# THE ROLE OF GEOSPATIAL INFORMATION IN NATIONAL DEVELOPMENT

## 56TH STSC – COPUOS

**MS. Luis Felipe Sáez Collantes**
**February 14, 2019, Vienna, Austria.**

Ministerio de Defensa Nacional
Gobierno de Chile

**Ministry of National Defense**

FUERZA AEREA DE CHILE
QUAM CELERRIME AD ASTRA

**Chilean Airforce**

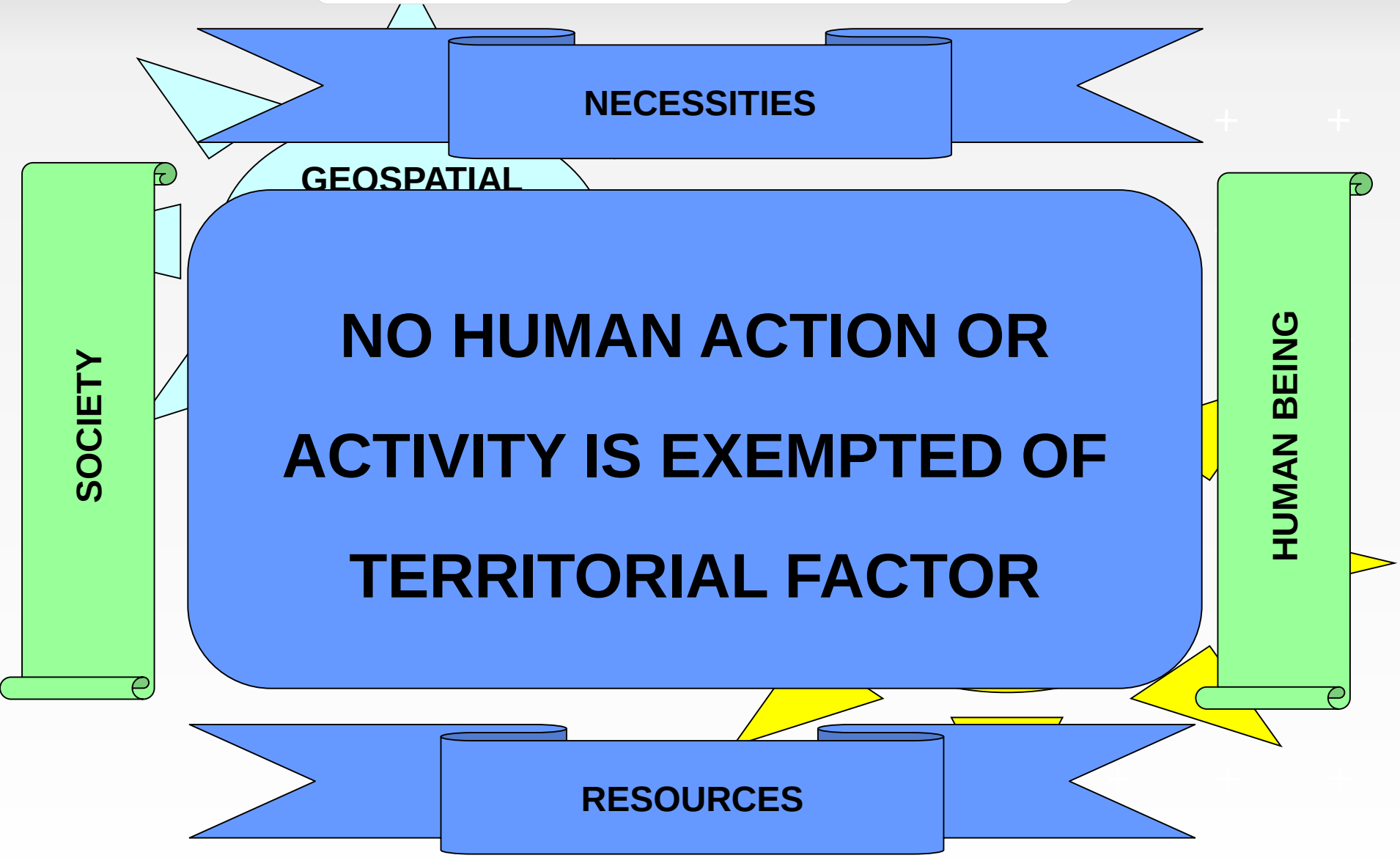
Ministerio de Relaciones Exteriores
Gobierno de Chile

