




On thin ice – adapting water resources management to a vanishing mountain cryosphere

Integrated water management in high mountain ecosystems in Colombia

Natalia Acero Martínez
Water and cities Director
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RésEAU Shareweb
Water

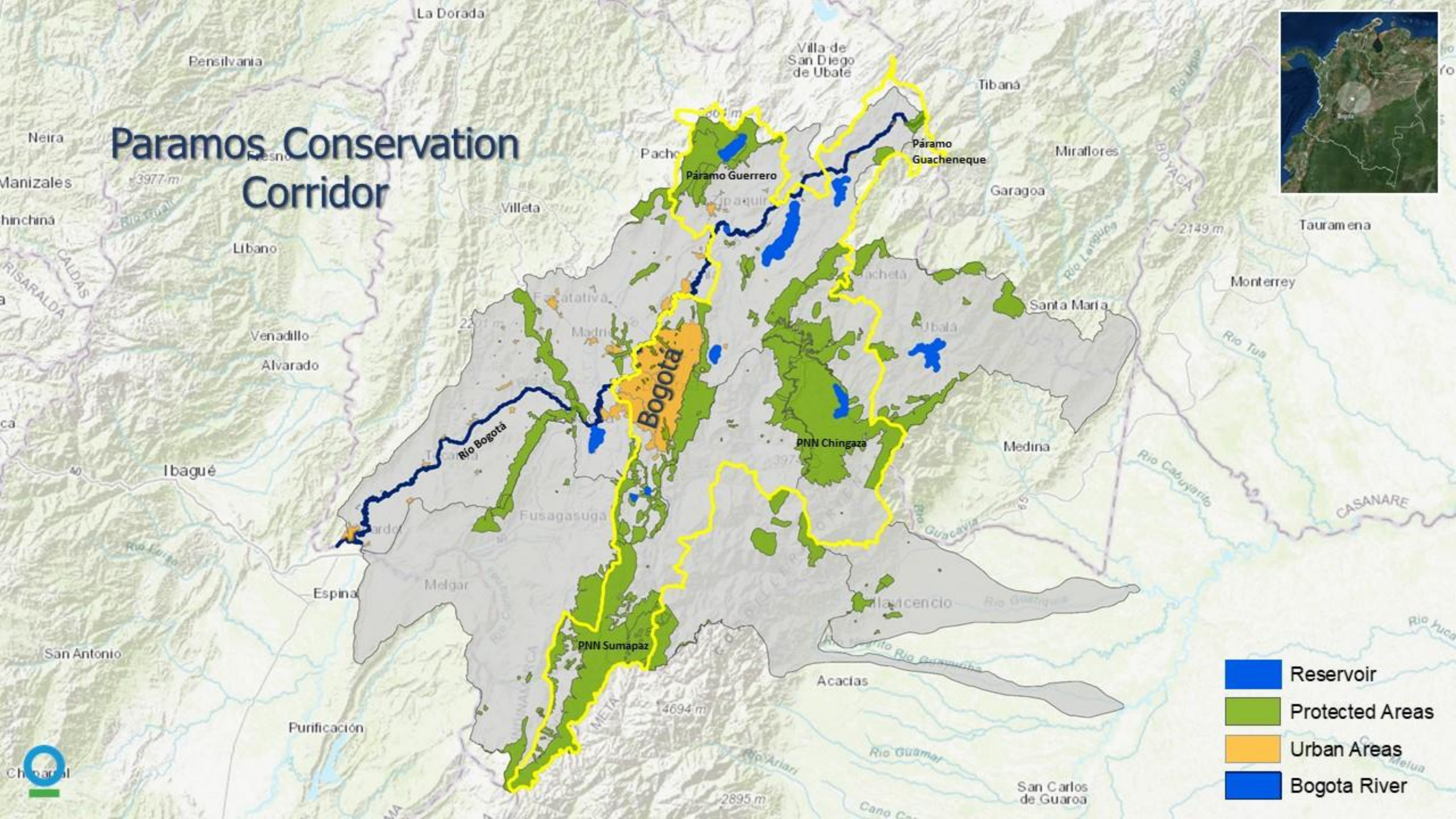
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Bogotá D.C

Paramos Conservation Corridor



- Reservoir
- Protected Areas
- Urban Areas
- Bogota River



A landscape photograph showing a mountain range in the background with a lake in the middle ground. The foreground is filled with a field of white flowers with yellow centers. The sky is overcast and hazy.

