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CENTRO DE RECURSOS HÍDRICOS PARA LA AGRICULTURA Y LA MINERÍA

Water Research Center for Agriculture and Mining

SUSTAINABILITY ASSESSMENT OF PUBLIC POLICY: METHODOLOGY TO PRIORITIZE ACTIONS ON WATER POLICY

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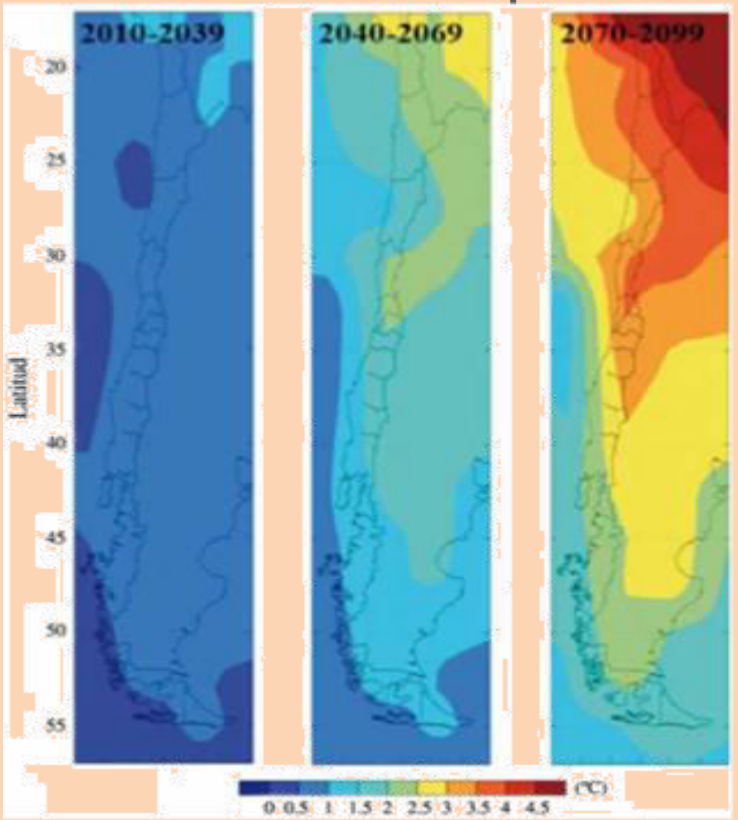
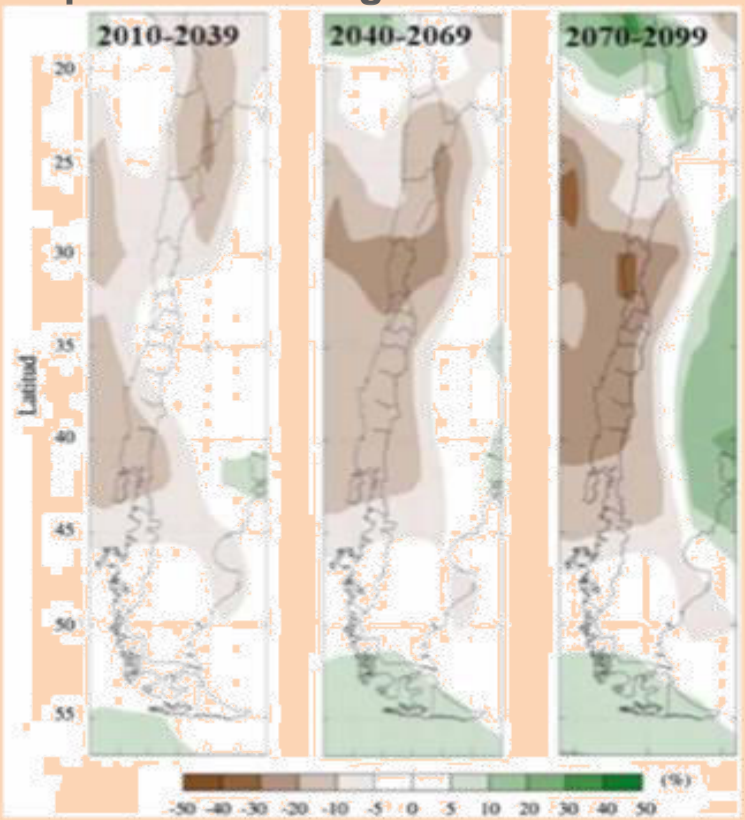
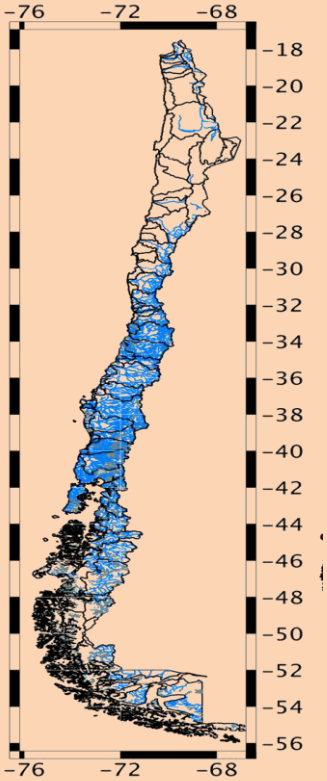
Global Warming and Chile