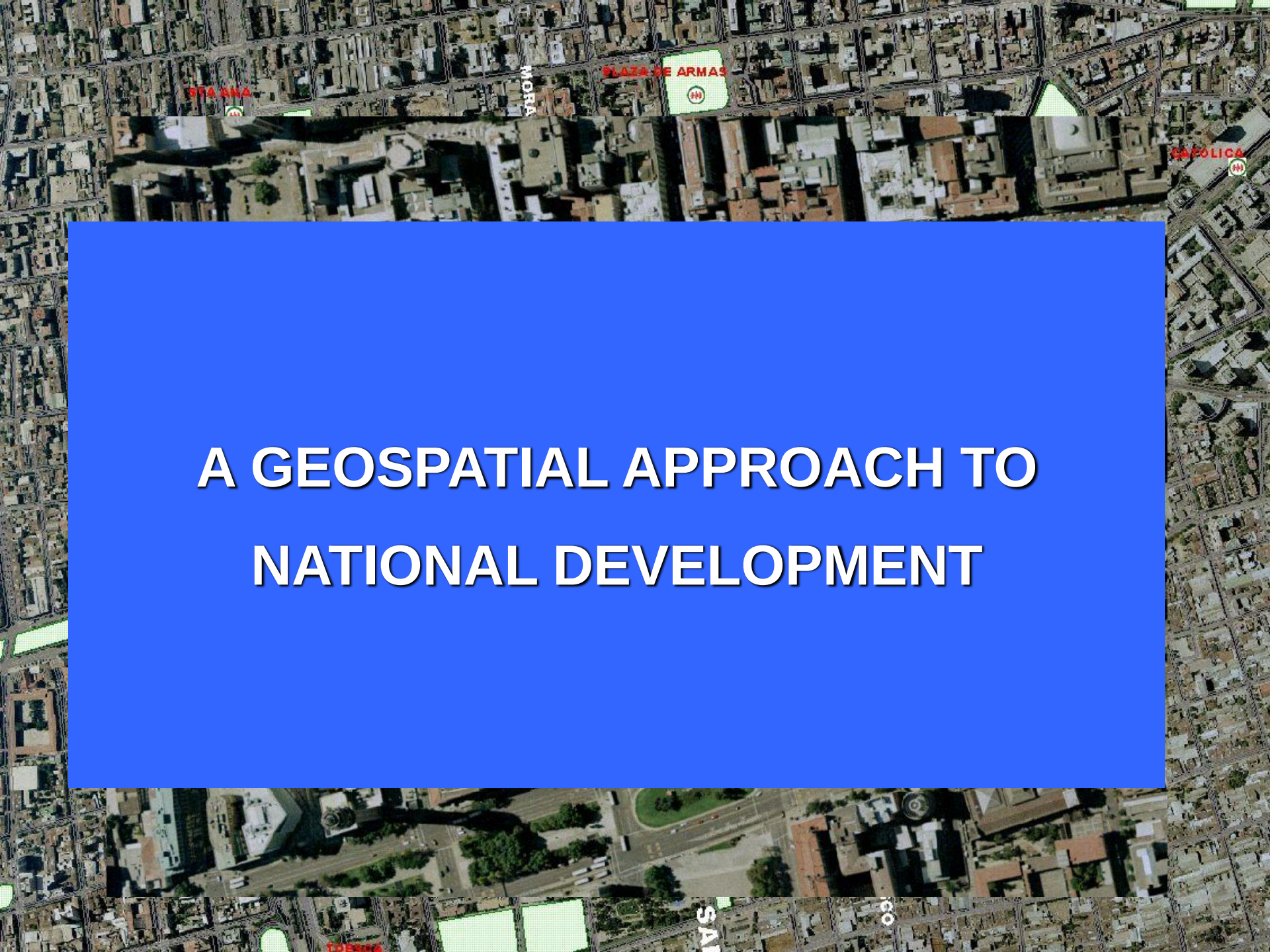
**Ministry of Foreign Affairs**

**Chile was affected by an earthquake of magnitude 8.8 and Tsunami in March 2010**

**THIS REQUIRED A GREAT EFFORT FOR THE RECOVERY OF THE INFRASTRUCTURE AND ALSO THE ECONOMIC CAPACITY**

# SPATIAL DIMENSION

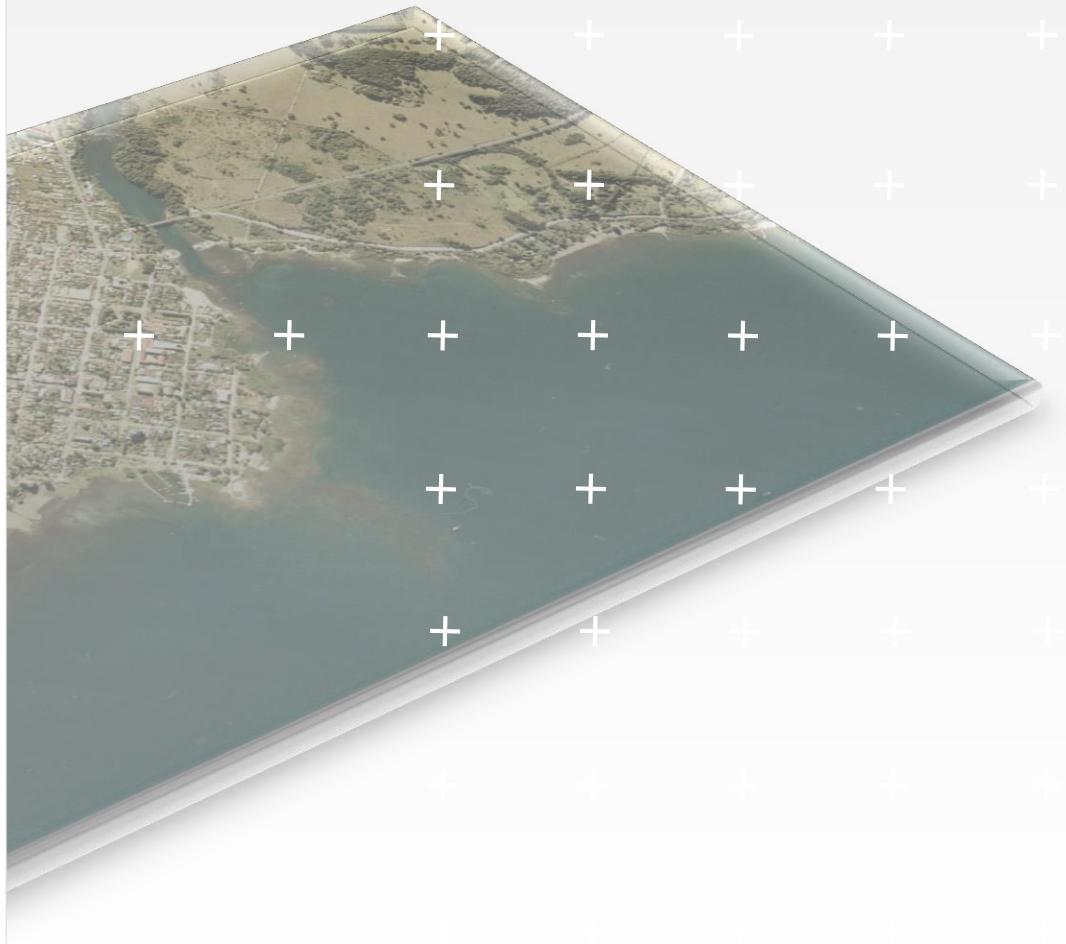




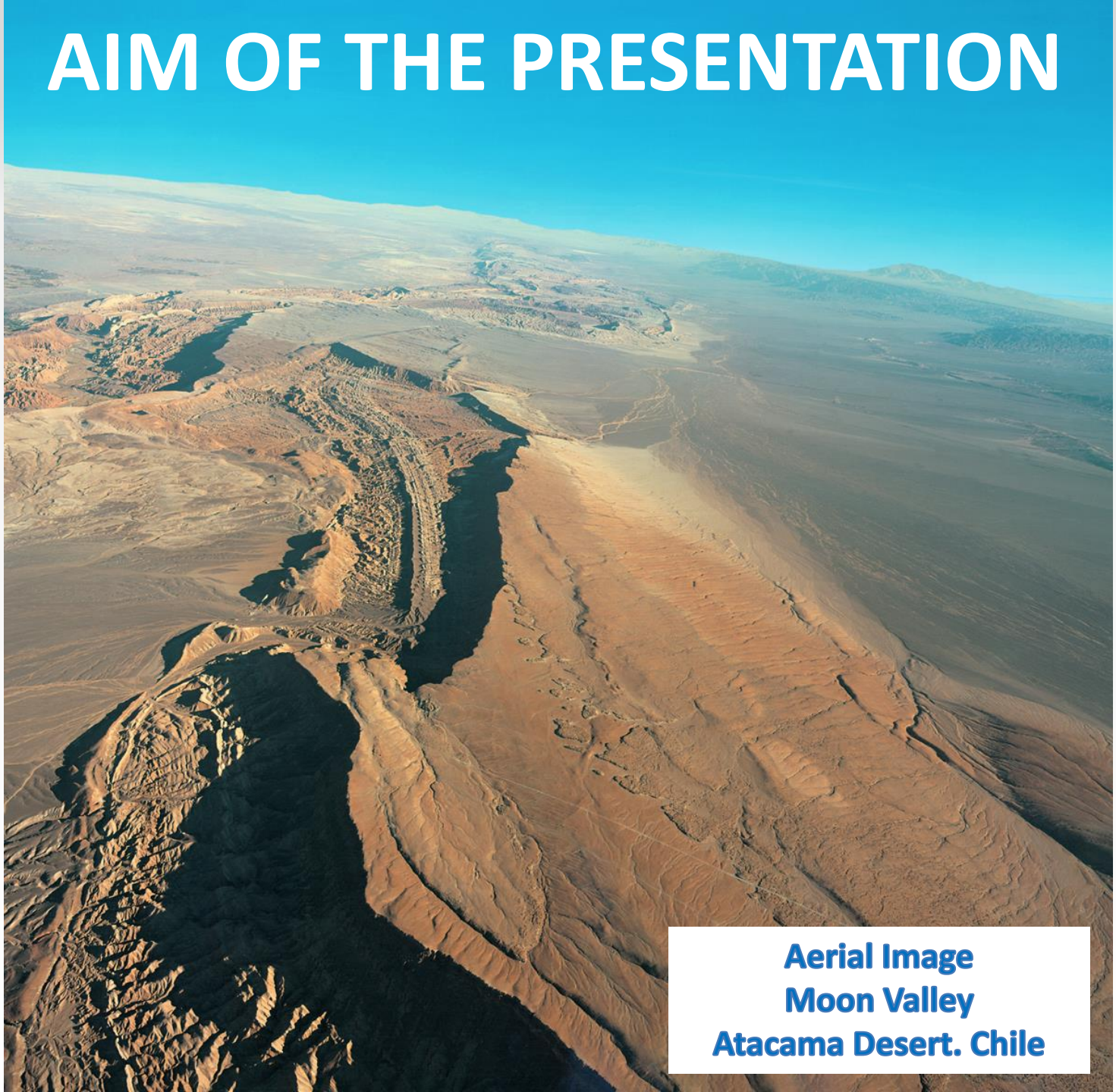

# A GEOSPATIAL APPROACH TO NATIONAL DEVELOPMENT

# STRUCTURE

- **PRESENTATION OUTLINE**
  - **Scope**
  - **Data Considered**
  - **Empirical Background**
- **LEARNED LESSONS**
  - **Outcomes**
  - **Challenges**
  - **Conclusions**



# AIM OF THE PRESENTATION



Aerial Image
Moon Valley
Atacama Desert. Chile

# GENERAL AIM

Establish the role of geospatial information, as a public asset, in the national development process, base on the geospatial nature of the human being, its territory and the resources that characterized a given area.

# SPECIFIC SCOPE

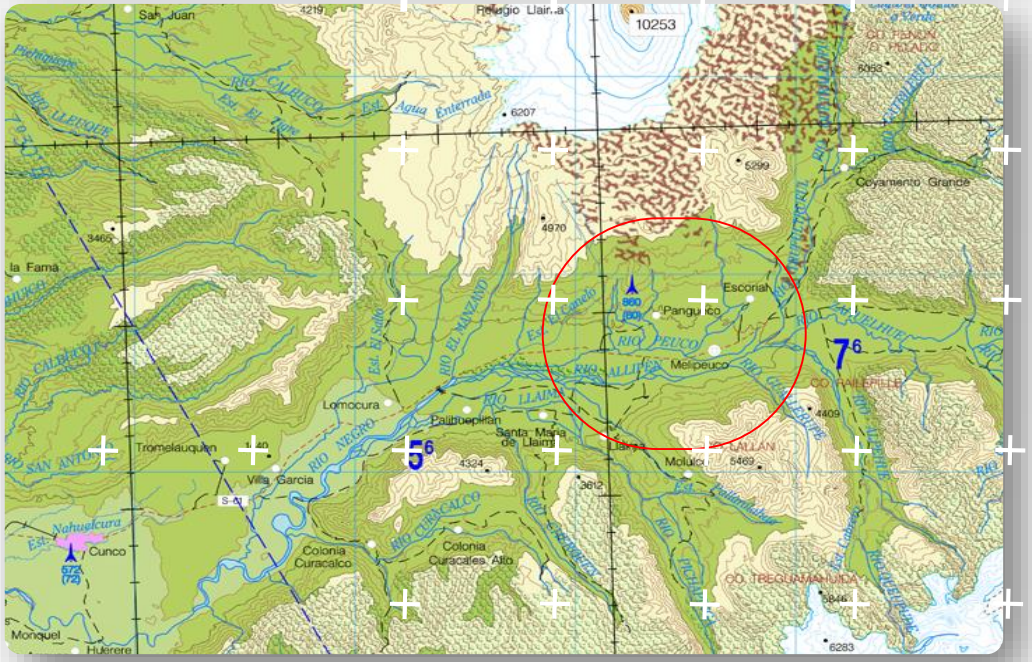
- Describe the way how Geospatial Information can contribute the development of a defined community.

- Identify the characteristics of geospatial information that a State require to promote national development.

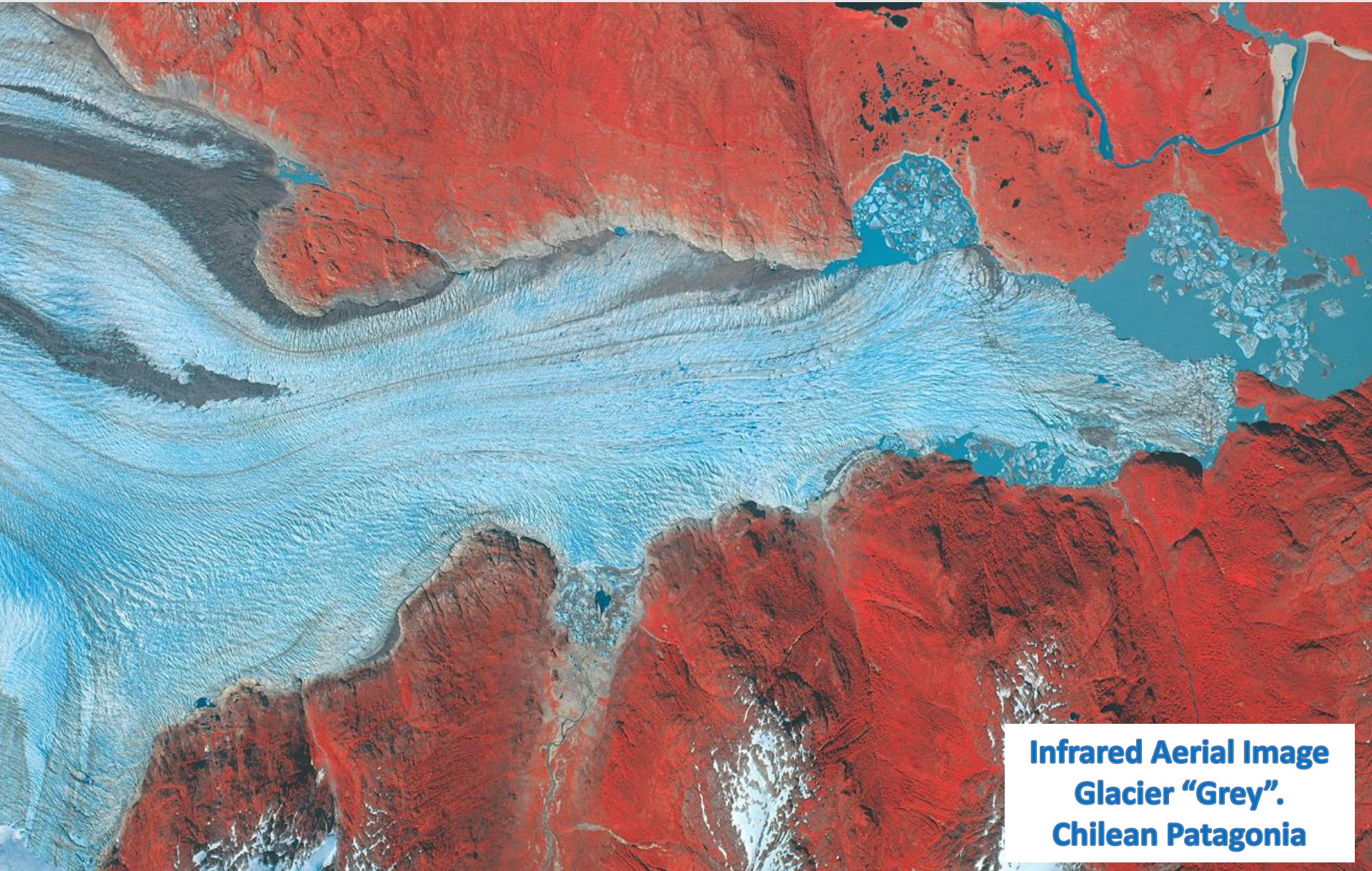
# SPECIFIC SCOPE

- Describe how the geospatial capabilities in the ambit of National Defense, can be used to support national development.

- Describe the type of national structure and capabilities required in the ambit of geospatial information.



