

A decorative logo on the left side of the slide, composed of several triangles in green, orange, yellow, and red, arranged in a larger triangular shape.

# General Direction of Geostatistics and Beneficiaries Registry from the Ministry of Social Development

## Data Science Lab



September  
2018



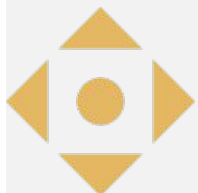
# Integrated Social Information System

SEDESOL  
SECRETARÍA DE  
DESARROLLO SOCIAL



**It allows to know the social conditions of the population**

Who are they? Where do they live? What deprivations do they have?



**It aligns the institutional offer**

of the three levels of government, according to the identified social needs (demand and supply).



**Unifies the targeting tools**

currently used by social programs in Mexico.



**Mitigates**

inclusion and exclusion errors.

## Georeferenced Social Information System

**Visualizes** geostatistical information from census sources and social programs.

# SISI



### Preventive Platform

**Exploits** SISI information through **Data Science** tools to generate predictive analytics.

### Targeting System for Development

**Identifies** potential target population. Evaluates the socioeconomic conditions of the most vulnerable households.

### Unique Register of Beneficiaries

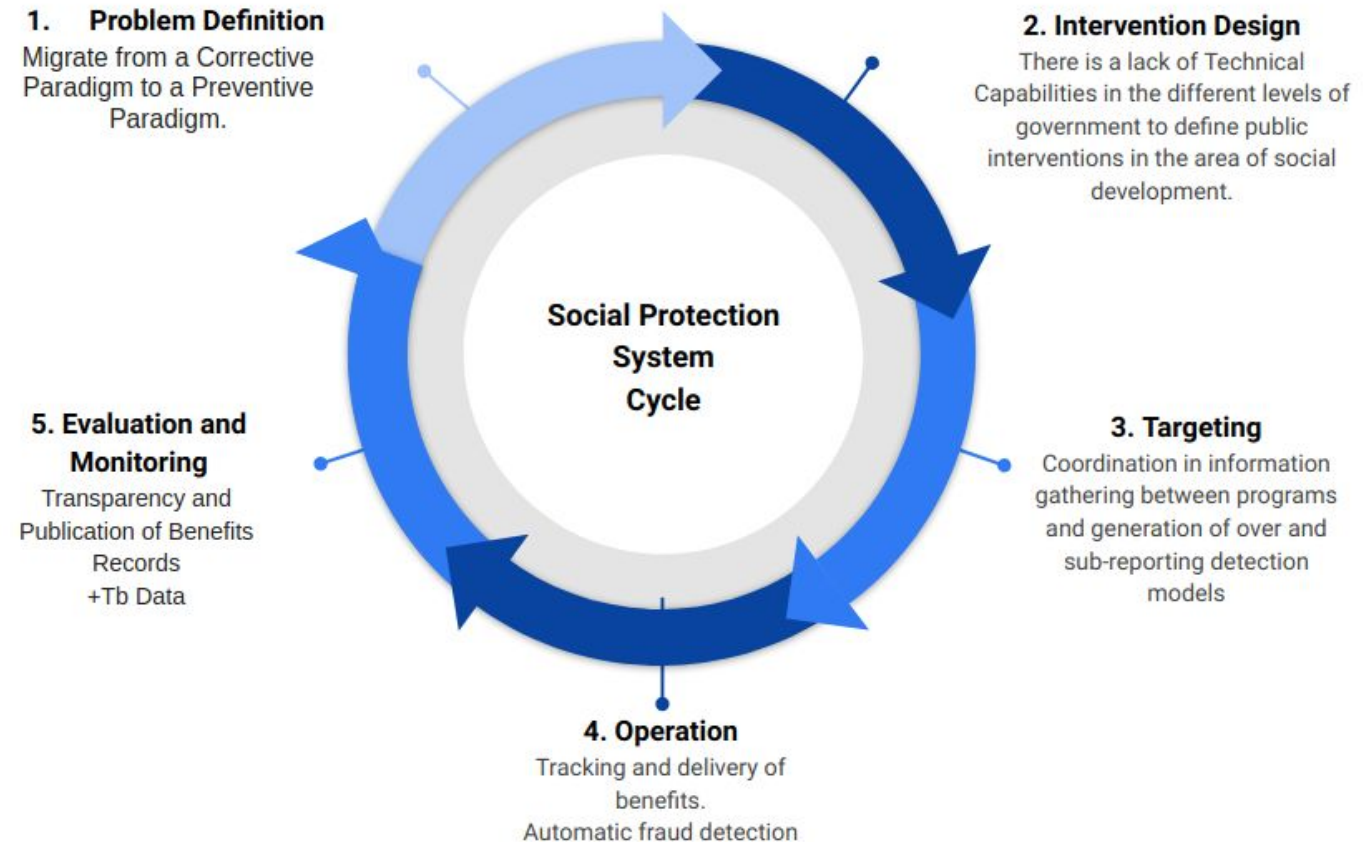
**Consolidates** the social programs registers to monitor the interventions received by the beneficiaries.



# How can Data Science help the Social Protection System?

- **Vulnerability:** The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.
- **Coping capacity:** is the ability of people, organizations and systems, using available skills and resources, to manage adverse conditions, risk or disasters. The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks.

- Mexico offers social welfare assistance to reduce the vulnerability of the Mexican population including assistance for low-income populations, young people, the elderly, and people with disabilities.