Source: Global Change Institute and ECLAC, 2010.

Temperature and Precipitation forecasting to 2100





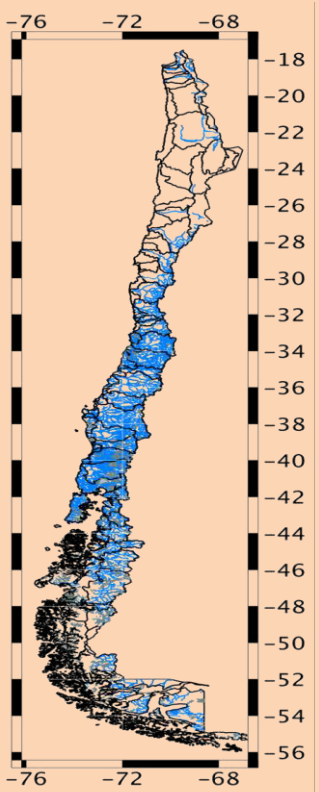


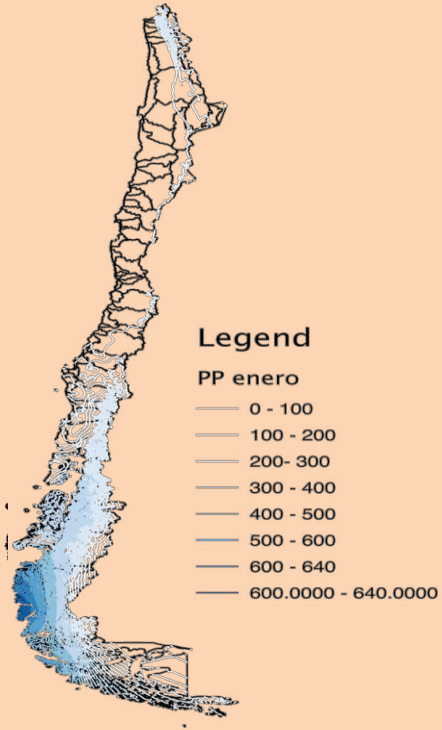
Global Warming and Chile

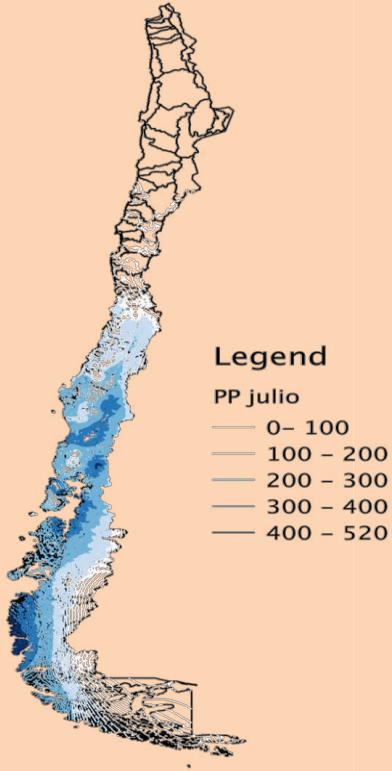
Source: Global Change Institute and ECLAC, 2010.