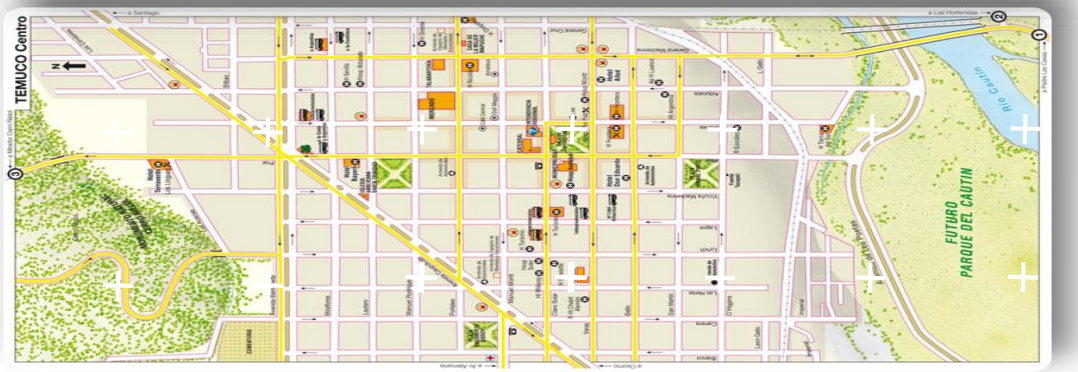

# DATA CONSIDERED



Infrared Aerial Image
Glacier “Grey”.
Chilean Patagonia

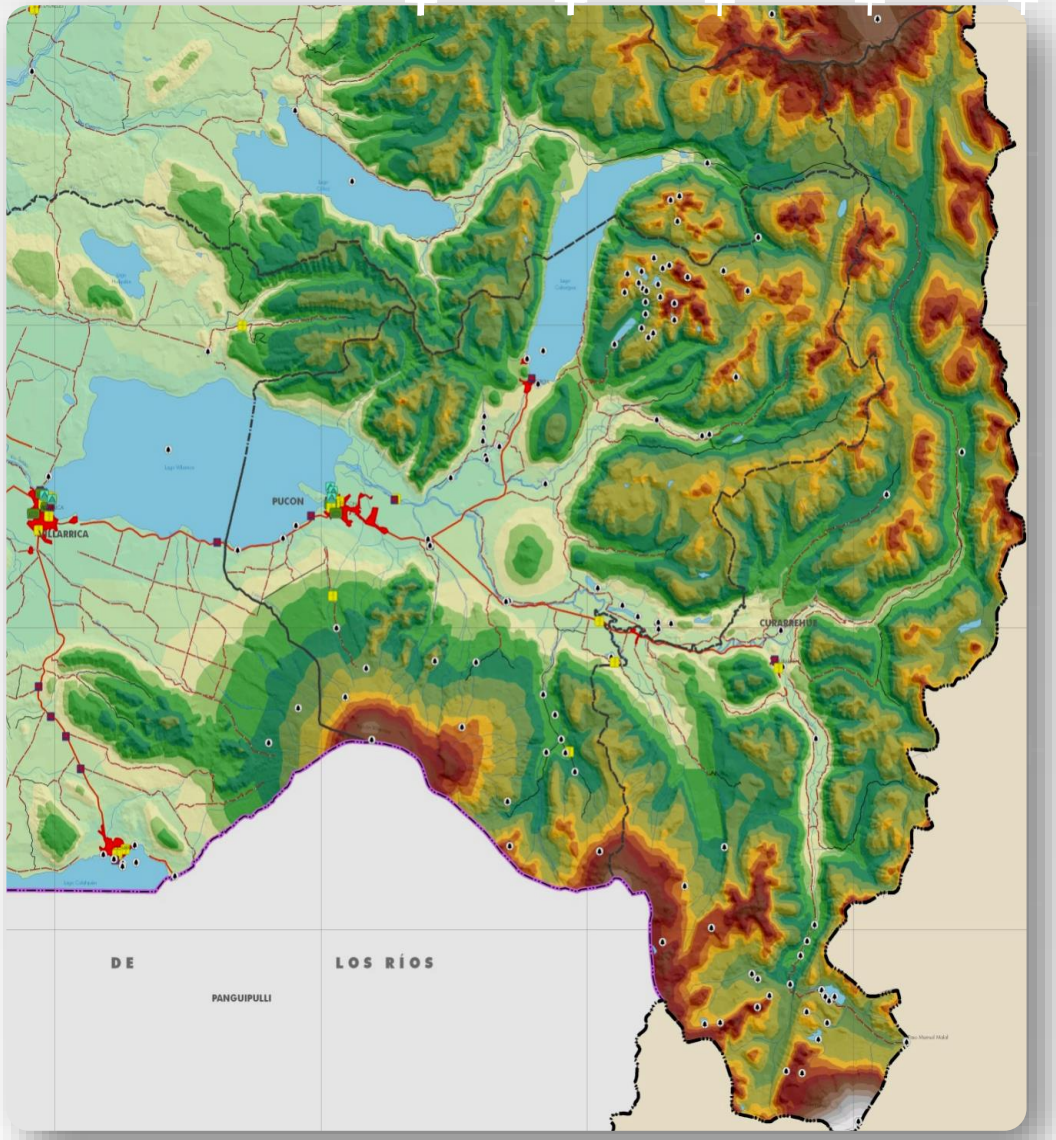
# Data Considered

- For the analysis, it was considered a multi-criteria methodology to perform a comparative description of some study case.



# Data Considered

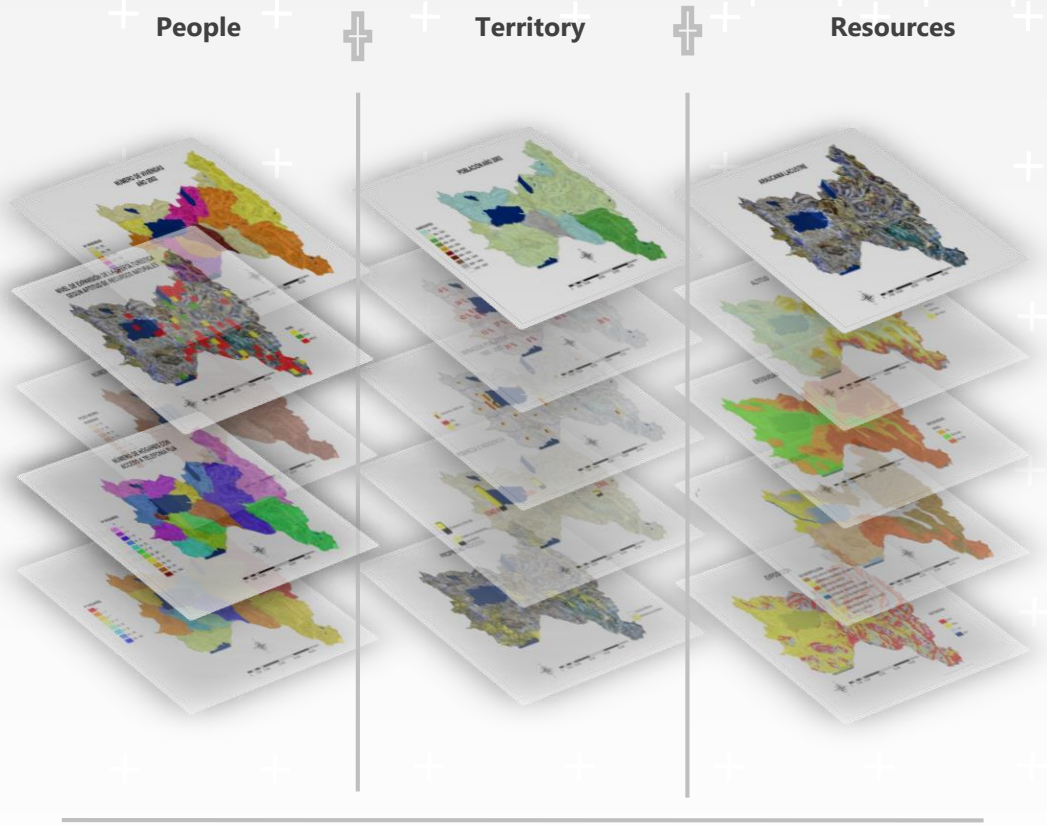
- In each case of study, was determined the way how the geospatial information and its associated technologies were used to support national development.



# Data Considered

## Case-Study Projects

- Project: Territorial Information System to Villarrica Basin (Araucania Region). (SCV).
- Project: Reform at the Chilean Welfare System (WSR).
- Project: Economic Recovery of Tocopilla City after the Earthquake on 2007 (Northern Region of Chile).



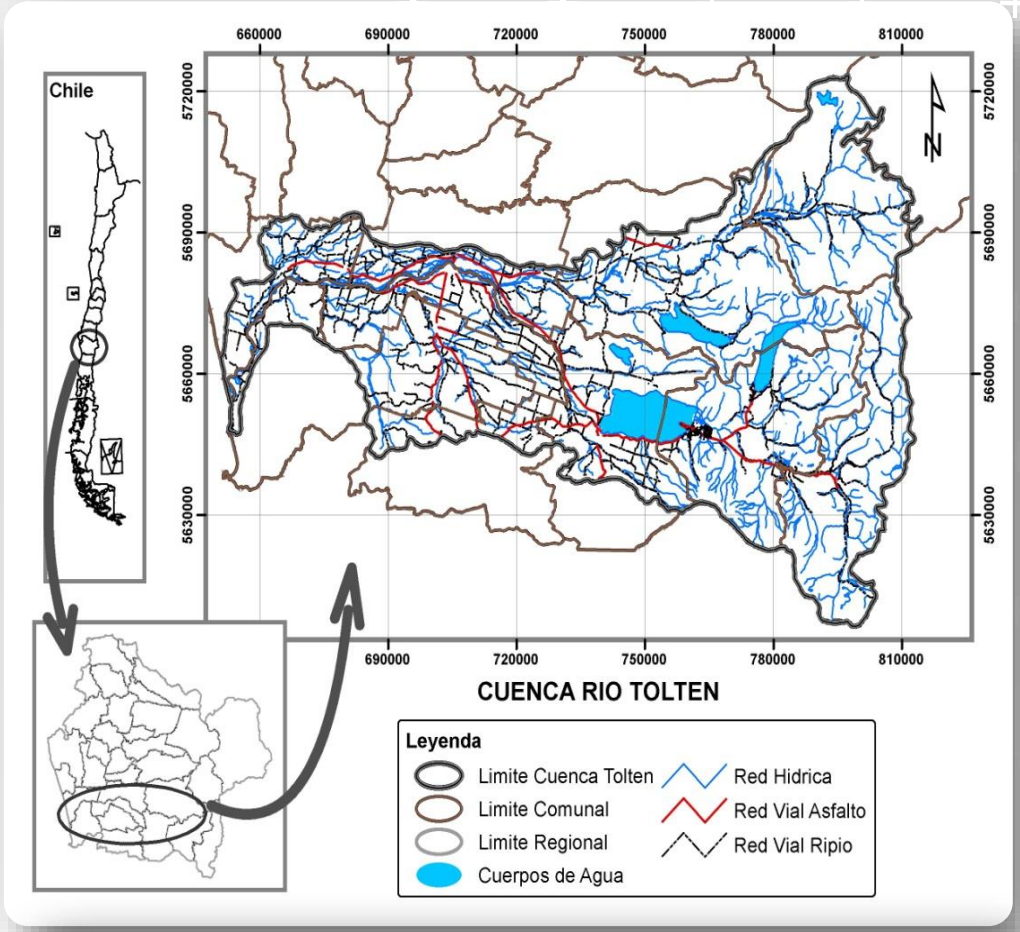
# Project: SCV

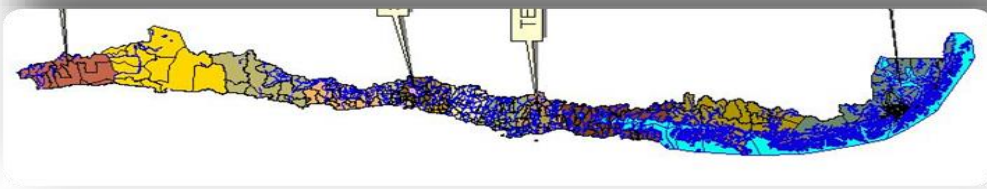
- Create a territorial information system to the sub-basin of Villarrica (Mapuche Zone).

- Analyze the territorial competitiveness, and focus the public and private investment.

- Perform a participatory process that allows improve the living conditions of local communities.

- From a holistic perspective includes the environmental, socio-economic and cultural aspects.

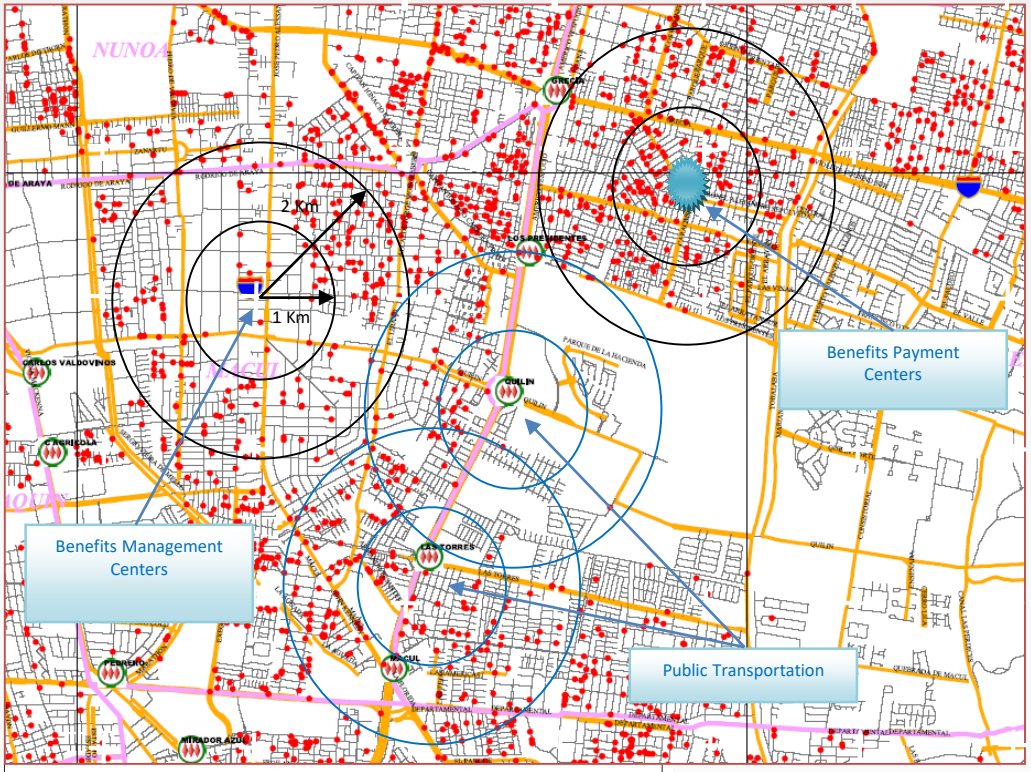


# Project:
# Reform at Chilean Welfare System (WSR)

• Develop an information system to optimize the decision - making process regarding pensions matters, base on update and reliable geospatial information.

