

The social vulnerability and ecosystem services feedback: approaching social-ecological analysis in water supply for Andean communities (Lake of Fuquene, Colombia).

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- “Hey, dad, look how great: they installed a cable! They are going to reconnect the electricity!”
- “No. That is the line of poverty!”

How the SES would help to understand the connections between Social Vulnerability and Ecosystem Services?

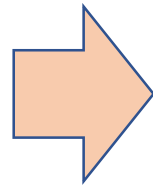
Ecosystem Services

the **benefits** people receive from nature (MEA (2005))

Social Vulnerability

Social Theory of Risk explains the “current development” (Natenzon, 2005):

“What we do for living creates new threats”



Social-Ecological Systems

It's referred on the adaptation of a territory to the impacts – Resilience.

Our hypothesis:

“Everybody is vulnerable in certain level but it differs from their resilient capabilities”

An example: “The loss of water supply in the Lake of Fuquene (Colombia)”

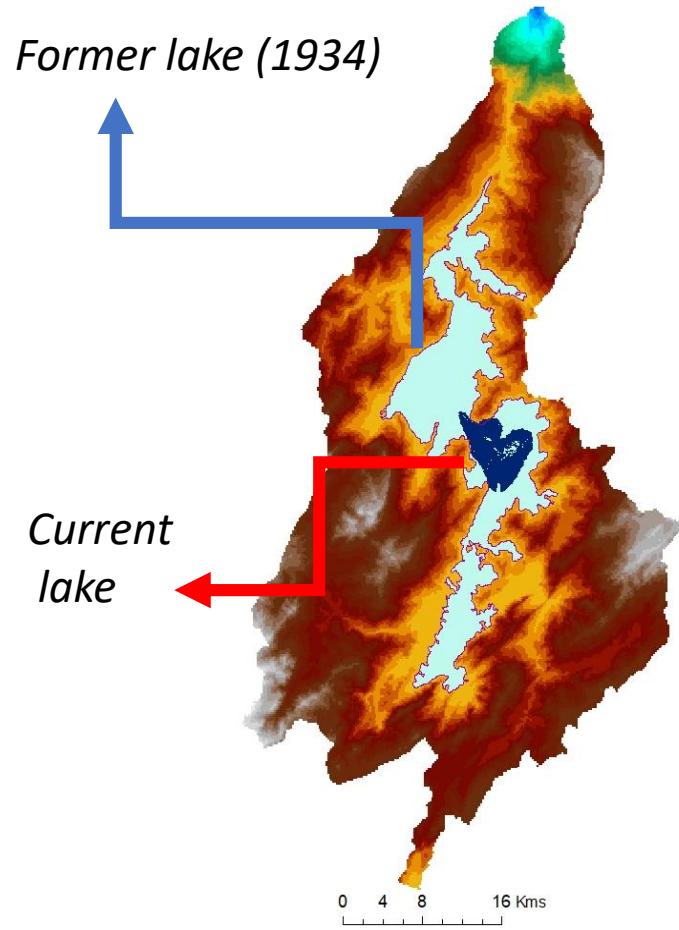
In 2006 and 2011 were catastrophic floods followed by intense droughts (next year)



IS THIS CLIMATE CHANGE?

Let's see the causalities (complex systems):

LOSS OF ECOSYSTEM SERVICES Flood regulation and water supply



GIS analysis

+ Historical information

73°47'0"O 73°46'0"O 73°45'0"O 73°44'0"O 73°43'0"O



Satellite imagery (2003-2014)

→ ~ 15% **deforestation** per decade (mostly agriculturalized).

→ **Modification** of the natural hidrological systems (dry sludges, dams construction, irrigations areas, etc).

→ **Reduction** of the water surface by aquatic plants

→ Highly **eutrophicated** (phosphorus and nitrates over the allowed) >10,000 downstream families affected.