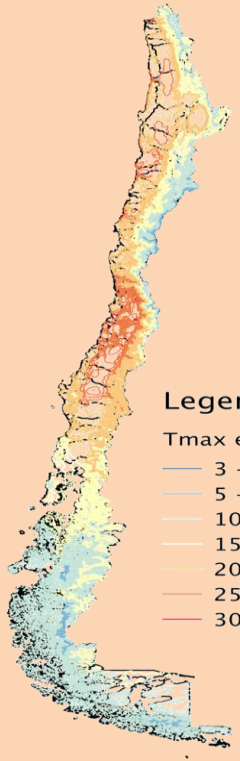
Temperature and Precipitation forecasting to 2100

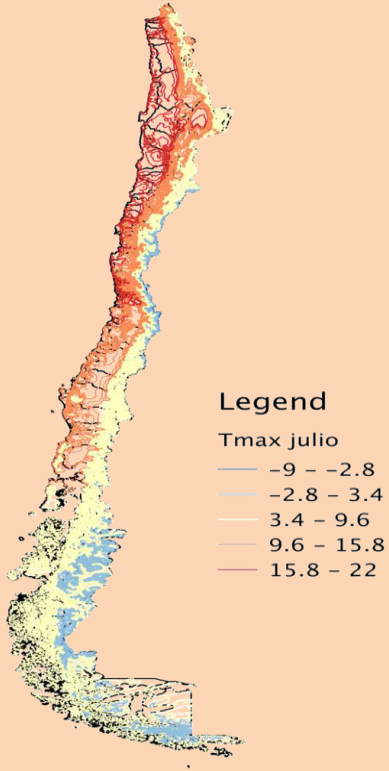
North always dry

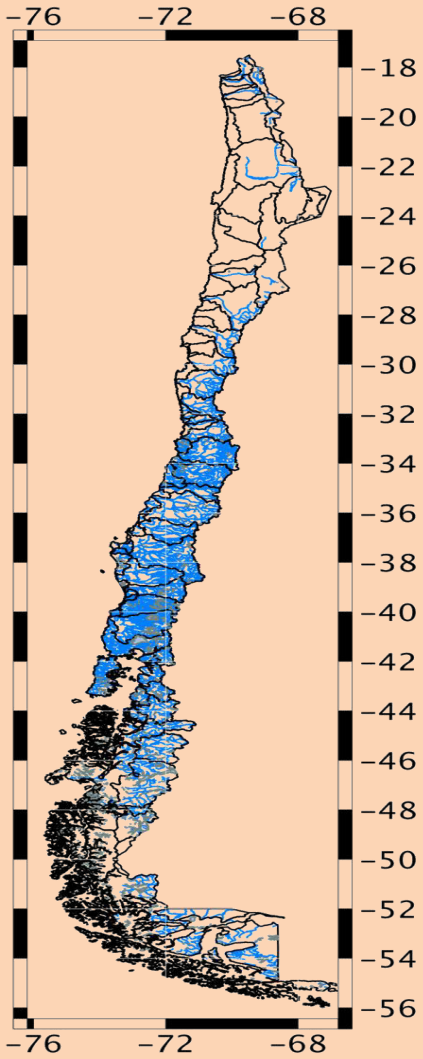


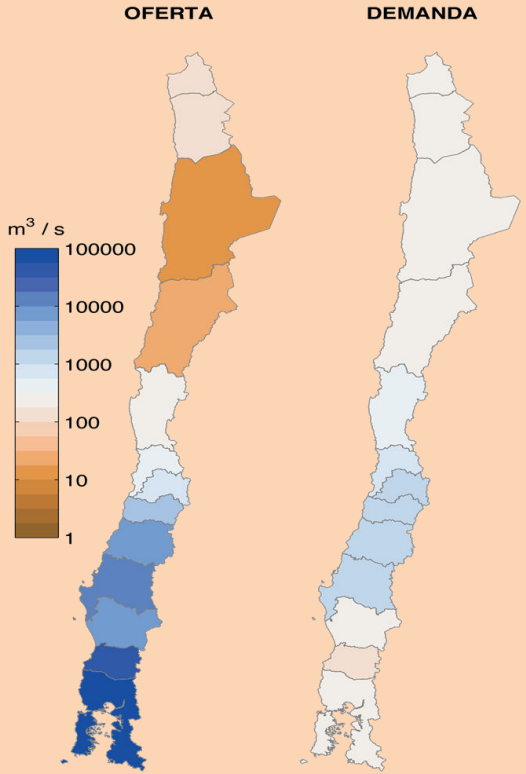


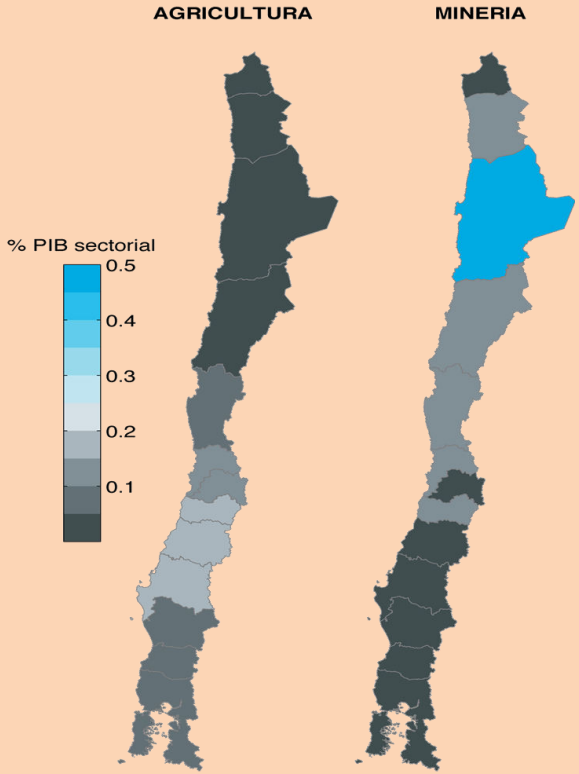