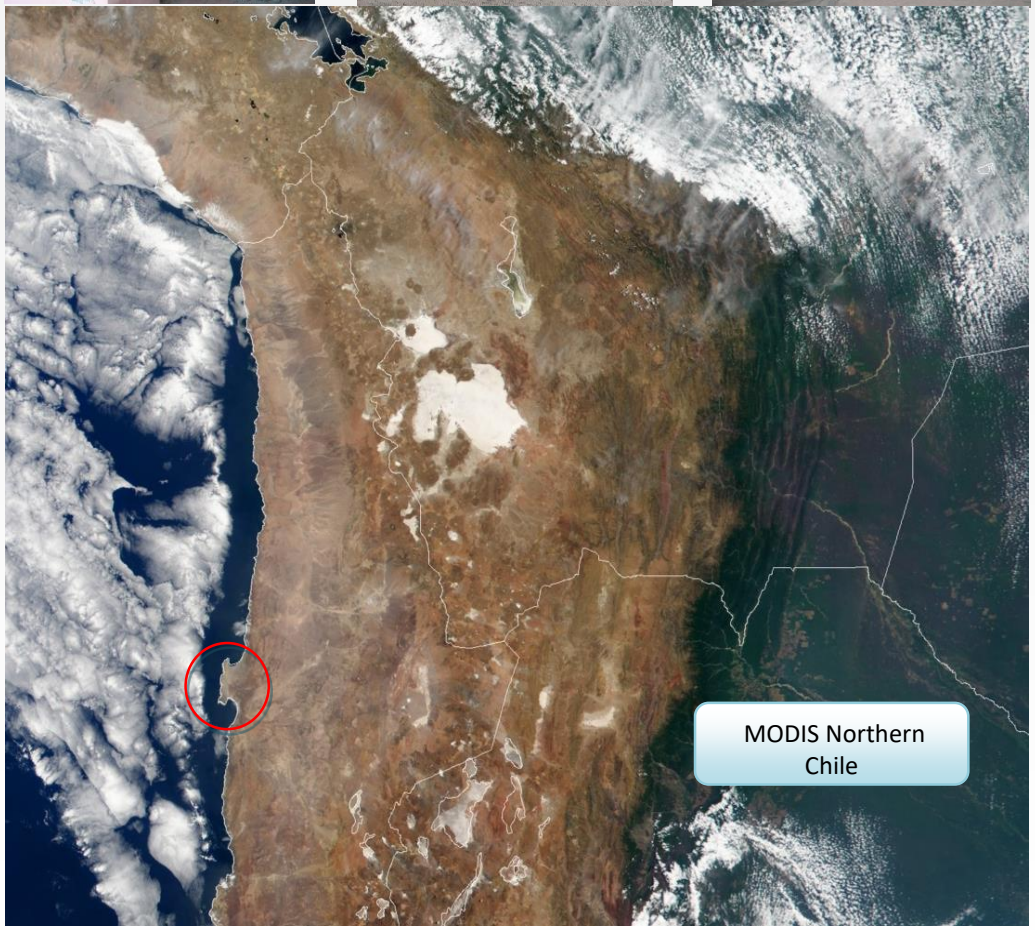
• Encompasses a broad set of measures and mechanisms developed to provide security, dignity and justice for all Chileans.





*Localización de Beneficiarios y centros de pagos de la comuna de Maipú.*

# Project: Economic Recovery of Tocopilla City

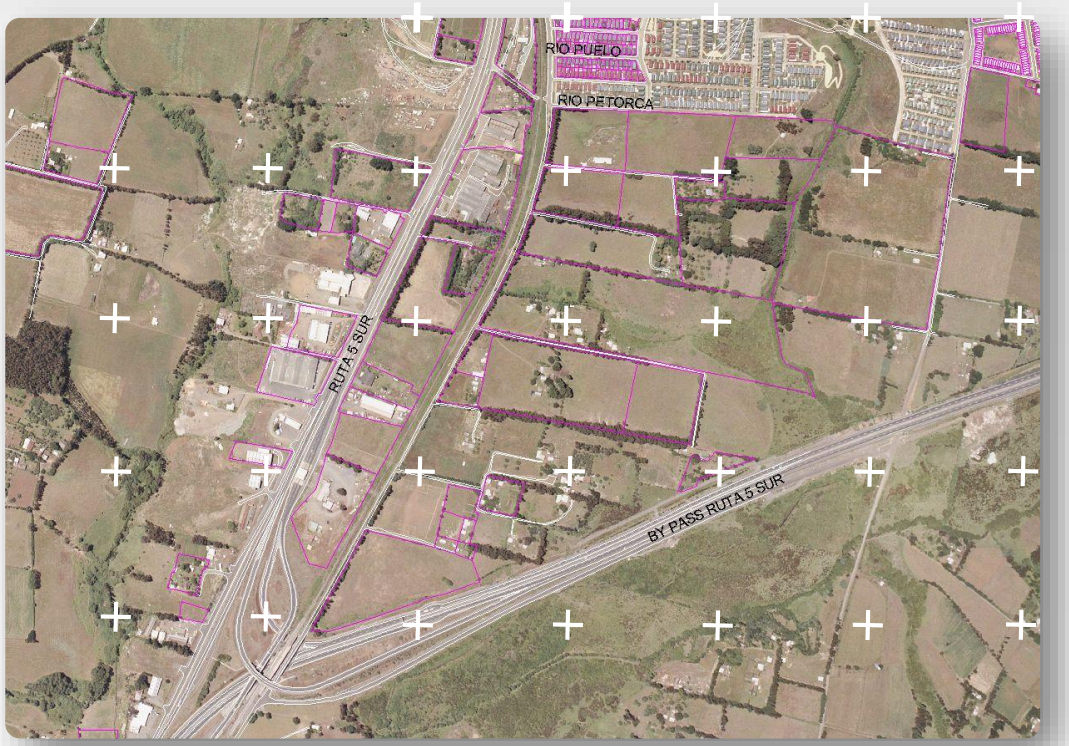




- Generate a strategic and operational framework to support the economic recovery of Tocopilla and Maria Elena cities (northern Chile) affected by the earthquake on November 14th 2007.

- Resume of entrepreneurial activities of trade and services sector associated with the mining industry.

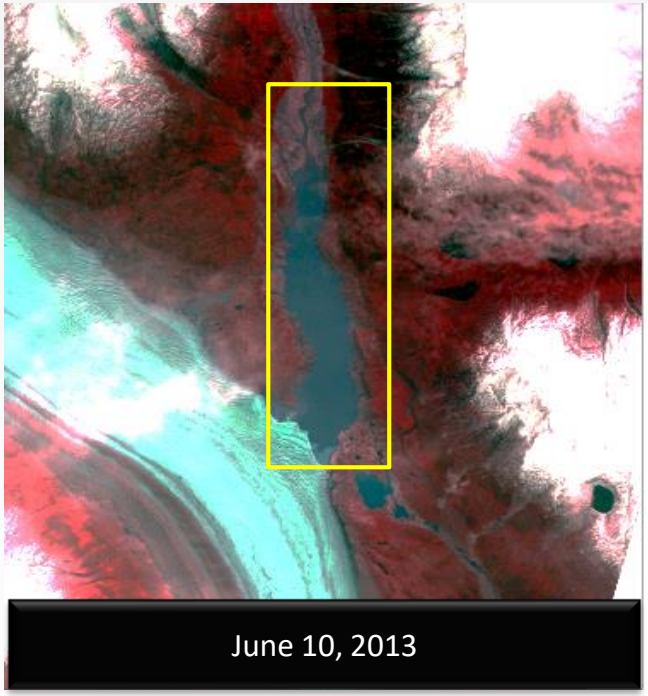
## DATA CONSIDERED

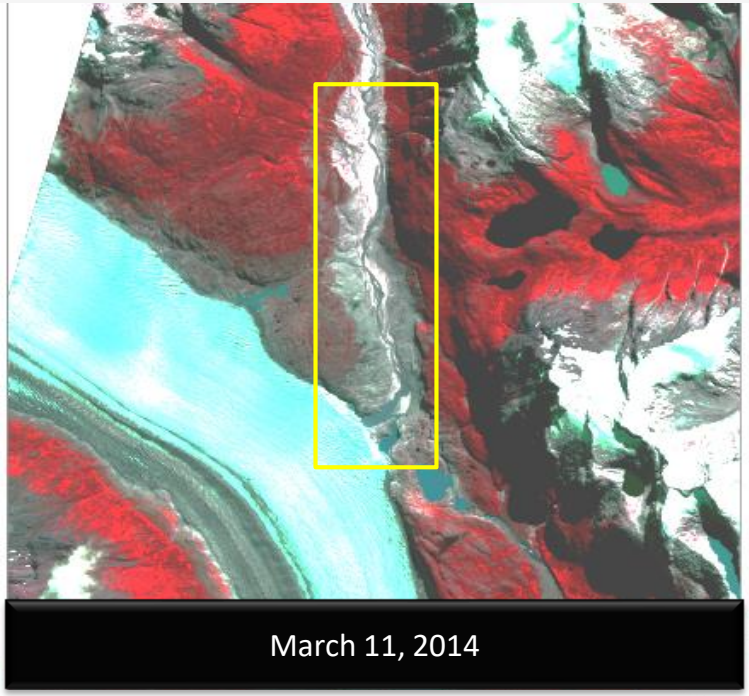
- Reports of the progress and results of projects.
- Aerial and satellites images.
- Databases and Digital maps.
- Geographic Information Systems (GIS).
- Additional support materials developed for each project.
- Experiences of employment of Geospatial Information in recent emergency situations.