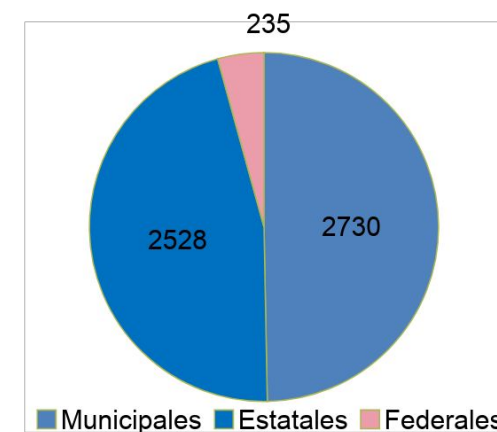




# Main Problems of the social protection system

1. Social policy design based on the **effects** and not studying its **causes**.
2. Insufficient understanding of the social protection system has led to incoherent policies and **duplicative efforts** wasting **potential synergies** between inter-ministerial programs.
3. At the local levels of government, the lack of technical capacities of public servants makes evident the need to **systematize easy-to-use tools** for policy making.
4. The impact of **exogenous shocks** is not measured which is why the Social Protection System makes targeting decisions with unreliable information.

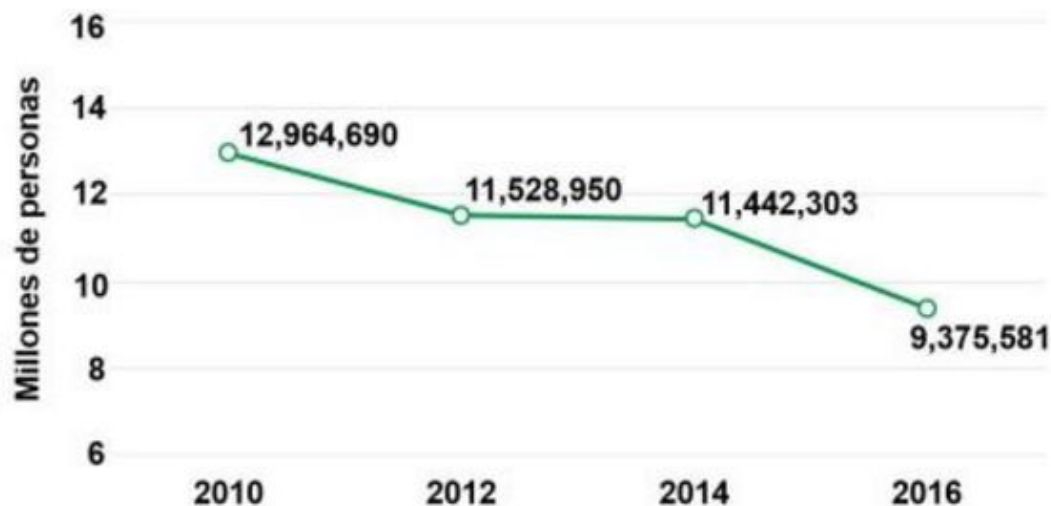
6,491 social programs and interventions. (CONEVAL 2014).



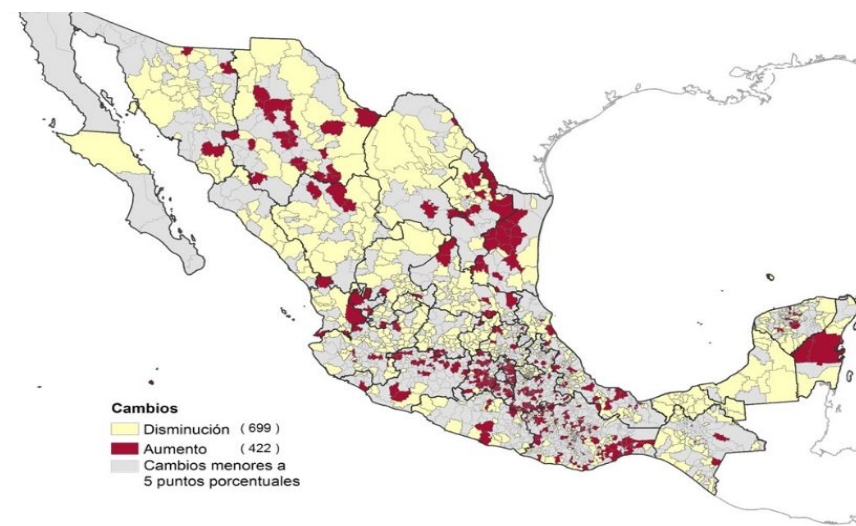


# Aggregate Shocks in Latin America

Number of people living in extreme poverty  
(México) 2010-2012



Positive and negative change in the population living in poverty (2010 - 2015)

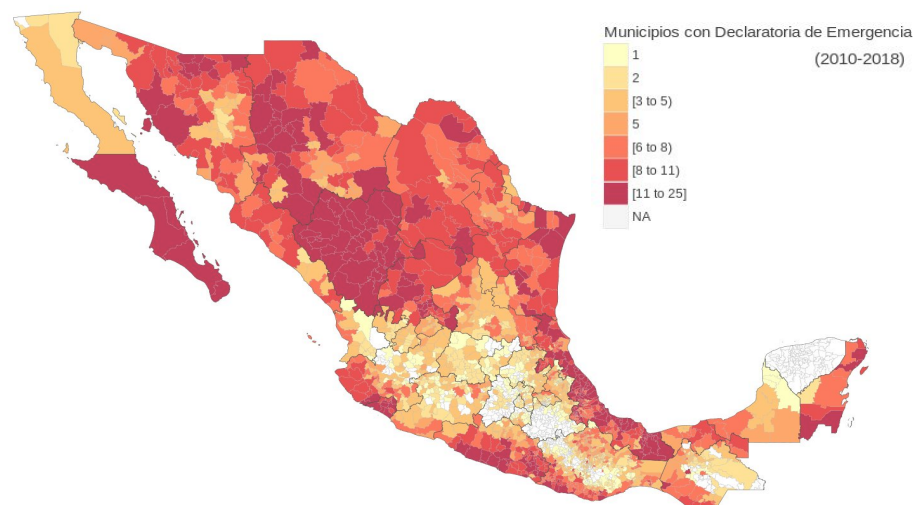


- Between 2003 and 2012 the proportion of people in extreme poverty (surviving on less than \$ 2.50 a day) was halved [12.3%].
- The number of disasters has grown more than three times at the regional level

