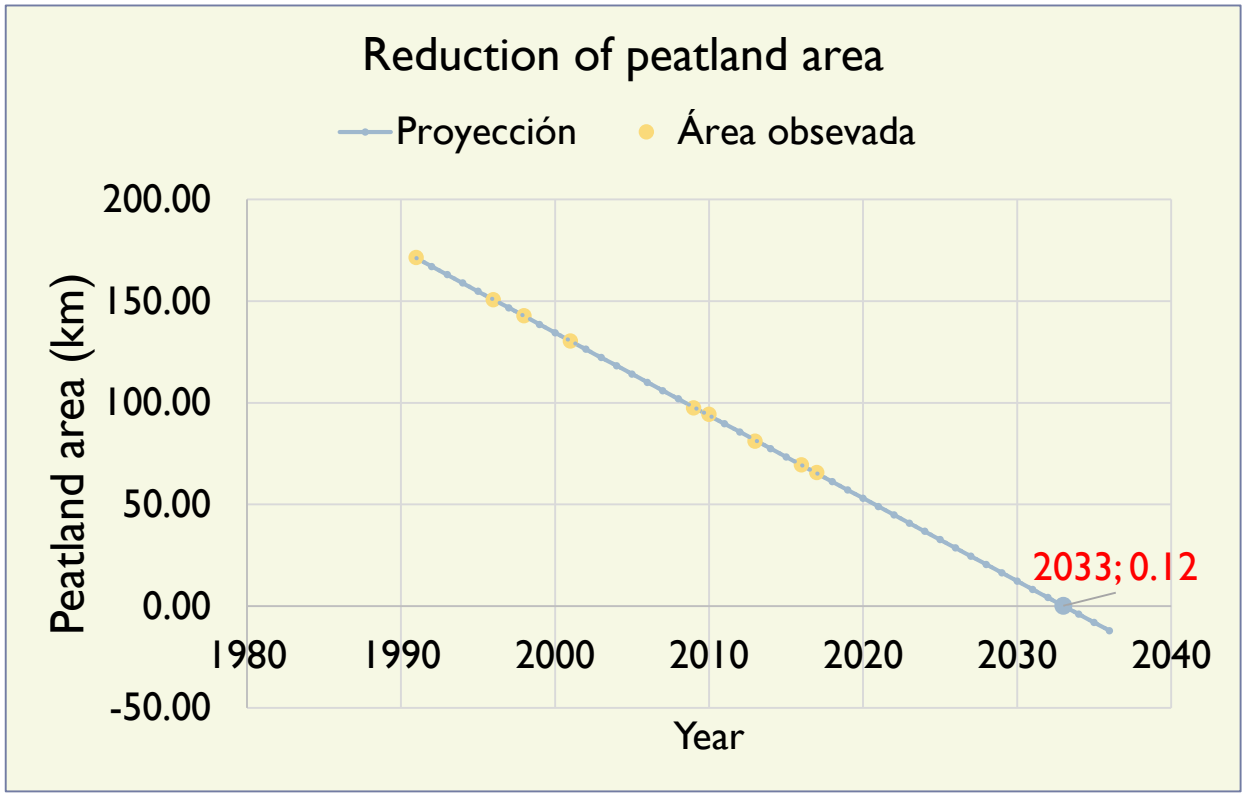

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Coeficiente de correlación múltiple	1,0000
Coeficiente de determinación R^2	0,9999
R^2 ajustado	0,9999
Error típico	0,4068
Observaciones	9

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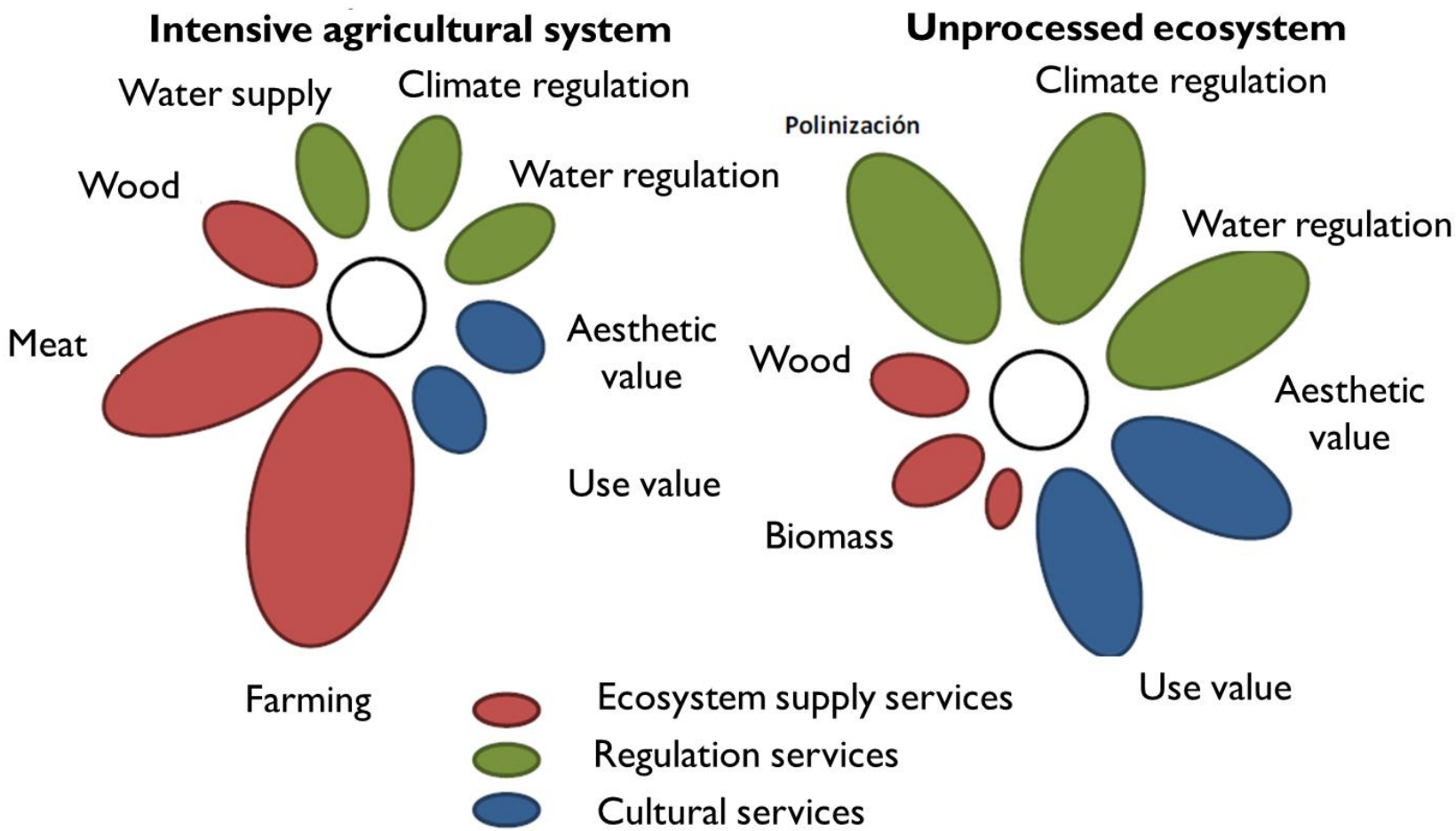
CONCLUSIONS



Source: Gordon et al. (2010).

- Source: ESPOCH, 2015


Thanks!!