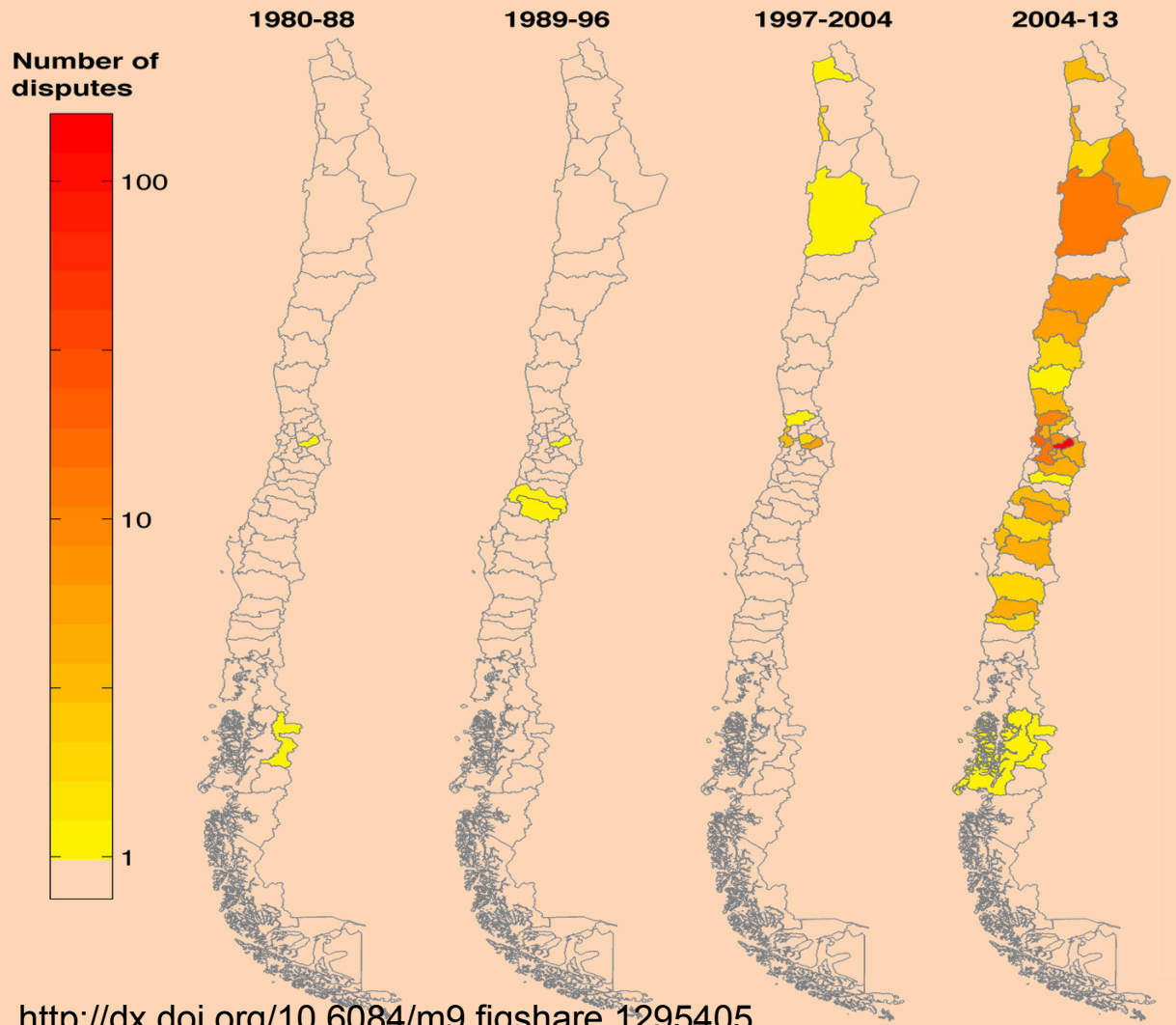


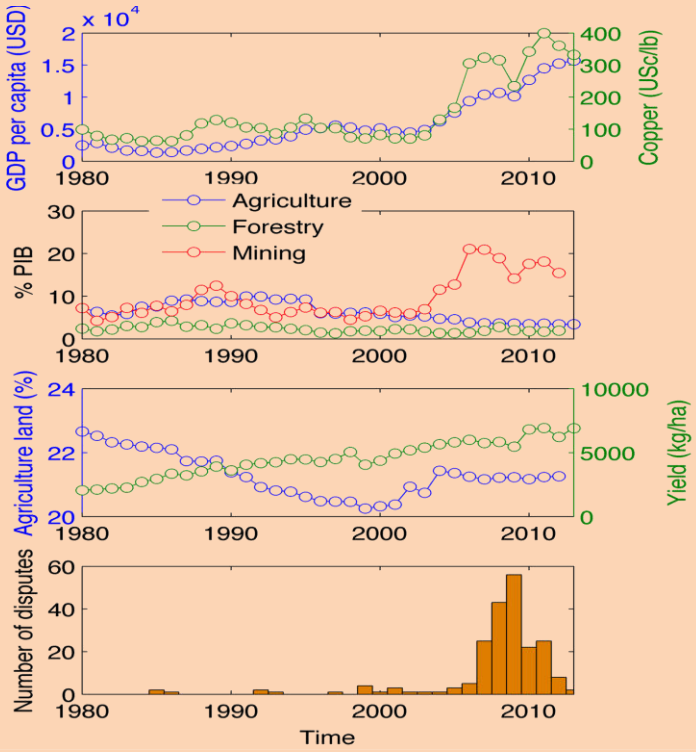


Water Balance in Chile

Chilean industrial activities based on the exploitation of natural resources –agriculture, hydropower, mining, tourism- depend heavily on surface and groundwater sources from the