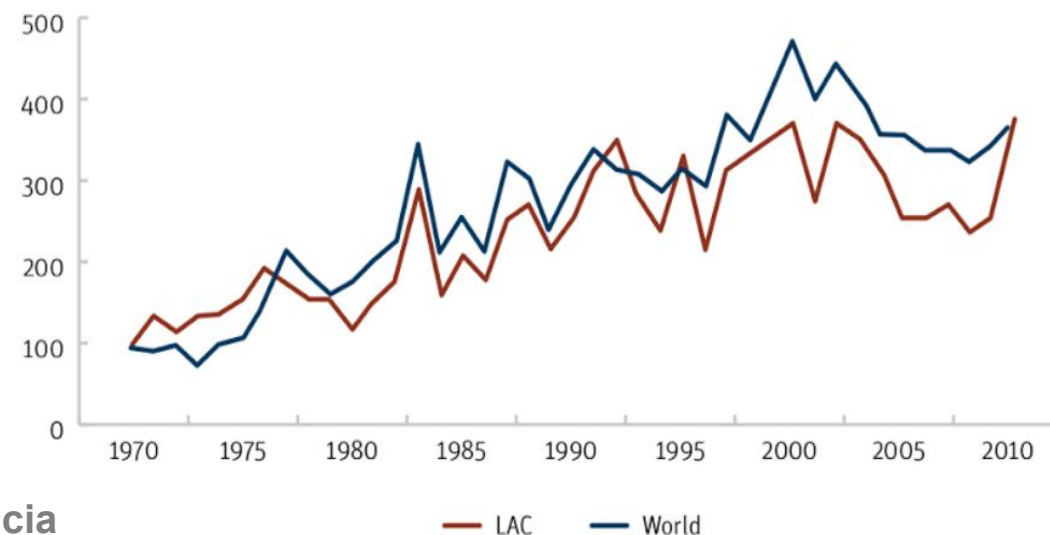


# Aggregate Shocks in Latin America

Number of “emergency declarations” at the municipal level (2010-2018)



Incidence of natural disasters, global and regional



Enfoque en Resiliencia

CHILE

8.6  
MAGNITUD

526  
MUERTES

HAITÍ

7.0  
MAGNITUD

+300,000  
MUERTES

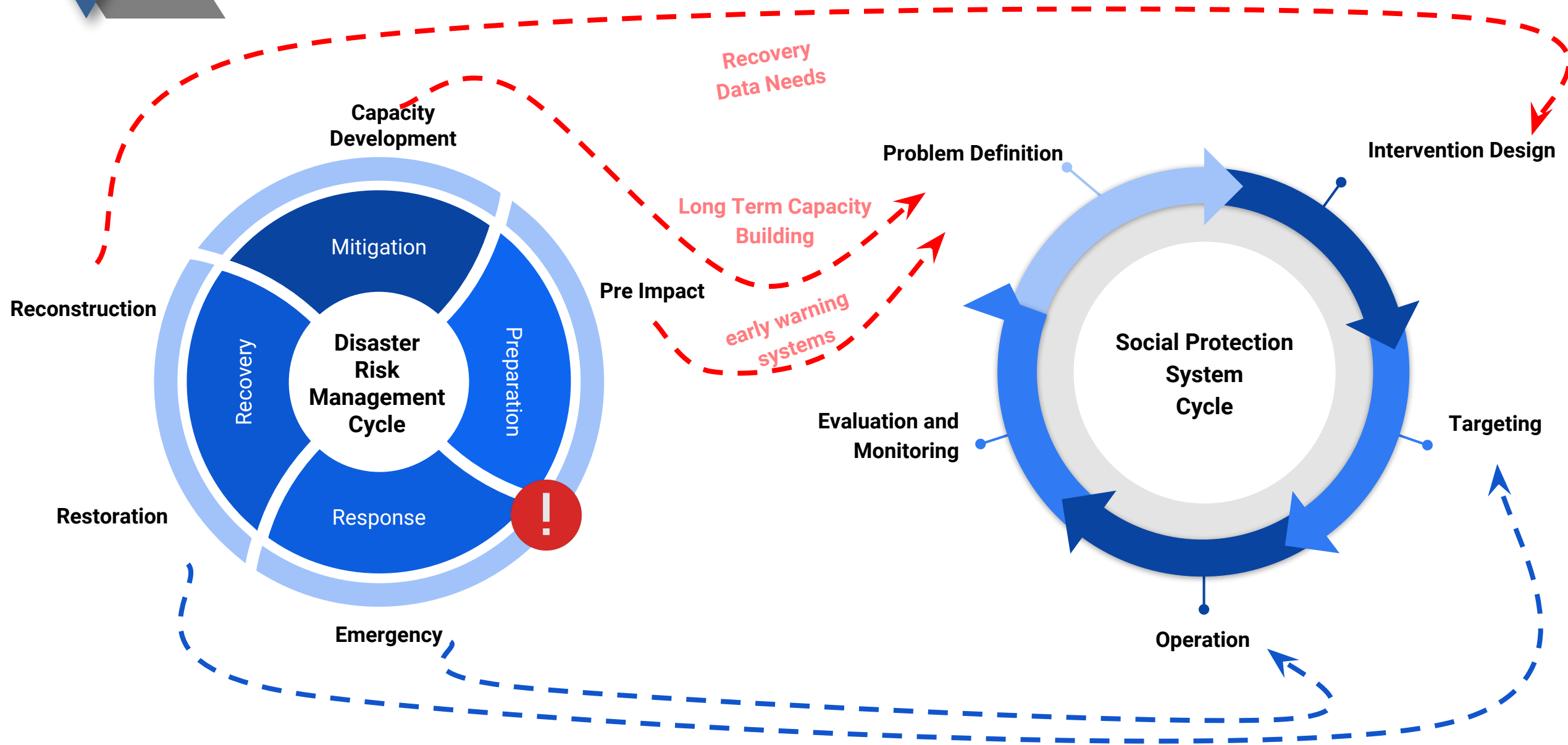
MÉXICO

7.1  
MAGNITUD

360  
MUERTES



# Collaboration between Social Protection System + DRR







# Tools of the Social Protection System

## Long Term Capacity Development

- Focused on Resilience Generation.
- Based on risk analysis. (Vulnerability, Coping Capabilities and Hazard & exposure).
- Focalization Mechanisms and Institutional Coordination.
- Coordination between programs.
- Reduction of inclusion and exclusion errors



## Preparation

### Early Warning Systems (Hazards):

- Drought.
- Hurricanes.
- Agricultural Production Anomaly.
- Food Price Warnings.
- Violence.