This región has a glacial heritage, with three major glacial events:

- A first glaciation whose dating has not yet been established,
- A second between 10,000 to 12,000 years B.C.
- A hird glaciation whose retreat began towards the 3,000 years B.C.

Which produced the disappearance of perpetual snows and ice caps of the region.

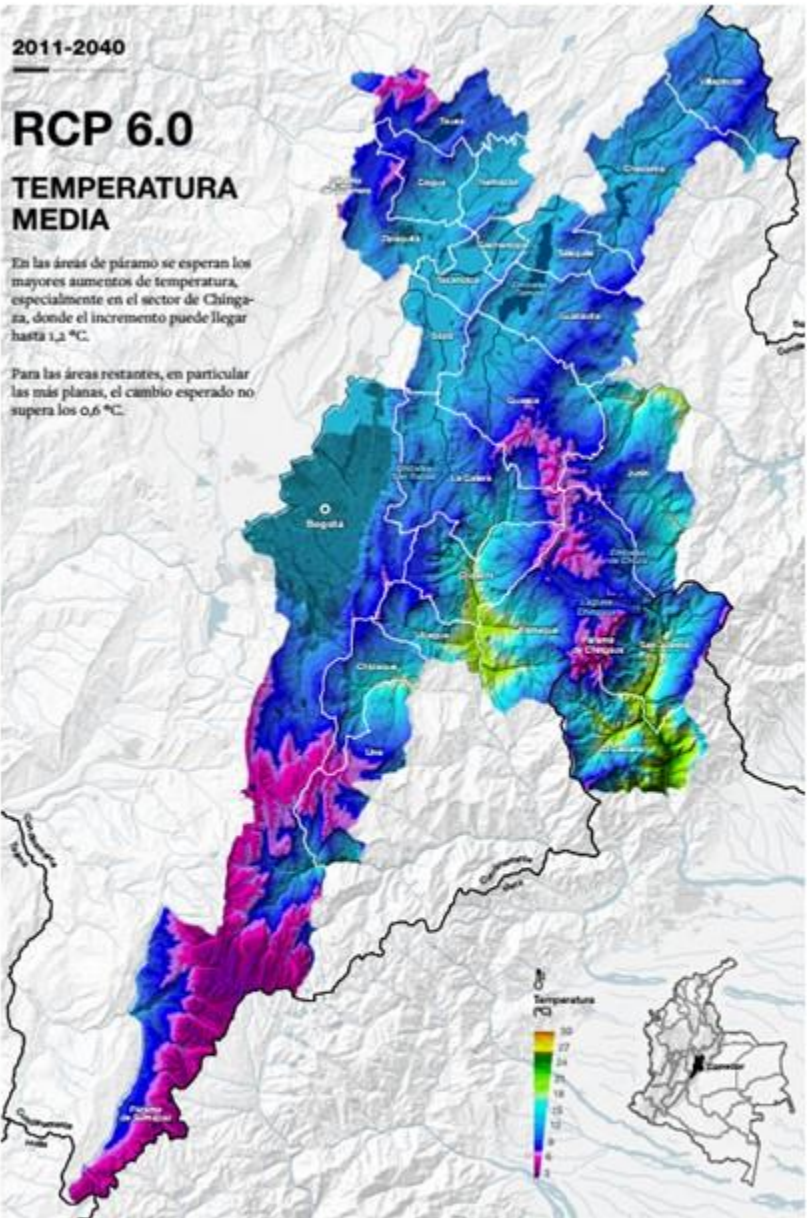


2011-2040

RCP 6.0 TEMPERATURA MEDIA

En las áreas de páramo se esperan los mayores aumentos de temperatura, especialmente en el sector de Chingaza, donde el incremento puede llegar hasta 1,2 °C.

Para las áreas restantes, en particular las más planas, el cambio esperado no supera los 0,6 °C.