Andes. Conflicts arise when multiple industries share the same watershed.

Water Conflict in Chile





http://dx.doi.org/10.6084/m9.figshare.1295405

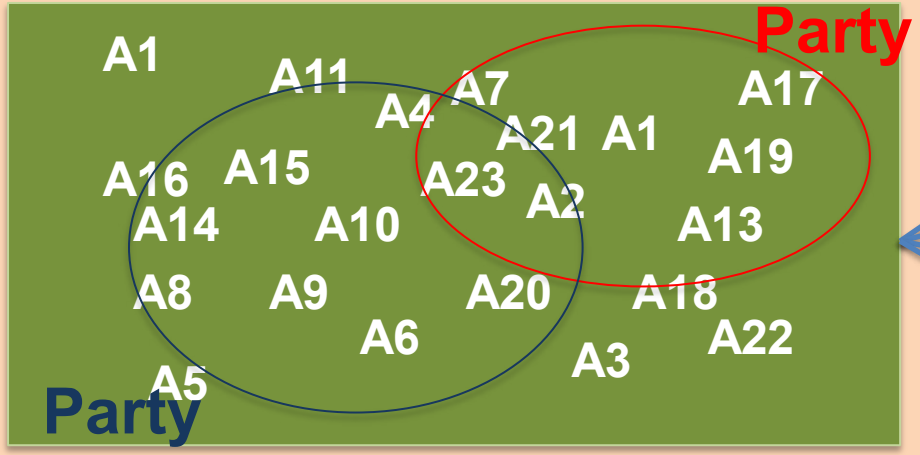
What is the problem? Politicians are no seeing the big picture and connecting the dots

Doesn’t matter?