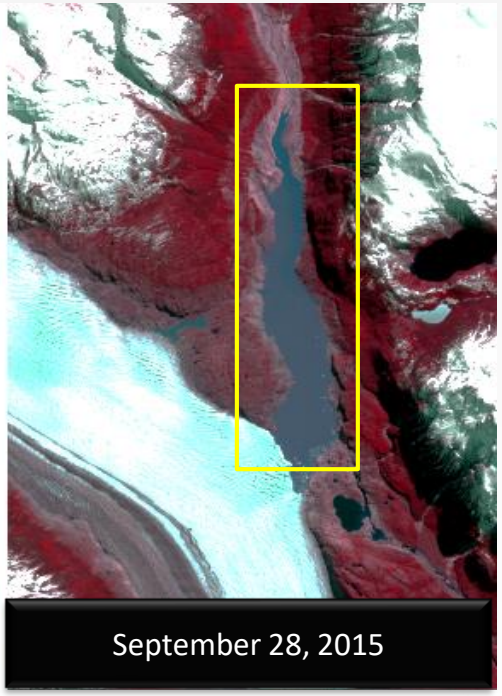




# Multitemporal Analysis



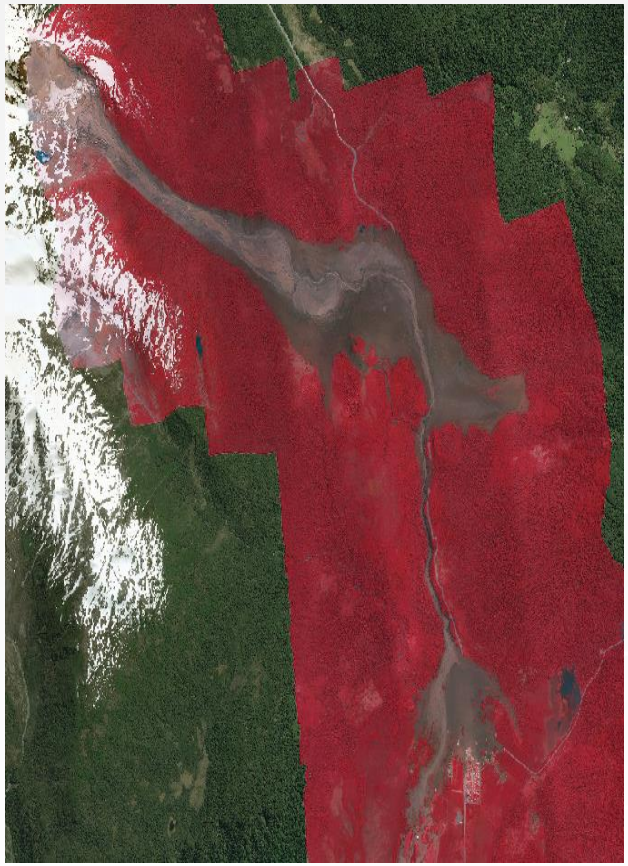




**Fasat C Satellite Image**
**Lake "Cachet II" Chilean Patagonia. Chile**

# Flooded Settlements Analysis

November, 2017



December, 2017

**Fasat C Satellite Image**
**Viila Santa Julia. South of Chile**

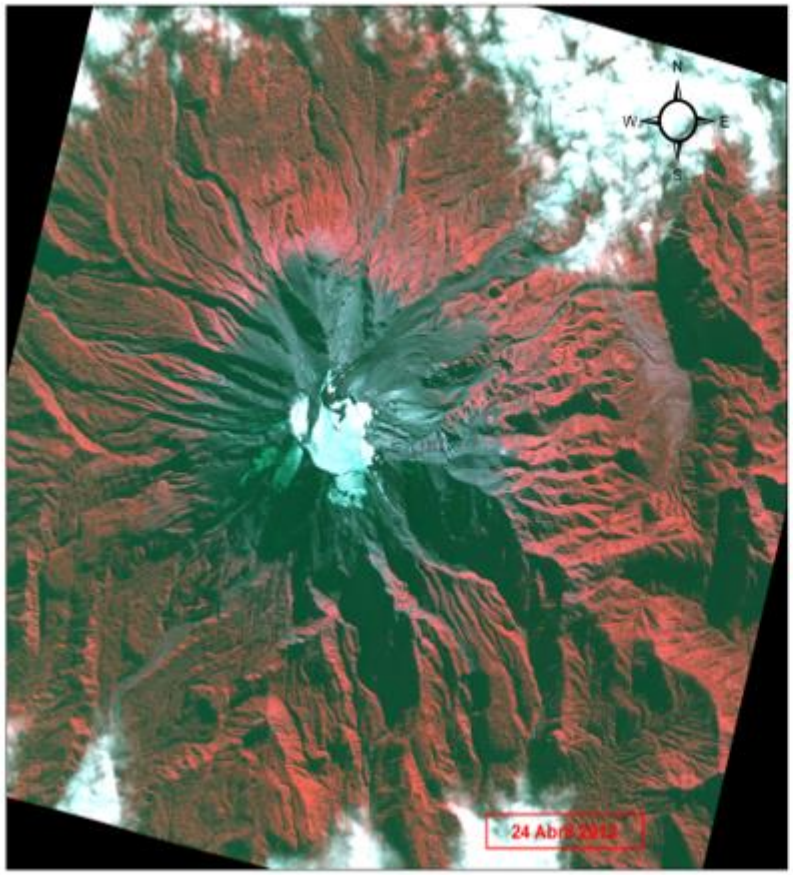
# Flooded Settlements Analysis

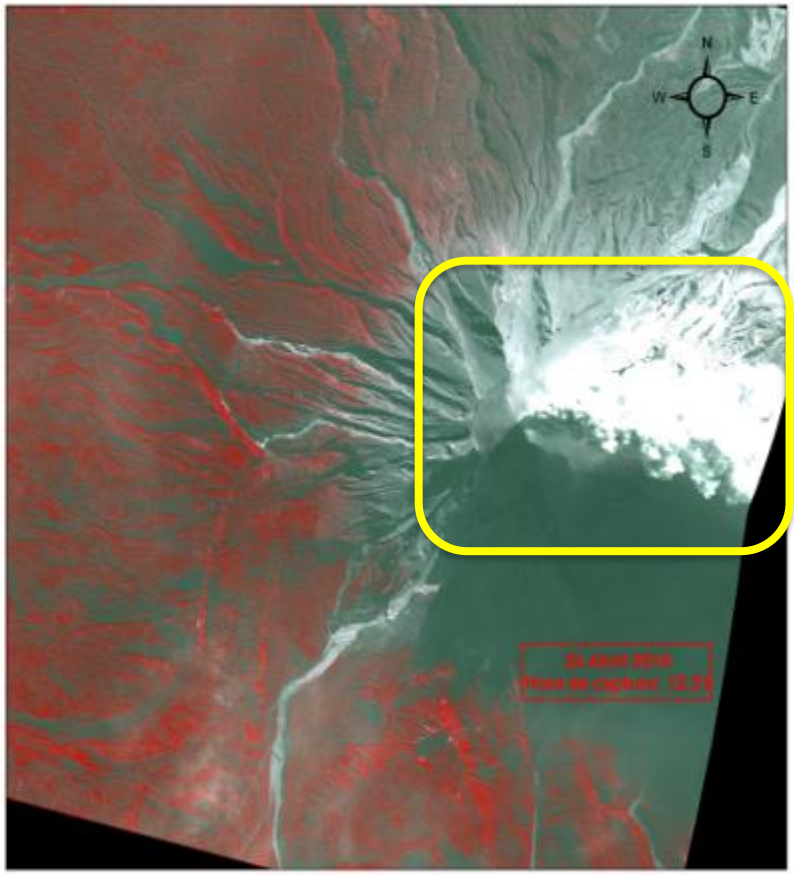
December 16, 2017

**Fasat C Satellite Image**
**Arica City. North of Chile**

Febreruary 2, 2019

# Volcanos Eruption Analysis



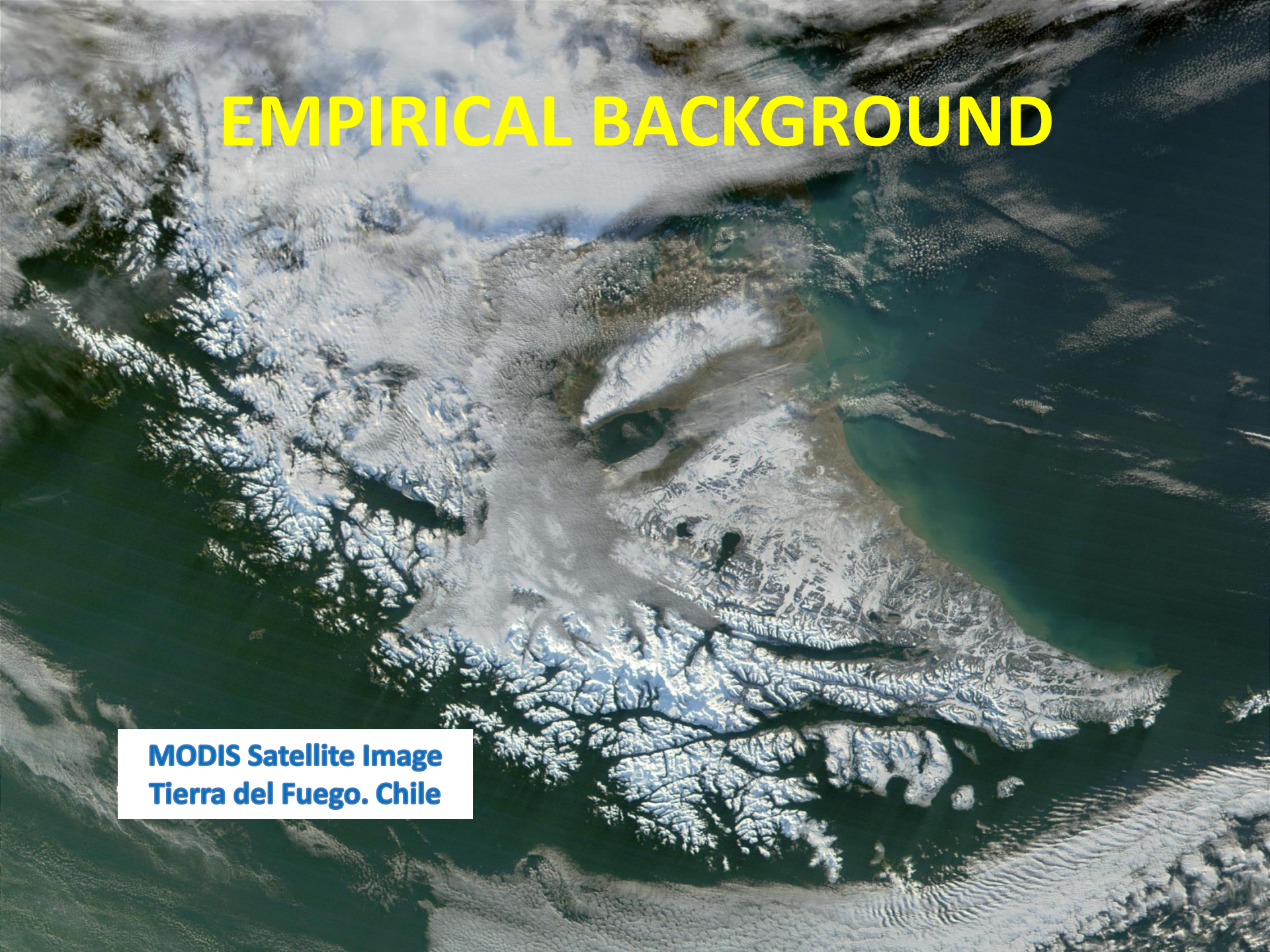




April 24, 2012

**Fasat C Satellite Image**
**Calbuco Volcano. South of Chile**

April 24, 2015

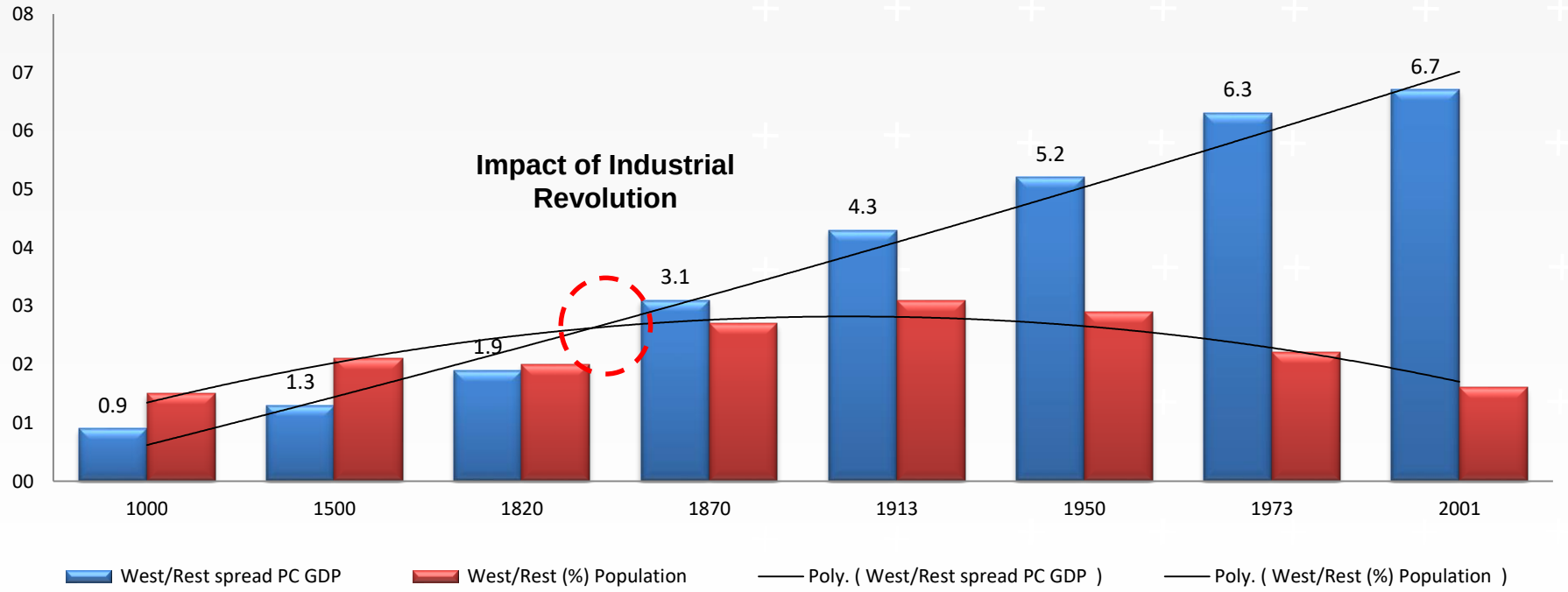
# EMPIRICAL BACKGROUND



MODIS Satellite Image
Tierra del Fuego. Chile

# EMPIRICAL BACKGROUND

The role that technology and information have played in increasing the development gap between some of the main regions of the world, which has characterized the history of our civilization. (*Reference below)