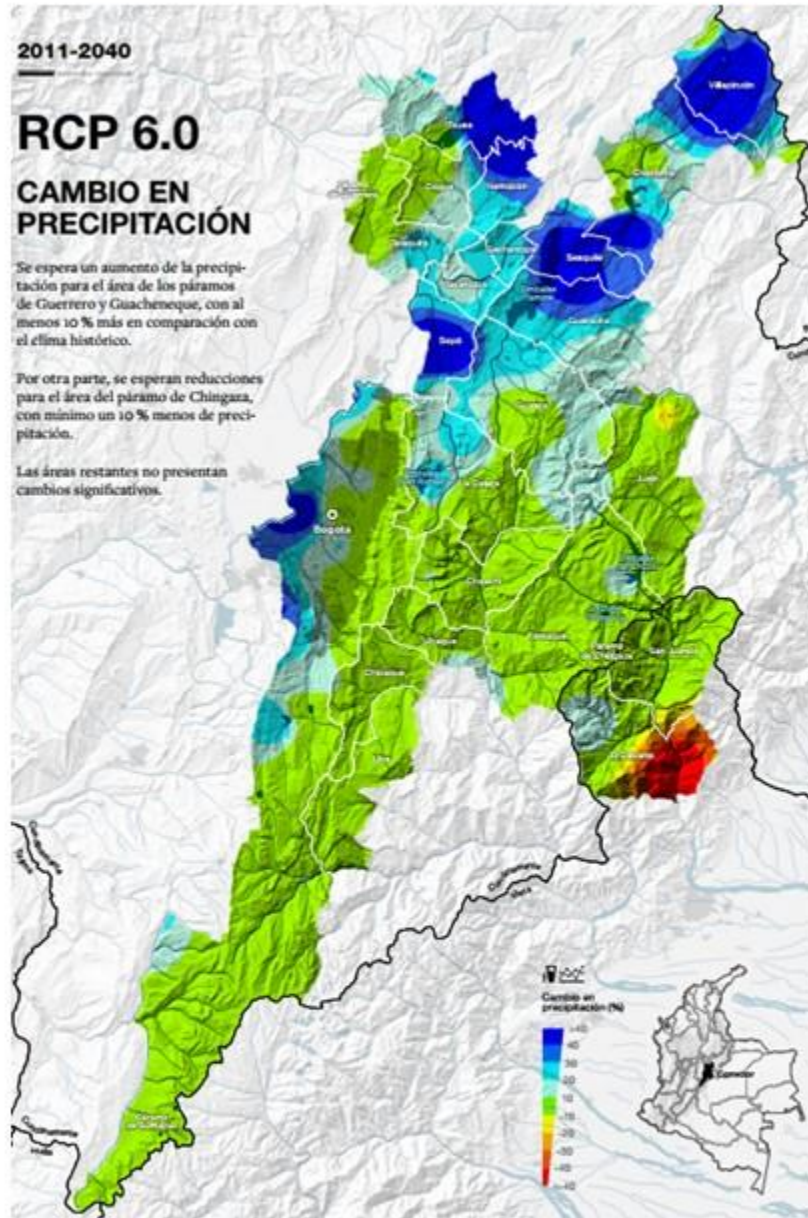
2011-2040

RCP 6.0 CAMBIO EN PRECIPITACIÓN

Se espera un aumento de la precipitación para el área de los páramos de Guerrero y Guachemeque, con al menos 10 % más en comparación con el clima histórico.

Por otra parte, se esperan reducciones para el área del páramo de Chingaza, con mínimo un 10 % menos de precipitación.