Considering the projected impacts of climate change, the strategies to improve water availability must include a continuous improvement in water efficiency and water allocation.

Public Policy Assessment

Policy Analysis
(Ex Ante)



Policy Evaluation
(Ex Post)

- **Outcome Evaluation**
- **Impact Evaluation**
- **Process Evaluation**
- **Cost-Benfit Evaluation**

Alternative Vision of Public Policy

As a Engineering System

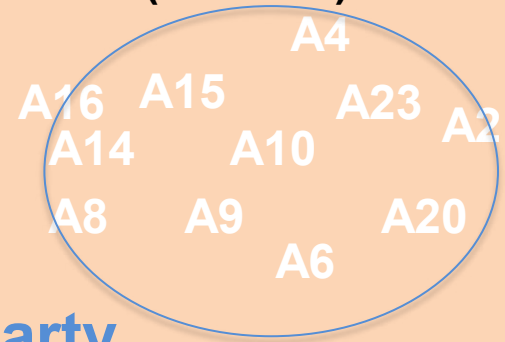
Public policy are "courses of action, regulatory measures, laws, and funding priorities concerning a given topic promulgated by a governmental entity or its representatives, **that finally will be translated in public works, engineering facilities and engineering technologies for long time in a geographical context**

History: In 2011, the National Commission for Irrigation issued the National Irrigation Strategy (NIS) as a blueprint of actions necessary to deploy an effective nationwide irrigation policy…. And listed a group of actions based on classic vision but… What is the first one?

Methodology: We analyzed the NIS using a sustainability assessment approach that prioritizes and defines the scope to ensure the sustainability of water resources.

A sustainability assessment goes beyond policy analysis – ex ante - or policy evaluation –ex post It explicitly recognizes that the process by which policies are made has some influence on how the policy is implemented and what the contents of policy are; thereby indicating the likelihood of policy success.

Policy Analysis (Ex Ante)



Party

Policy Evaluation (Ex Post)