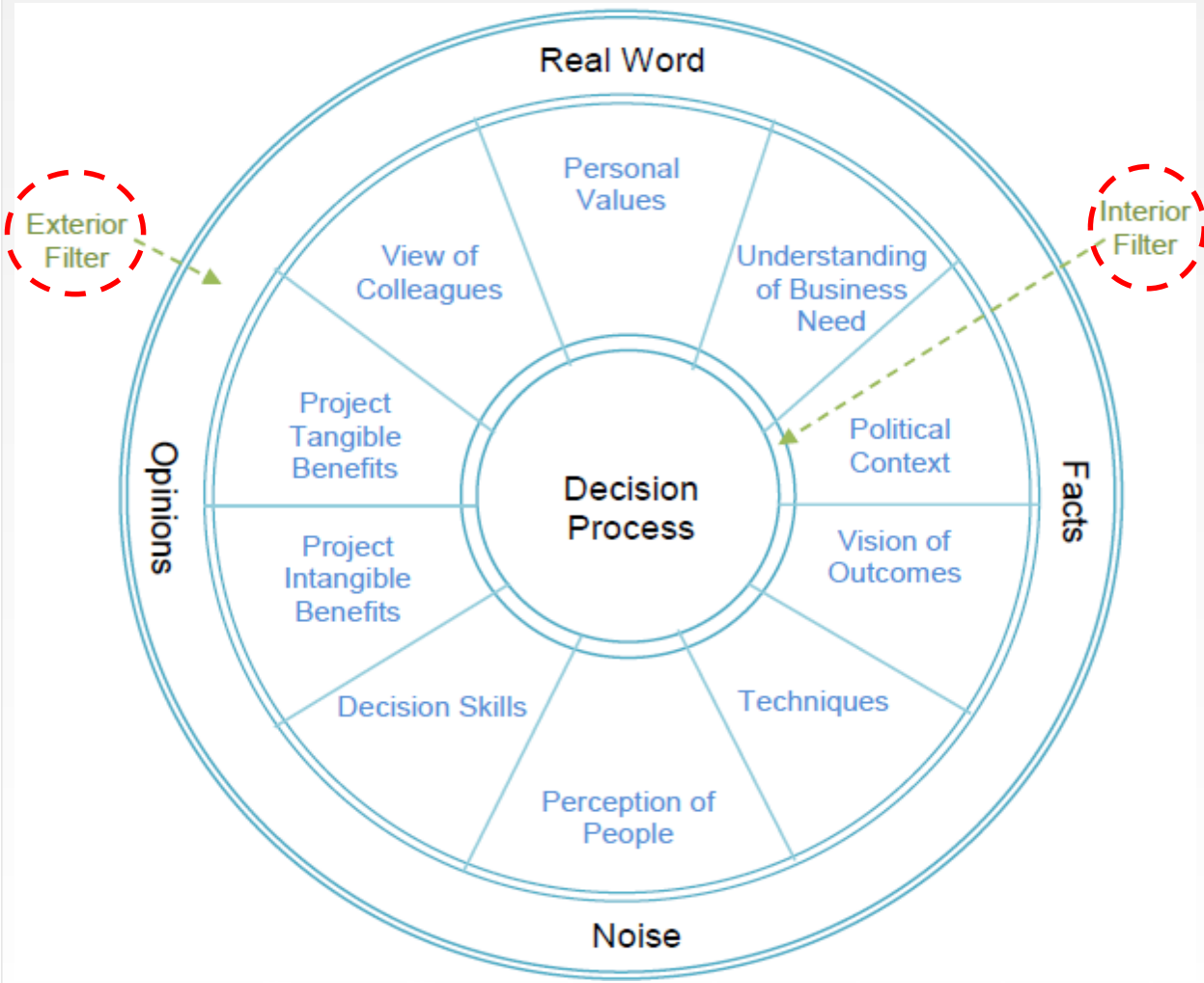



* Sáez, Luis. (2010) The Role of Geospatial Information In Local Economic Development. Master Code. University of Trento. Italy

# EMPIRICAL BACKGROUND

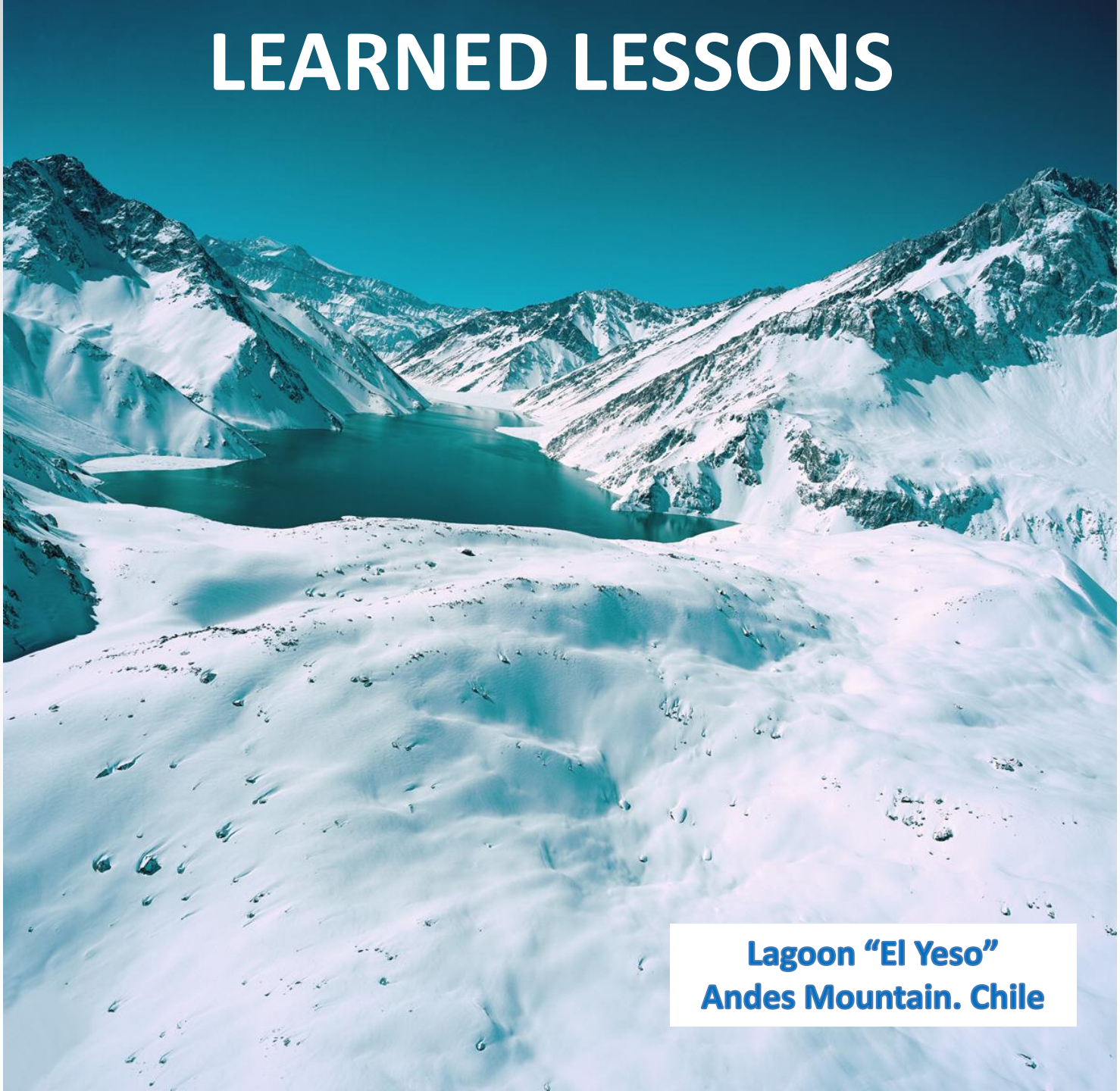
The way how geospatial information may contribute to:

- Better decision - making process of individuals and authorities
- A better understanding and relation of society with its environment.




* Sáez, Luis. (2010) The Role of Geospatial Information In Local Economic Development. Master Code. University of Trento. Italy

# LEARNED LESSONS



Lagoon “El Yeso”
Andes Mountain. Chile

# OUTCOMES

## Multicriteria Analysis *

The highest values of Geospatial Information (GI) utilization, may represent the contribution of GI and its related technologies to:

- Improve the adaptability capacity of society,
- Allow people better understanding of their surroundings,
- Interact in a more sustainable and efficient way with their environment.

| KEY ISSUES | CONCEPTS | CATEGORIES | COMPONENT | PROJECTS (Initial Situation) SCV | WSR | TOCOPILLA |
|---|---|---|---|---|---|---|
| STRATEGIC VALUE | Local Competitiveness | Local Attractiveness | 0,73 | 0,60 | 0,60 | 1,00 |
| | | Local Value Chain | 0,73 | 1,00 | 0,20 | 1,00 |
| | 0,67 | Local Competitive Strategy | 0,90 | 1,00 | 0,70 | 1,00 |
| | | | | **0,88** | **0,52** | **0,60** |
| CRITICAL VALUE | Local Effectiveness | Local Resource Management | 0,73 | 1,00 | 0,50 | 0,70 |
| | 0,57 | Local Production Enhancement | 0,40 | 0,40 | 0,40 | 0,40 |
| | | | | **0,70** | **0,45** | **0,55** |
| OPERATIONAL VALUE | Local Efficiency | Local Institutional Framework | 0,77 | 0,80 | 0,70 | 0,80 |
| | 0,81 | Stakeholders Participation | 0,83 | 1,00 | 0,50 | 1,00 |
| | | | | **0,92** | **0,58** | **0,92** |
| ARCHITECTURAL VALUE | Local Structure | Physical Infrastructure | 1,00 | 1,00 | 1,00 | 1,00 |
| | 0,82 | Economic Structure | 0,70 | 0,80 | 0,50 | 0,80 |
| | | | | **0,88** | **0,70** | **0,88** |
| INVESTMENT VALUE | Local Value | Value of Markets Factors | 0,63 | 1,00 | 0,60 | 0,30 |
| | 0,72 | Value of Non Market Factors | 0,80 | 1,00 | 0,70 | 0,70 |
| | | | | **1,00** | **0,65** | **0,50** |
| RISK ASSESSMENT | Local Standing | Local Adaptive Capacity | 0,97 | **1,00** | **0,90** | **1,00** |
| | 0,83 | Local Risk & Vulnerability | 0,63 | 0,70 | 0,70 | 0,50 |
| | | | | **0,88** | **0,82** | **0,80** |
| | | | **OVERALL TOTAL** | **0,88** | **0,62** | **0,69** |
| | | | | **0,731** | | |

* Sáez, Luis. (2010) The Role of Geospatial Information In Local Economic Development. Master Code. University of Trento. Italy

# OUTCOMES

## Multicriteria Analysis *

The highest values of Geospatial Information (GI) utilization, may represent the contribution of GI and its related technologies to:

- Better decisions of people and especially governments, related to the physical infrastructure required for better adaptation to the environment and exploitation of its resources.

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# OUTCOMES

## Multicriteria Analysis *

The highest values of Geospatial Information (GI) utilization, may represent the contribution of GI and its related technologies to:

- The incorporation of local actors in decision-making processes, corroborating the important role that Geospatial capabilities have in governance and democracy.