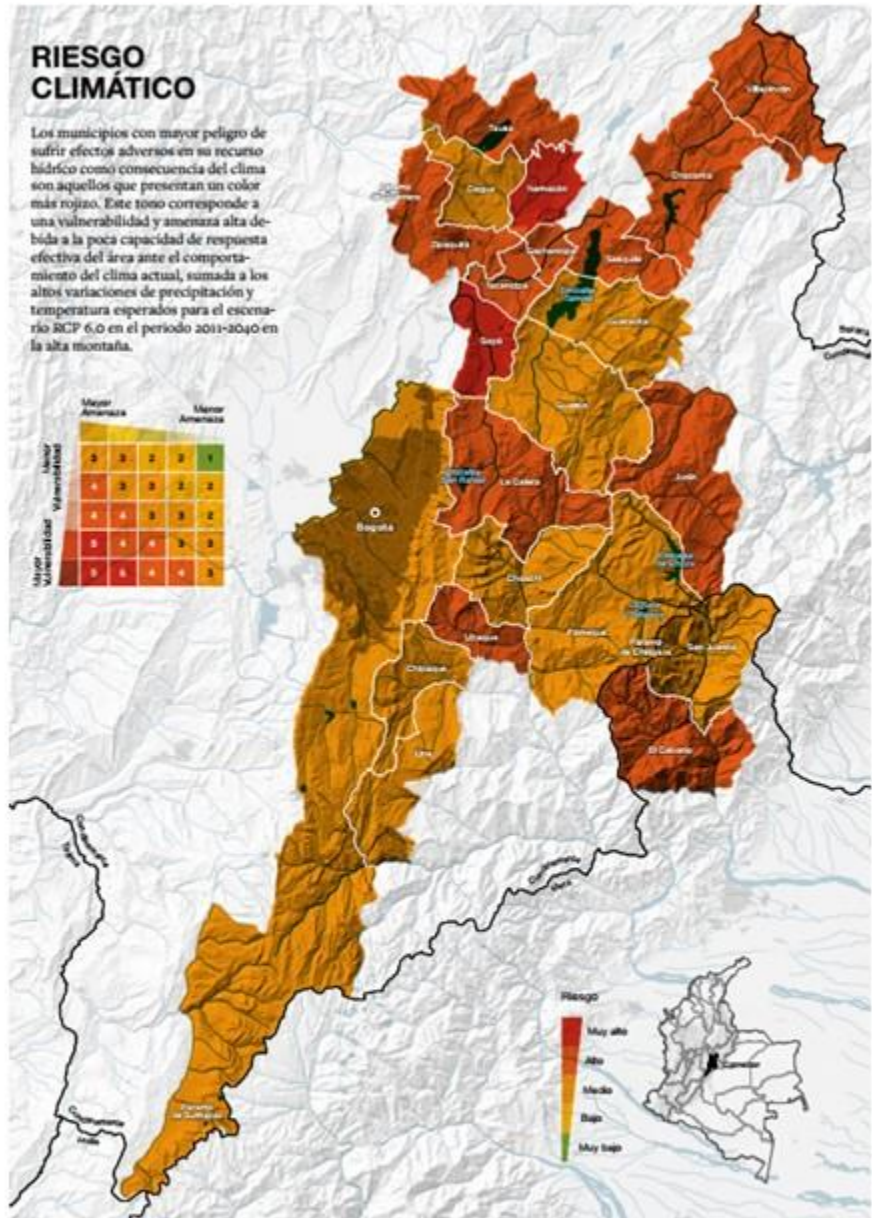
Las áreas restantes no presentan cambios significativos.



RIESGO CLIMÁTICO

Los municipios con mayor peligro de sufrir efectos adversos en su recurso hídrico como consecuencia del clima son aquellos que presentan un color más rojizo. Este tono corresponde a una vulnerabilidad y amenaza alta debido a la poca capacidad de respuesta efectiva del área ante el comportamiento del clima actual, sumada a los altos variaciones de precipitación y temperatura esperados para el escenario RCP 6.0 en el periodo 2011-2040 en la alta montaña.

	Mayor Amenaza					Menor Amenaza				
Mayor Vulnerabilidad	5	4	3	2	1	5	4	3	2	1
Menor Vulnerabilidad	5	4	3	2	1	5	4	3	2	1



WHAT IS OUR CLIMATE RISK?



An aerial photograph of a multi-level wooden boardwalk system winding through a dense forest. The boardwalk consists of several elevated platforms and walkways connected by ramps, all constructed from light-colored wood. People are seen walking on various levels of the boardwalk. The forest is lush with green trees and undergrowth. The text 'TRANSFORMATIVE ADAPTATION' is overlaid on the left side of the image in a bold, orange font.

TRANSFORMATIVE ADAPTATION

Responses that fundamentally change social-ecological system states and interactions (structures, functions, ways of thinking) and address the root causes of vulnerability



WHAT CHARACTERIZE TRANSFORMATIVE ADAPTATION?

references in literature
(80 papers reviewed)



NATURE – BASED TRANSFORMATIVE ADAPTATION?