Outcome Evaluation

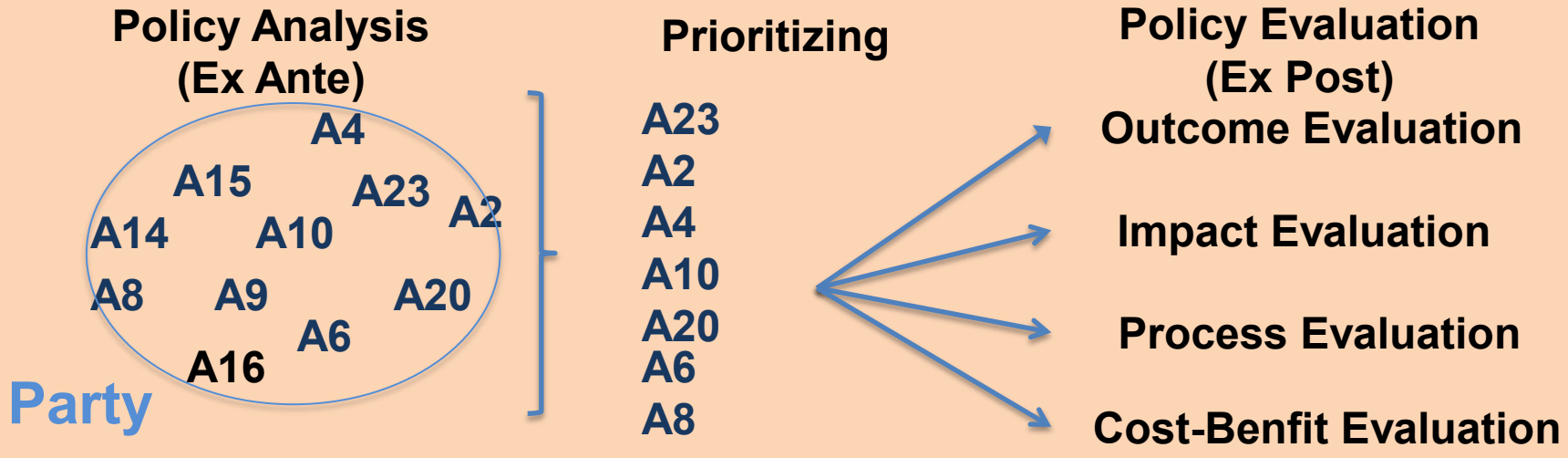
Impact Evaluation

Process Evaluation

Cost-Benfit Evaluation

Sustainability Assessment of Public Policy

Therefore, the contents and prioritization of actions inside policy can define the process, outcome, impact and its relation cost-benefit deployed. It is a tool neither to analyze best option nor to evaluate a set of actions but to evalute n existing policy in a new way to safeguard the acceptability of the policy while continuing to sustain the resources..How?



Setting Scopes of Public Policy (Engineering Scopes)

We set the water resources as the keystone for the new irrigation policy. According to new policy, three main scopes were proposed: An increase in the availability of water resources, An improvement in water use efficiency and an improvement in allocation based on information systems and water markets

Increase the availability of water

- Develop water works
- Find new sources of water

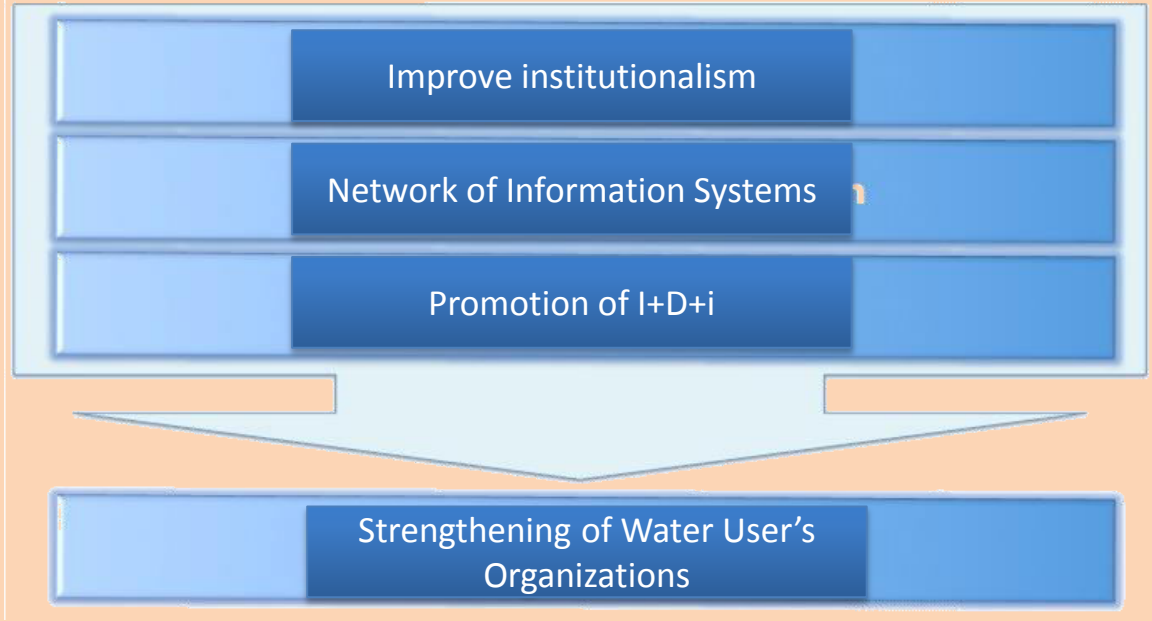
Increase water efficiency

- Improve information systems: Sensoring and Monitoring
- Promote the development of new technologies

Optimize distribution and allocation of water rights

- Improve the performance of water markets
- Promote sinergy between industrial sectores

Setting Scopes of Public Policy (Social Scopes)



Value Chain of Water Resource Management

Sustainability Assessment in action

All actions are based on (1) the relationship between increasing water availability and its efficient use to alleviate water scarcity and food security, (2) environmental sustainability, (3) the role of users to promote a fair distribution of resource into water markets.