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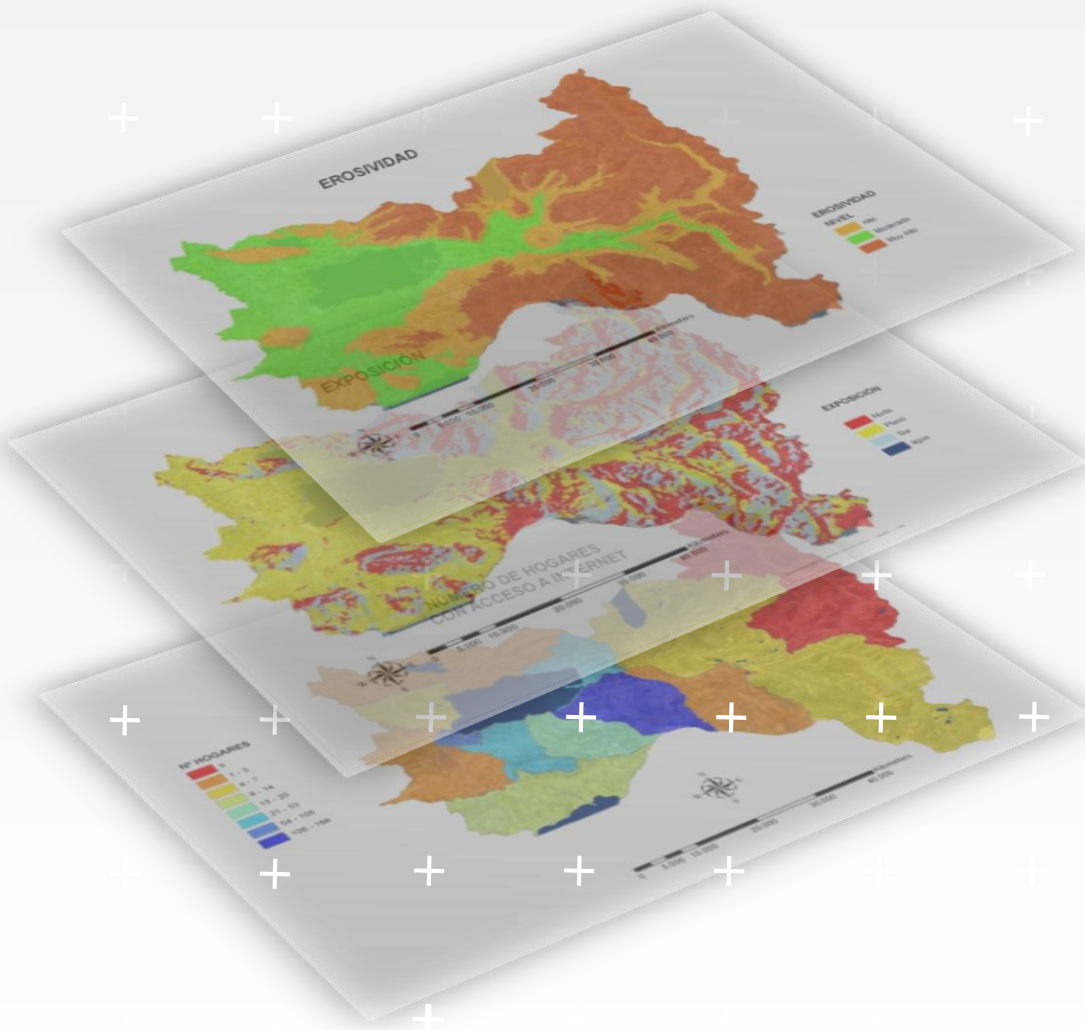
## SYNTHESIS

The use of geospatial information through a comparative & interorganizational approach:

- Facilitates the coordination of stakeholders.
- Allowed the incorporation of local actors in decision making process.
- Facilities the decisions to increase local competitiveness.



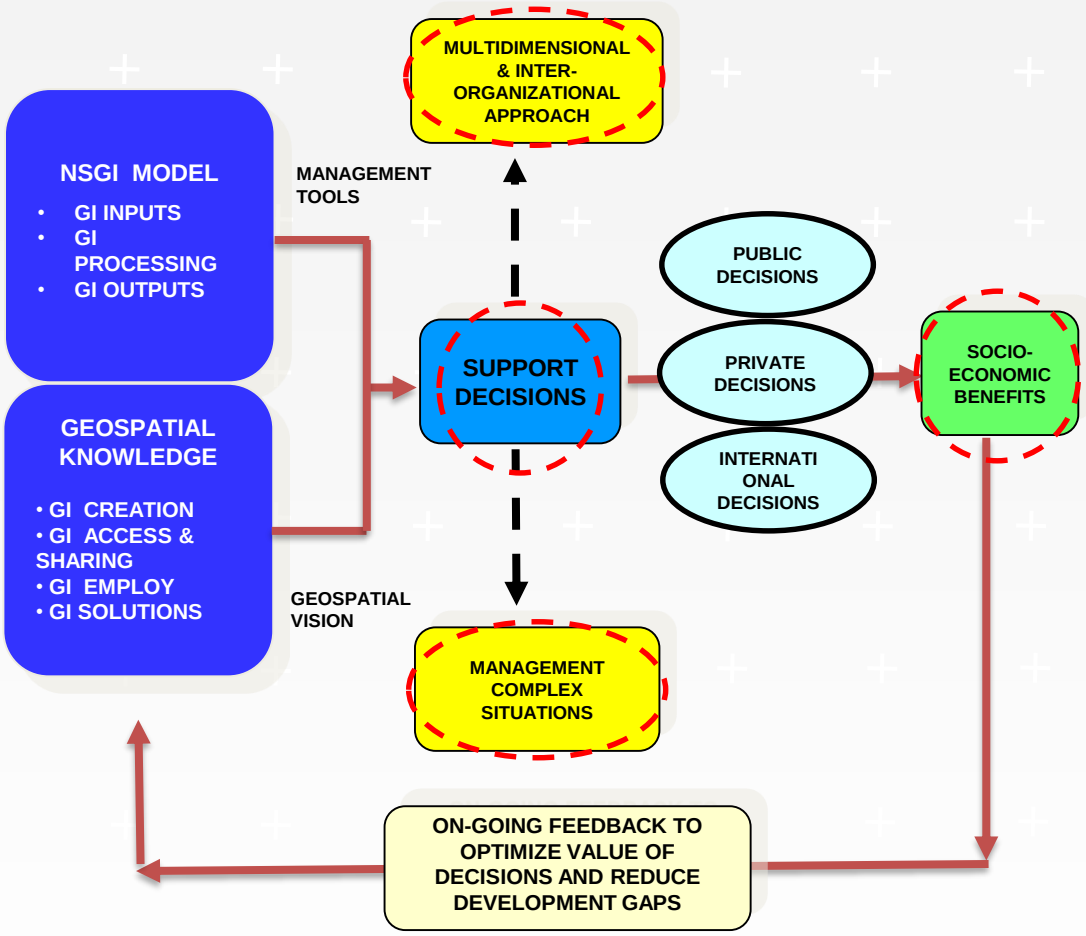
# CHALLENGES

Rapa Nui. Chile

# CHALLENGES

## TO BUILT A GEOSPATIAL SYSTEM

It is necessary establish the structure that a country should have to use geospatial capabilities to support national development.



# CHALLENGES

## TO DEFINE A NATIONAL SPATIAL STRATEGY

**Purpose**

- Strengthen the National Space System

**Objectives**

- Financial Framework
- Regulatory Framework
- Institutional Framework

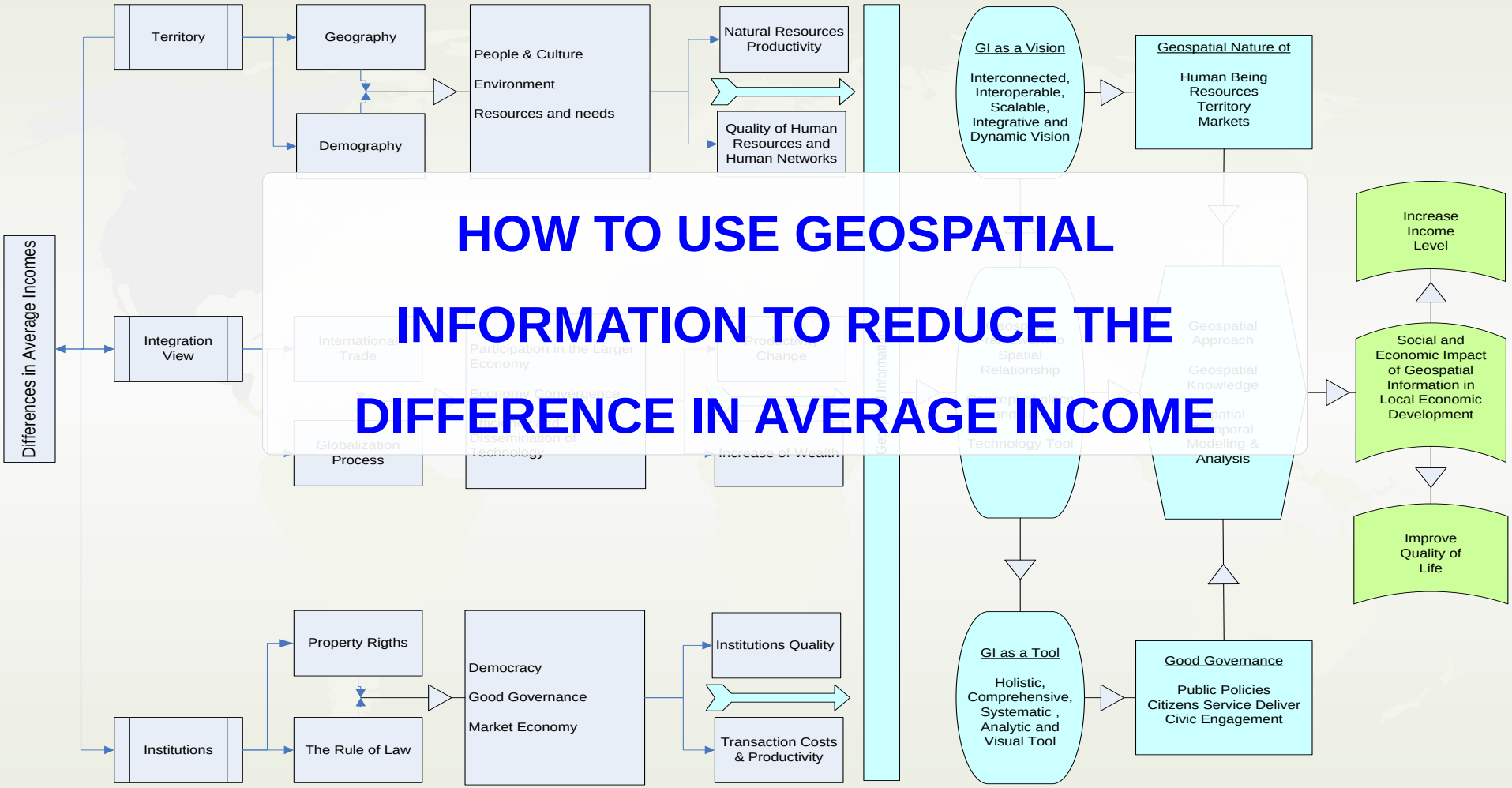
**Areas of Interest**

- Geospatial Information Management
- Cybersecurity & Mathematical Data Modeling
- Space Assets
- SATCOM & multi-sensor land stations