## Recovery

### Disaster Management Protocol:

#### Define information needs:

- Humanitarian Action
  - Short Response survey
- Recovery
  - Mechanism of information collection through sampling and small area estimation.

Public policy recommendation update



# 1. Long Term Capacity Development

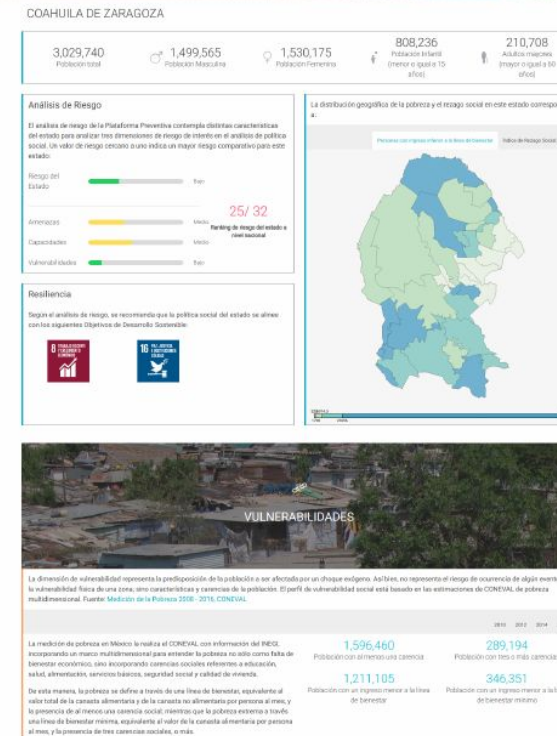
## Problems:

1. Social policy design based on the **effects** and not studying its **causes**.
2. At the local levels of government, the lack of technical capacities of public servants makes evident the need to **systematize easy-to-use tools** for policy making.



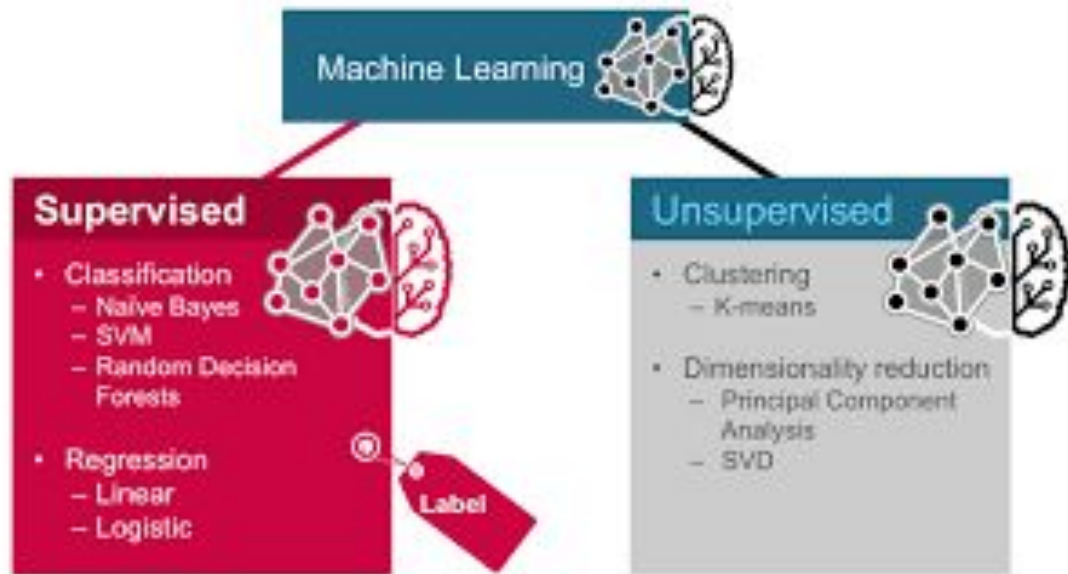
- Recommendation System of social policy based on risk analysis to facilitate public policy decisions at a state and municipality level.

## Social Protection System NETFLIX





# 1. Long Term Capacity Development



1. We don't have enough data.
2. We don't have impact evaluations for all the interventions.

We need -> expert knowledge

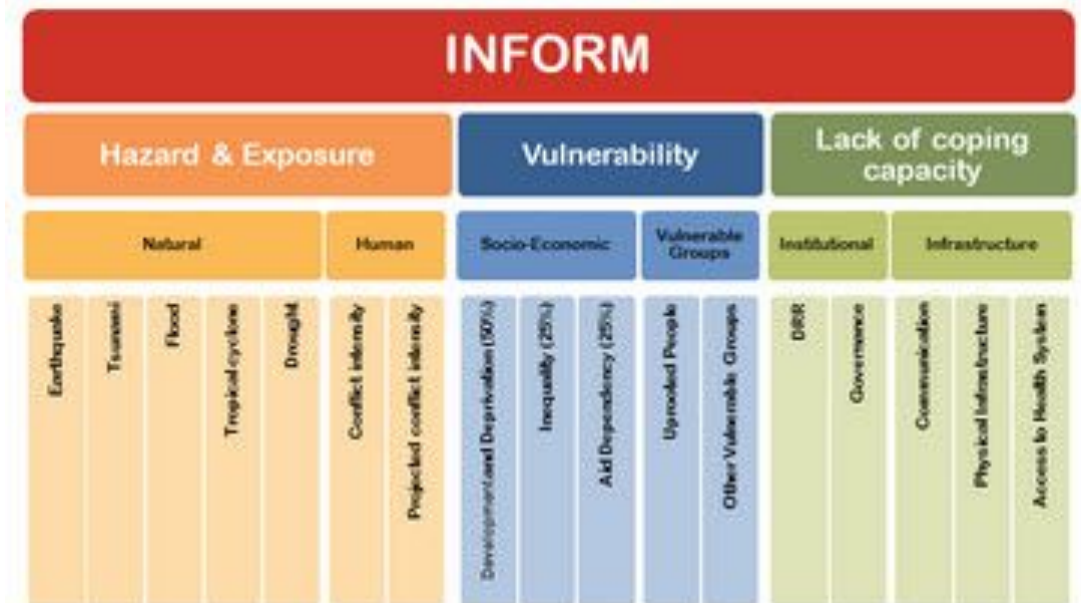
## Two Steps:

Theoretical framework of Risk analysis.  
Bayesian Network + Expert knowledge.

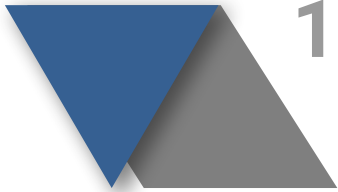
**INFORM**  
INDEX FOR RISK MANAGEMENT

**Risk Index**

Municipality and State level

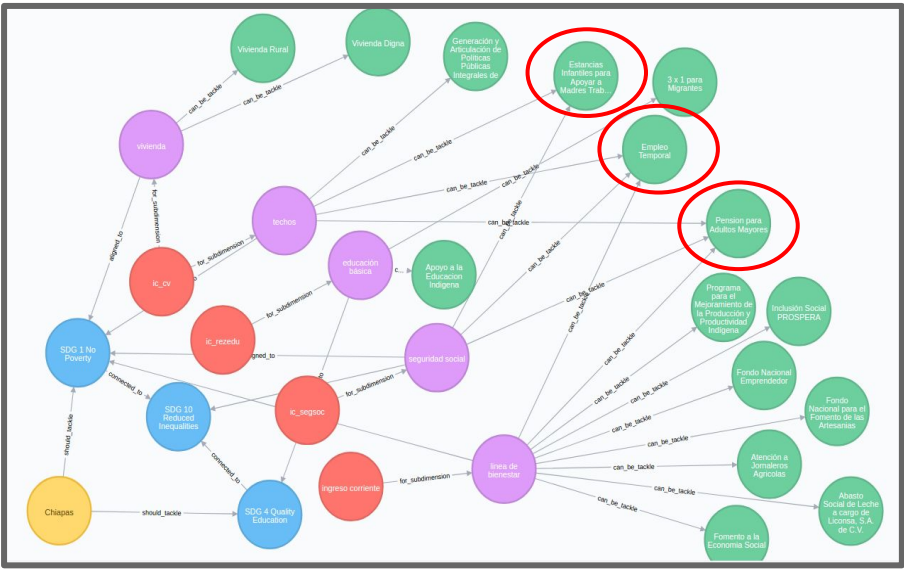
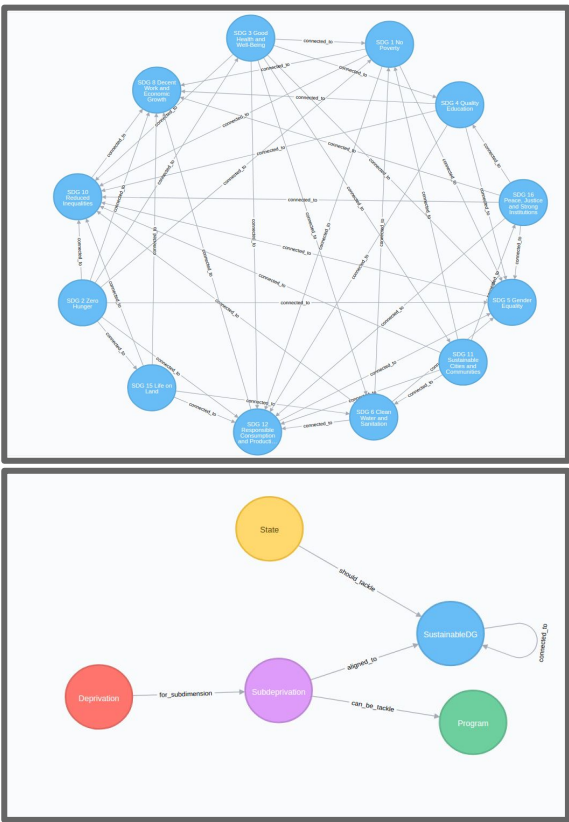
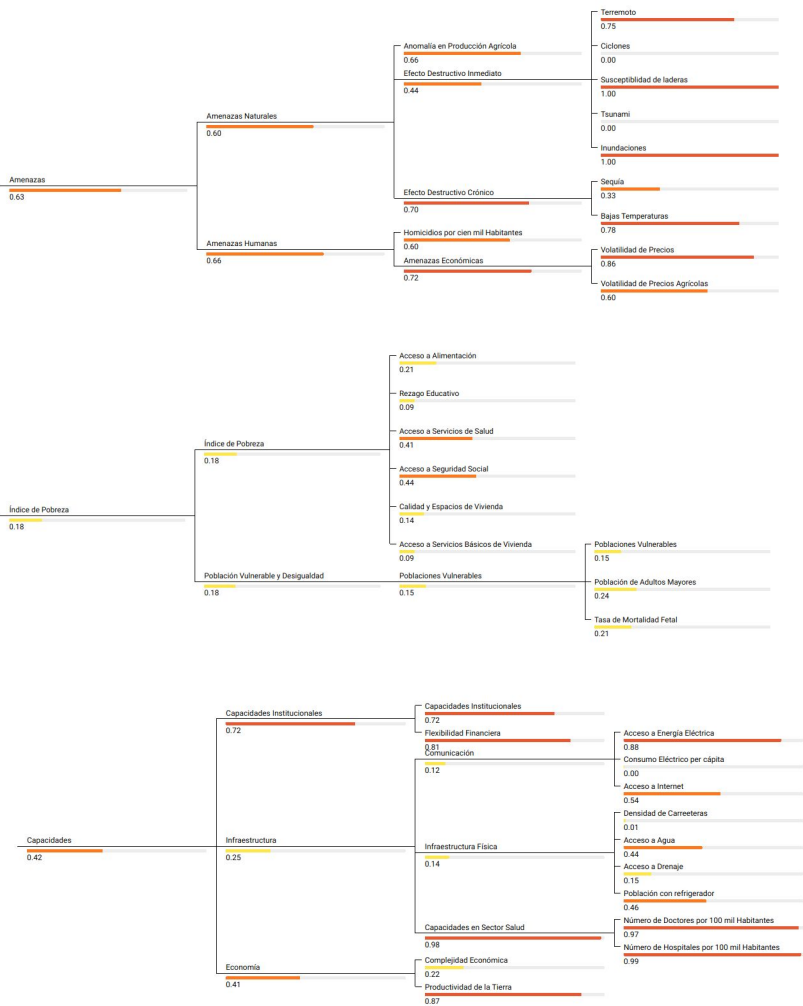