Restructuring

- Changing behavior of water consumption for agriculture and domestic uses.
- Restoring connectivity and native states of high mountain ecosystems (Páramo)



Path-shifting

- Reversing the trend of high mountain and páramos degradation.
- Shifting from unsustainable agriculture to more adapted and diversified agriculture (lower water demand and vulnerability).





ISOLATION

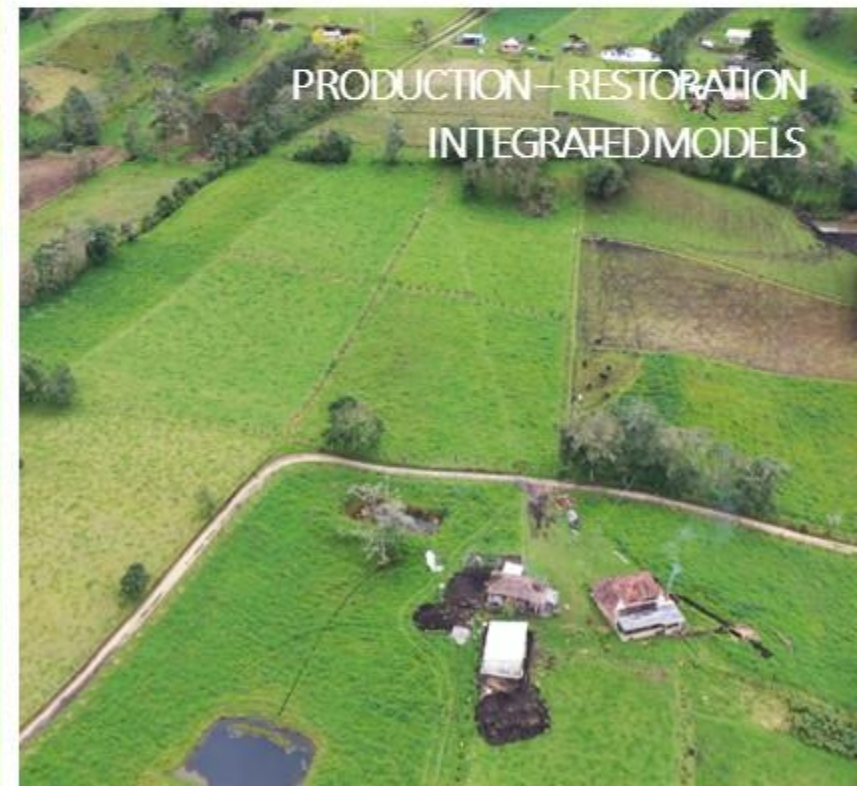


RESTORATION



ENRICHMENT

REVERSING THE TREND OF HIGH MOUNTAIN ECOSYSTEM DEGRADATION



PRODUCTION – RESTORATION
INTEGRATED MODELS

NATURA – BASED TRANSFORMATIVE ADAPTATION?



System-wide

- Benefiting indirectly 20% of Colombia population (7 M).
- Covering 3 regions with protected páramos and high Andean forest that encompass the entire Bogotá watershed.



Multiscale

- Involving multiple water users upstream and downstream (from mountain to city).
- Creating a regional forum of multiple water users.



PRODUCTIVE ACTIVITIES



RESTORATION ACTIVITIES



MONITORING ACTIVITIES





**INVOLVING MULTIPLE
WATER USERS
UPSTREAM BY
IMPLEMENTING
SUSTAINABLE
PRODUCTION SYSTEMS**



NATURA – BASED TRANSFORMATIVE ADAPTATION?



Innovative

- Introducing climate information systems and participatory monitoring on temperature, water and soil conditions.
- Updating municipality plans about land use to include adaptation and introducing climate risk management.



Persistent

- Strengthening regional water management institutions to explicitly include Ecosystem Based Adaptation into their plans.
- Establishing restoration agreements with family farmers in the watershed.



THANK YOU

Natalia Acero Martínez
Water and cities Director
nacero @conservation.org

CONSERVATION
INTERNATIONAL