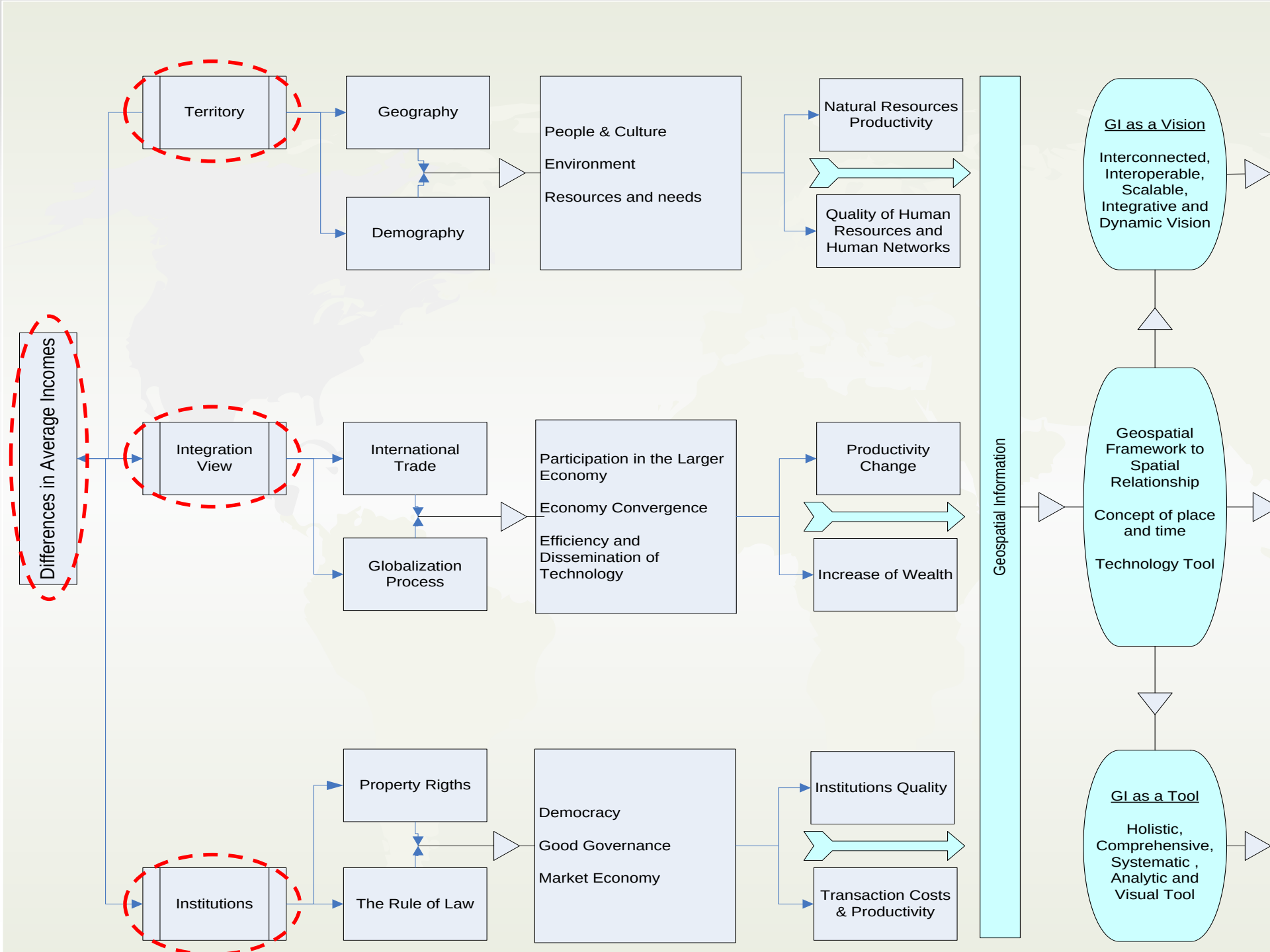
**Lineas of Action**

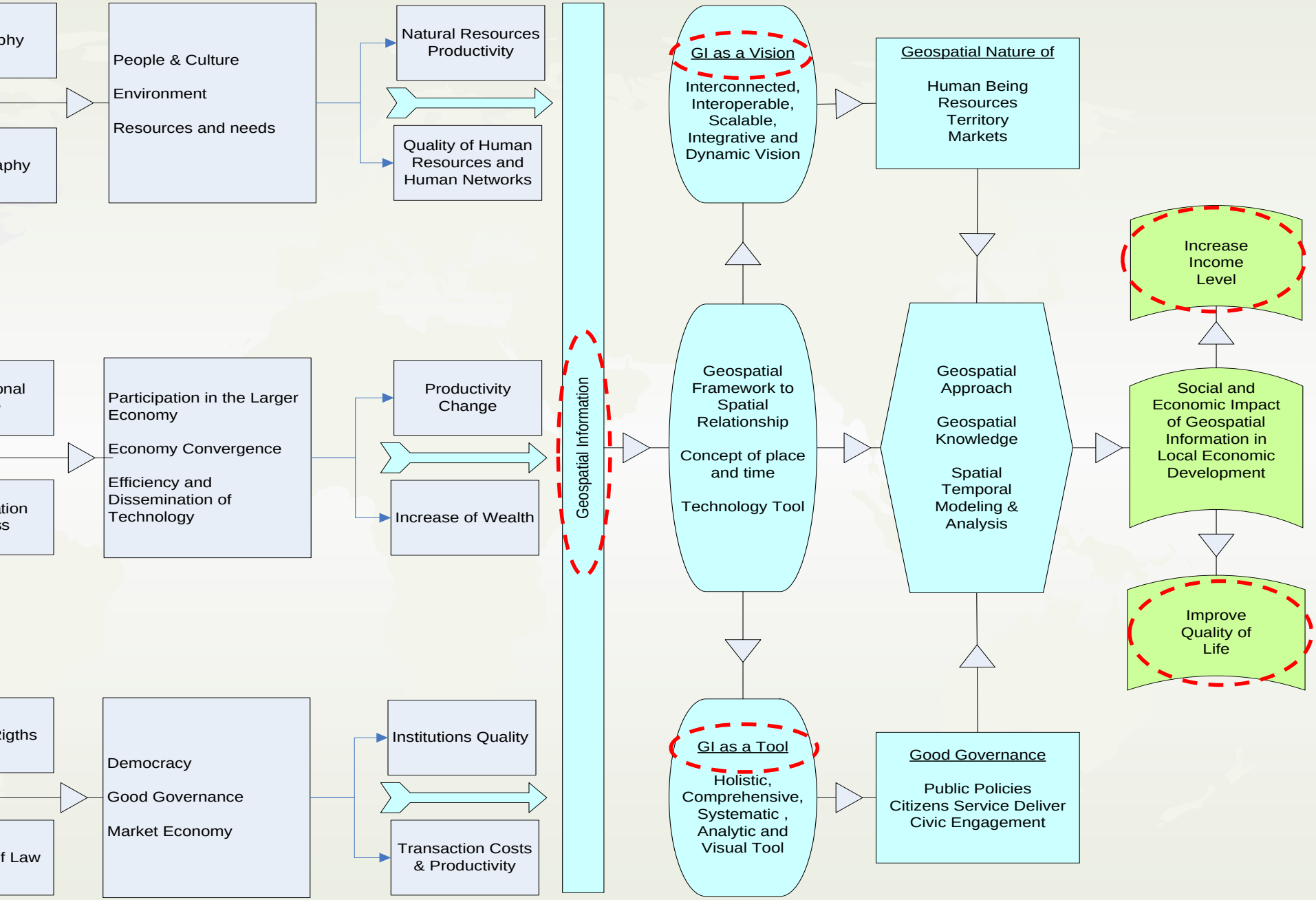
- National Space Industry
- I 2 + D
- National, Regional and International Collaboration

# HOW TO USE GEOSPATIAL INFORMATION TO REDUCE THE DIFFERENCE IN AVERAGE INCOME




* Sáez, Luis. (2010) The Role of Geospatial Information In Local Economic Development. Master Code. University of Trento. Italy


Differences in Average Incomes
Territory
Integration View
Institutions
Geography
Demography
International Trade
Globalization Process
Property Rigths
The Rule of Law
People & Culture
Environment
Resources and needs
Participation in the Larger Economy
Economy Convergence
Efficiency and Dissemination of Technology
Democracy
Good Governance
Market Economy
Natural Resources Productivity
Quality of Human Resources and Human Networks
Productivity Change
Increase of Wealth
Institutions Quality
Transaction Costs & Productivity
Geospatial Information
GI as a Vision
Interconnected, Interoperable, Scalable, Integrative and Dynamic Vision
Geospatial Framework to Spatial Relationship
Concept of place and time
Technology Tool
GI as a Tool
Holistic, Comprehensive, Systematic , Analytic and Visual Tool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Territory
Markets
Geospatial Approach
Geospatial Knowledge
Spatial Temporal Modeling & Analysis
Good Governance
Public Policies
Citizens Service Deliver
Civic Engagement
Increase Income Level
Social and Economic Impact of Geospatial Information in Local Economic Development
Improve Quality of Life

# CONCLUSIONS

Santiago City. Chile

# CONCLUSIONS

- Geospatial Technologies has helping to optimize the way in which society perceives, understands, and relate with its environment; playing a fundamental role to increase territorial competitiveness, improve local economic performance and foster adaptive capacity of human being.

- Geospatial Information as a vision and development instrument has allowed improve the communication and decision making process across sectors and levels of society; providing as well new forms to relate among actors, besides a common language to begin meaningful dialogs.

# CONCLUSIONS

- The national spatial development requires to be considered as a challenge of political nature and strategic scope, feasible to be solved by means of diverse alternatives of a technical nature. It is not just a technical problem.

- It is necessary to define a national strategy that allows the space to be considered as a pole of strategic development of the country (similar to Antarctic and Astronomy for our country), essential for the national development and the welfare of its population (Economy of space & services economy)

# CONCLUSIONS

- The information collected from the space through public resources and managed by state institutions, can be considered as a public goods that represents the subsidiary role of the State and creates public value for its inhabitants.

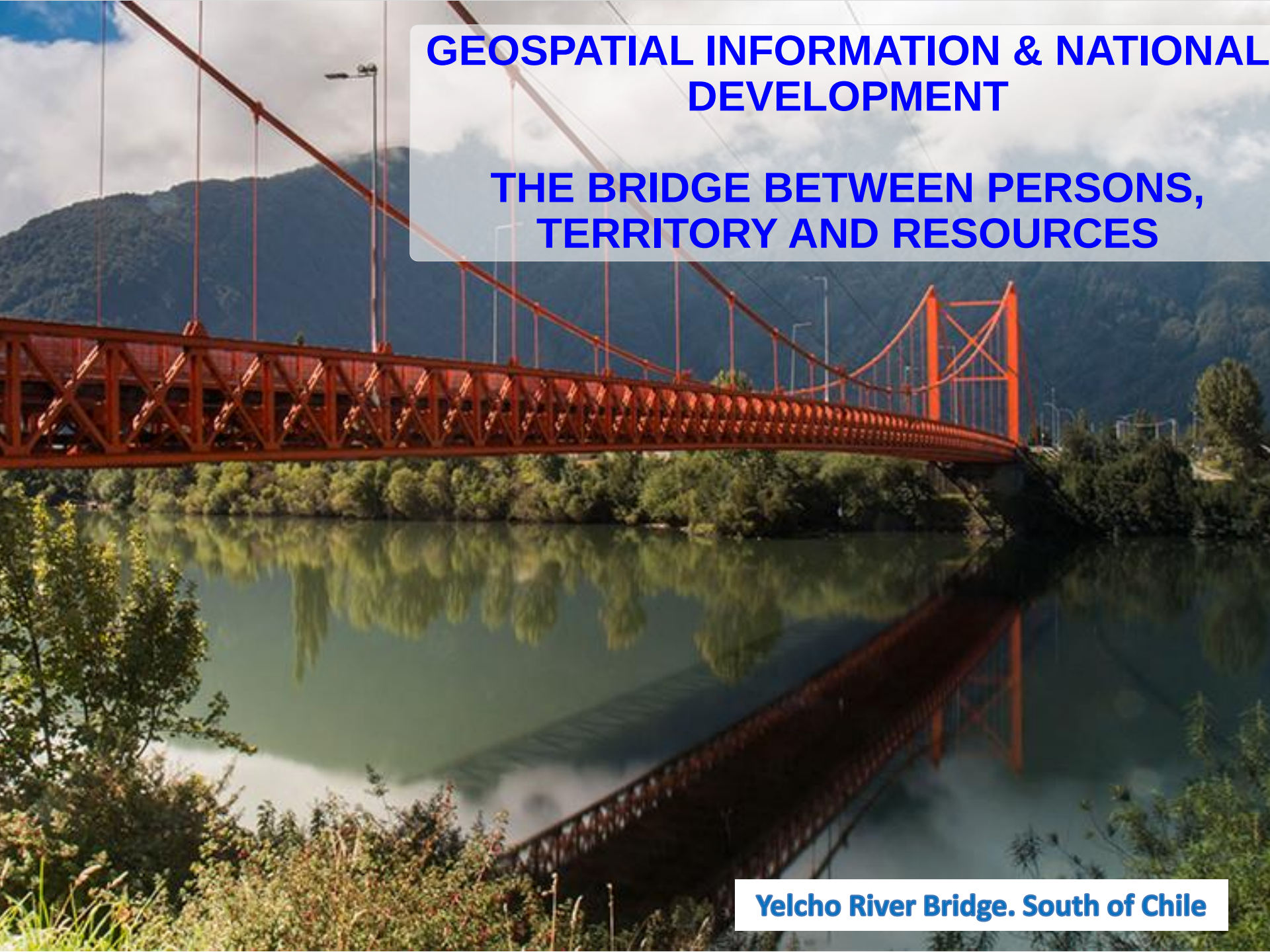
- It requires a specific, permanent and complementary budgetary framework between different public and private actors, as well as strengthening the regulatory and institutional framework for national space development.

# GEOSPATIAL INFORMATION

# THE BOARD FOR A NATIONAL DEVELOPMENT

# GEOSPATIAL INFORMATION & NATIONAL DEVELOPMENT

## THE BRIDGE BETWEEN PERSONS, TERRITORY AND RESOURCES



Yelcho River Bridge. South of Chile