# 1. Long Term Capacity Development

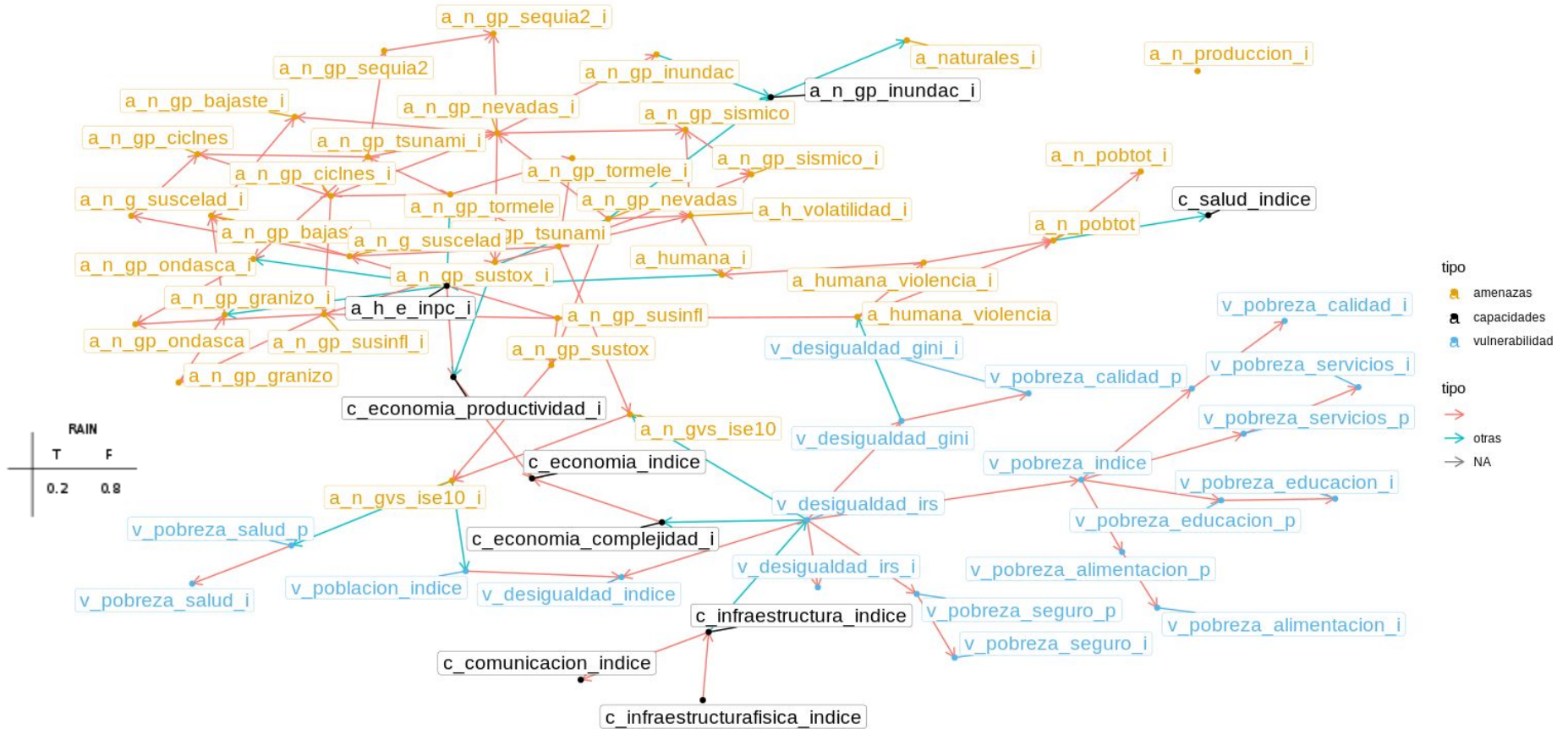
- Analysis of relationships between deficiencies and the social offer to maximize collaboration between agencies.



David Le Blanc's . Towards integration at last? The sustainable development goals as a network of targets.