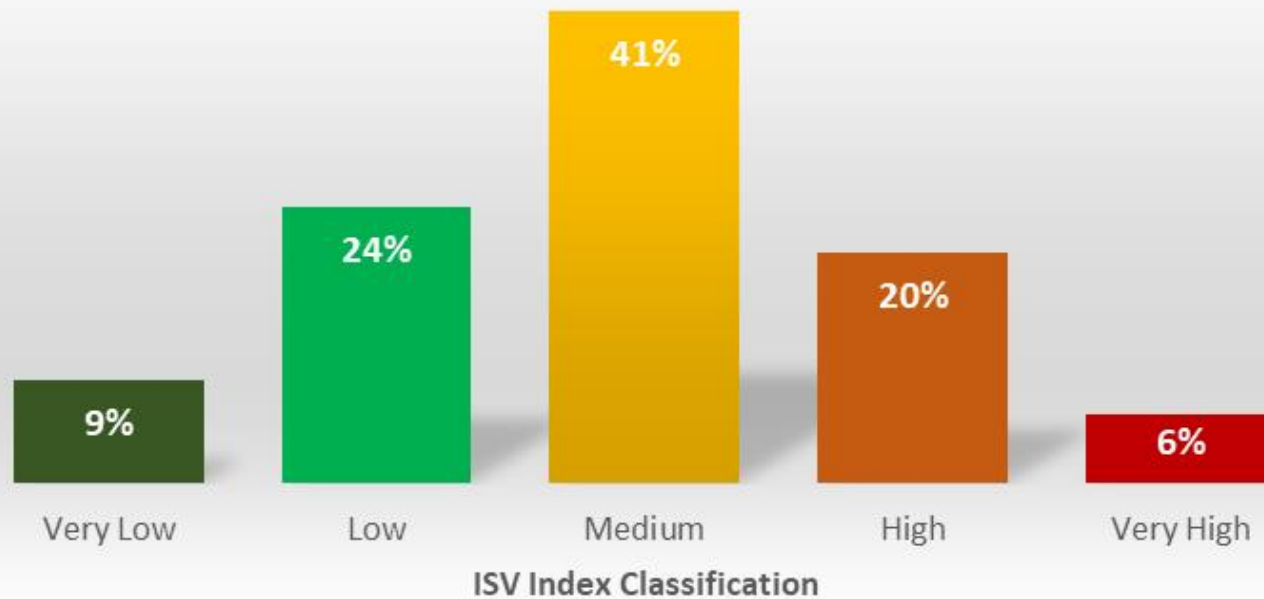
Reduction of the flood reservoirs and water storage.

Where this 'actually' comes from?

"What we do for living creates new threatens"

Social Vulnerability feedbacking the loss of the Ecosystem Services

SVI FÚQUENE LAKE (218 SURVEYS)



➤ 67% families are from middle to very high vulnerability conditions

or drought events (past 2

>50% flood and
>60% drought

intensification from climate impacts years)