Actions by Decision Makers

Stressors

- Investment in large regulation works to increase storage capacity.
- Investment in medium works, distribution and infiltration (eg. Artificial recharge).
- Promotion of private investment in irrigation and drainage smaller scale.
- Efficient Storage Systems
- Determination and cadastre of underground reservoirs
- Connectivity water resources between river basins
- desalination
- Reuse of water resources

Impact Assessments by Stakeholders

Impact assessment and prioritization of actions are based on expert knowledge (local) and stakeholder participation (Likert scale)

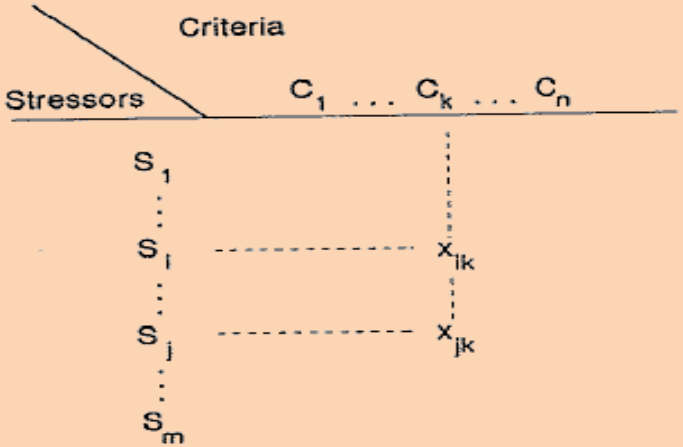
Matrix for Sustainability Assessment

Stressors (Engineering Works)

- Construction and improvement of distribution systems
- Promoting investment in small works - microponds
- Promoting investment in small works - Telemetry applied to irrigation and water management
- training
- Supervisory Boards Constitution
- Regularization and / or Improvement of Rights
- Increased capacity of reservoirs
- Hydro connectivity among watersheds
- Alternative water sources
- Underground reservoirs and groundwater recharge
- Flood Control
- ecological flow
- Promoting investment in small works - Infiltration
- Promoting investment in small works - Water Quality
- Construction and improvement of infiltration systems (NATIONAL)
- Promoting Public-Private Participation
- hydroelectric Generation
- fishing
- Tourism
- Development incorporating technologies

Criteria

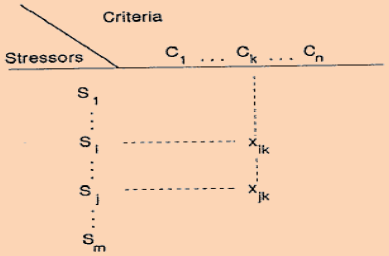
Availability, Efficiency, Distribution



Water Risk Assessment Approach to Prioritize Actions

$$D_k(i,j) = x_{ik} - x_{jk}$$

$$R = (r_{ij}), \quad r_{ij} = \sum_{k=1}^{n} D_k(i,j), \quad i,j = 1, 2, \ldots, m$$



	C_1	C_2	C_3
S_1	0	2	1
S_2	1	0	1
S_3	3	1	2
S_4	1	2	2

$$r_{12} = D_1(1,2) + D_2(1,2) + D_3(1,2) = (0 - 1) + (2 - 0) + (1 - 1) = 1$$

	S_1	S_2	S_3	S_4	Row sums
S_1	0	1	−3	−2	−4
S_2	−1	0	−4	−3	−8
S_3	3	4	0	1	8
S_4	2	3	−1	0	4

Ranking

Actions	Rank
Construction and Improvement of distribution Systems	95
Promoting Investment in Small works : Microponds	70
Promoting Investment in Small works : Telemetry applied to Irrigation and water management	48
training	48
Supervisory Boards Constitution	40
Regularization and / or Improvement of Rights	38
Increased capacity of reservoirs	35
Hydro connectivity among watersheds	30
Alternative water sources	20
Underground reservoirs and groundwater recharge	15
Flood Control	0
ecological flow	0
Promoting Investment in Small works : Infiltration	-12
Promoting Investment in Small works : Water Quality	-20
Construction and Improvement of Infiltration Systems (NATIONAL)	-37
Promoting Public-Private Participation	-45
hydroelectric Generation	-55
fishing	-85
Tourism	-87
Development Incorporating technologies	-100

Results

The results, shows that the investment in distribution and infiltration systems are the preferred options over the construction of large dams or reservoirs which contradicts the perception in Chile that dams provide the best solution.

Discussion

1. The actions in a public policy determinate the outcome
2. Local experts and stakeholder assest the impactos of actions taking into considerations local condicionts, climate change and regulatory framworks
3. Big groups are better than smaller grups to decision making

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