ES and social vulnerability feedback

Causes/Effects

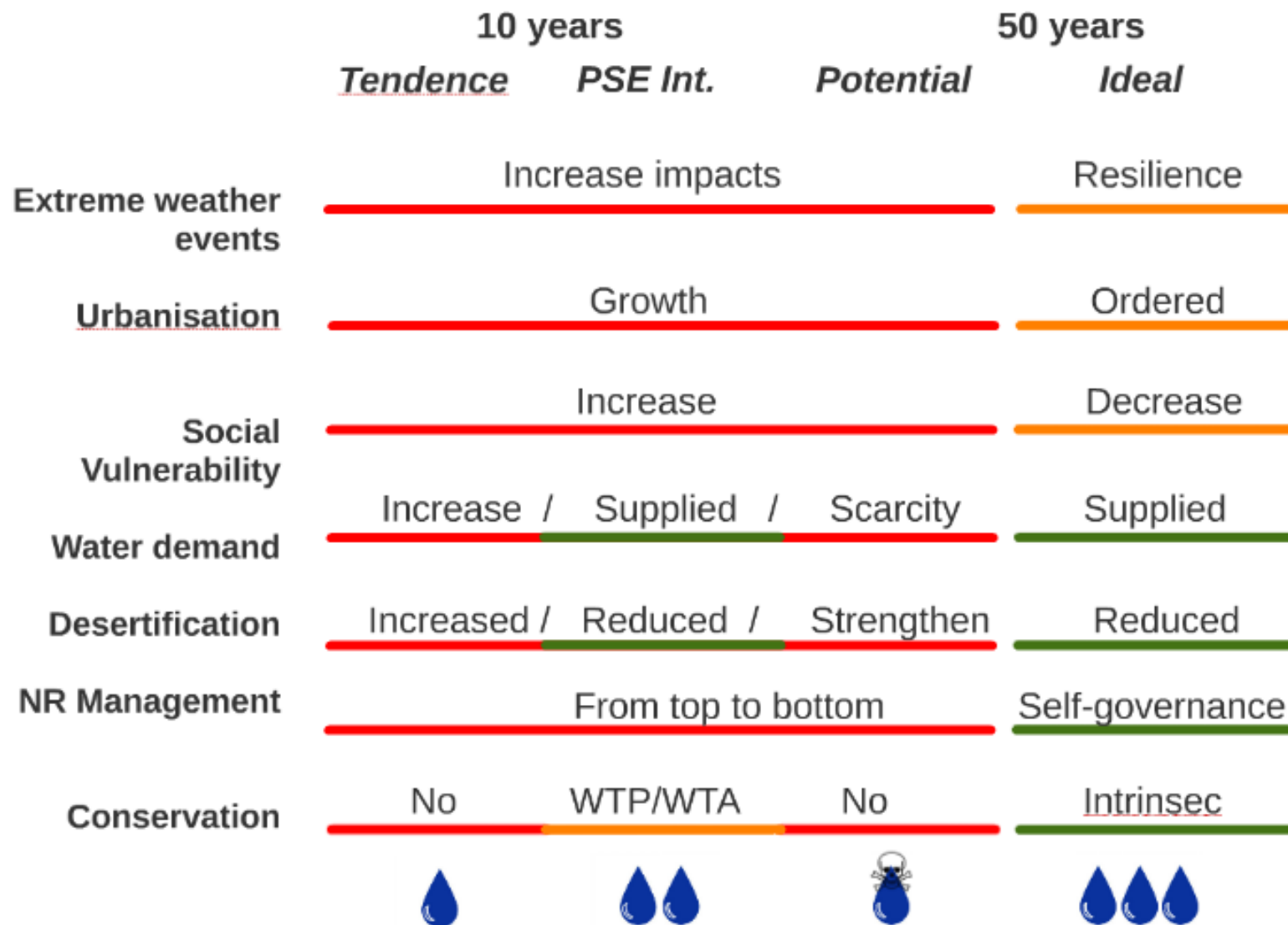
1. Agriculture **techniques** (agrochemicals and high rain dependance).
2. **Inequal** land access (<0,5 ha) and **day labourers** (>60%).
3. **Deforestation** in high mountains areas key for water capture.
4. Anthropic / “Engineer” system **modifications** (drying lakes, irrigation system, electricity dams)

When the **vulnerability** conditions increase, the territorial **resilience decrease**. But probably, there are more dimensions which are pushing out of their limits this SES.

Problems

1. The **pressure on the natural resources** are related to the social-economical conditions of the population.
2. The structural social-economical conditions of the people need to be solved:
 - Access granted to education
 - Access granted to a proper health service
 - Confidence to Government and each other
 - Self-management of the Natural Resources Capital. “If it is of all of us, it’s from nobody”

Future Scenarios



ありがとう
Thank you!



*In memoriam of our
loving colleague,
Silvia González*

*Your legacy will remain in the
science and our hearts...*