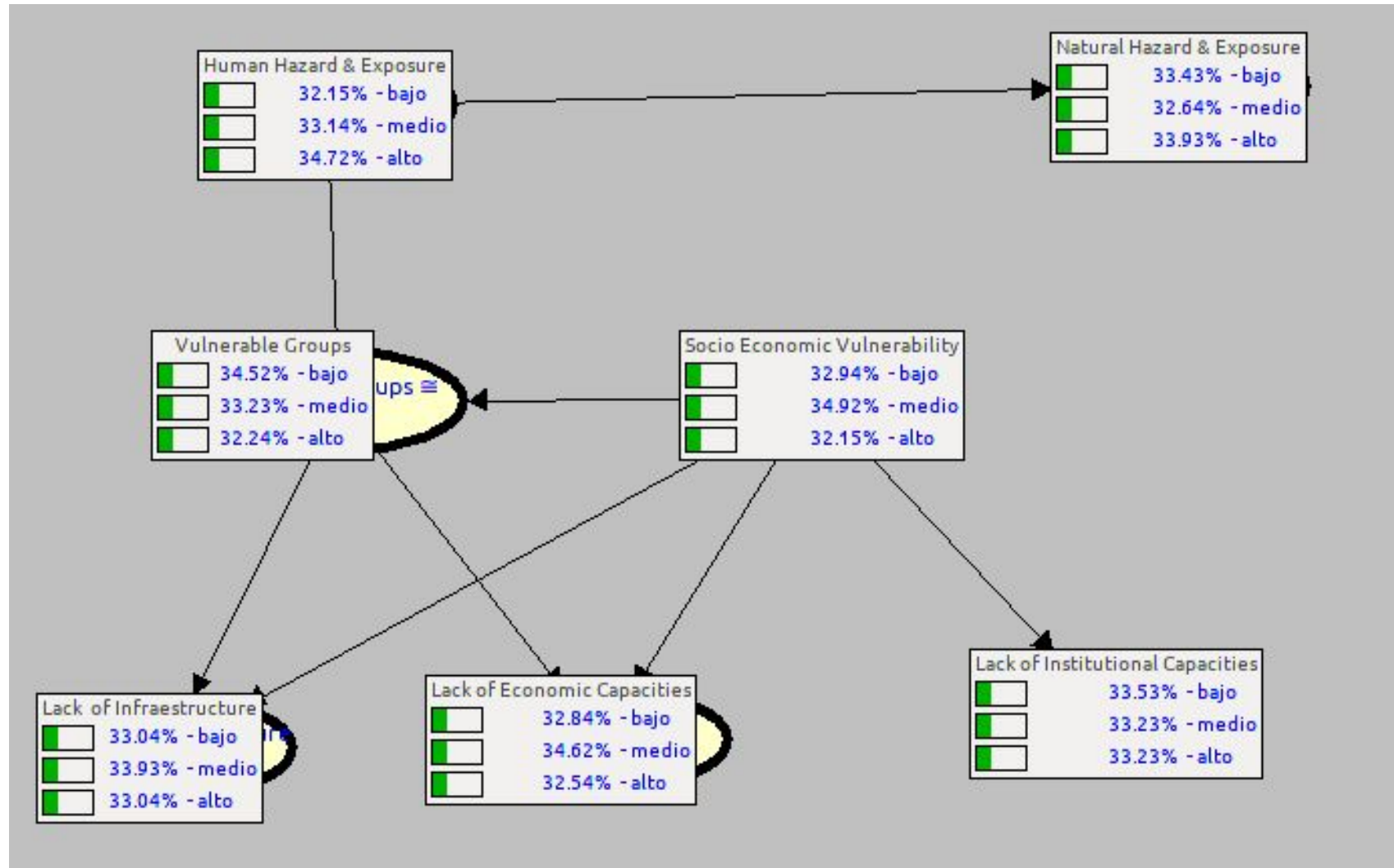


## Bayesian Networks + Expert knowledge



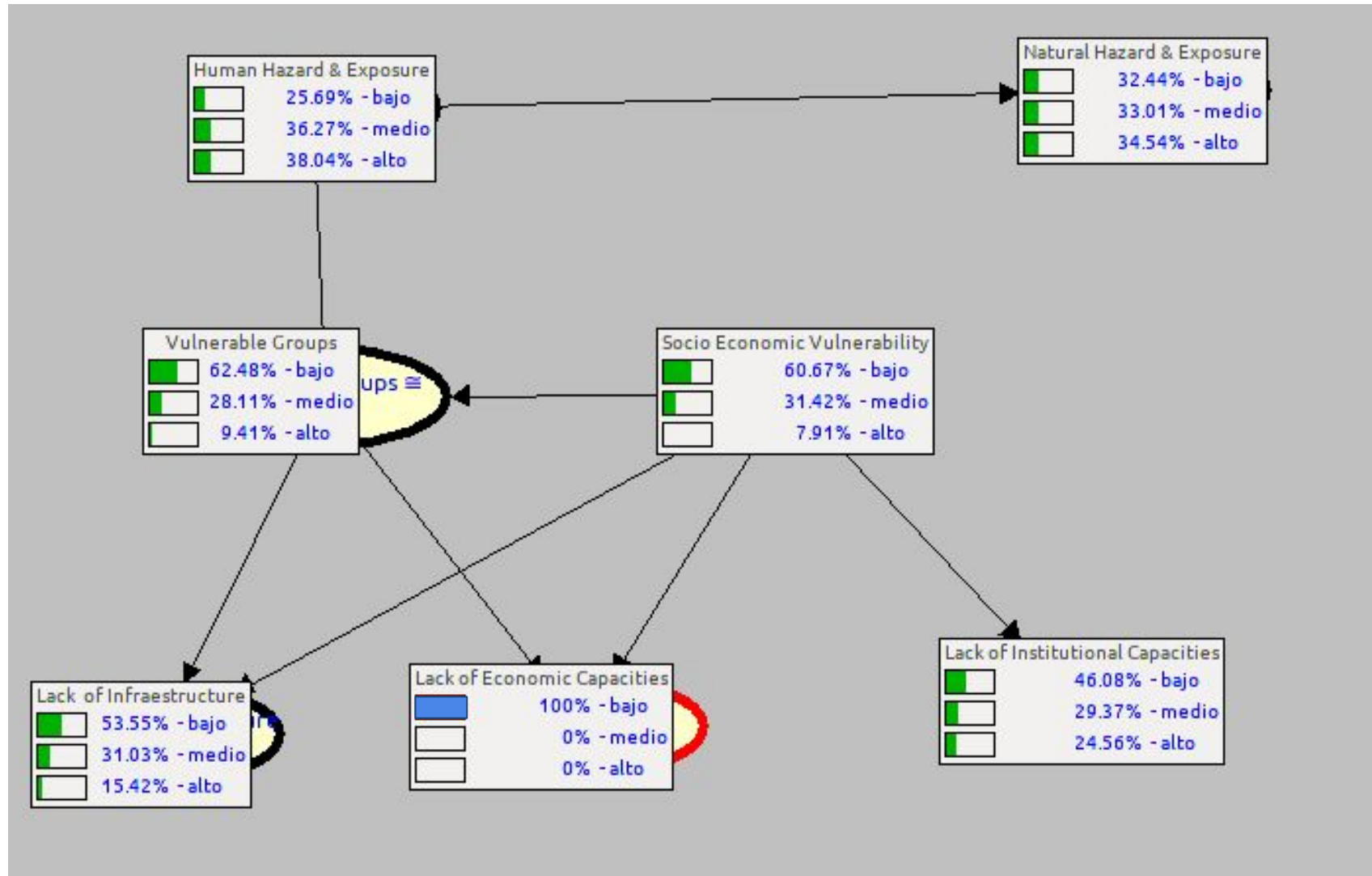


# 1. Long Term Capacity Development



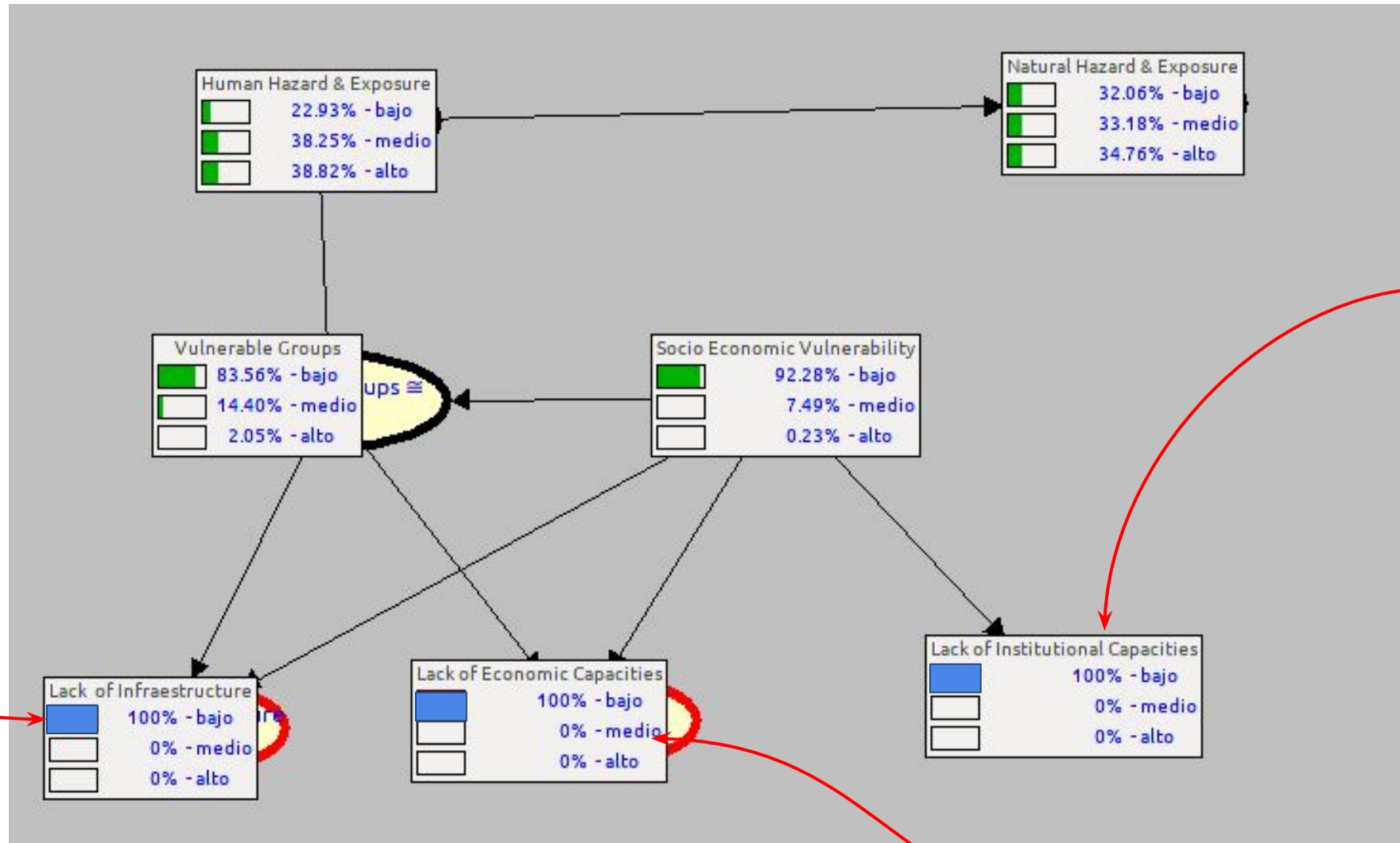


# 1. Long Term Capacity Development





# 1. Long Term Capacity Development



SCT

SECRETARÍA DE  
COMUNICACIONES  
Y TRANSPORTES

Road Conservation  
Program

SAGARPA

SECRETARÍA DE AGRICULTURA,  
GANADERÍA, DESARROLLO RURAL,  
PESCA Y ALIMENTACIÓN

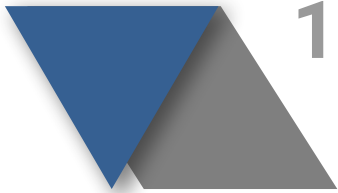
Rural support fund  
for weather  
contingencies

SEDESOL

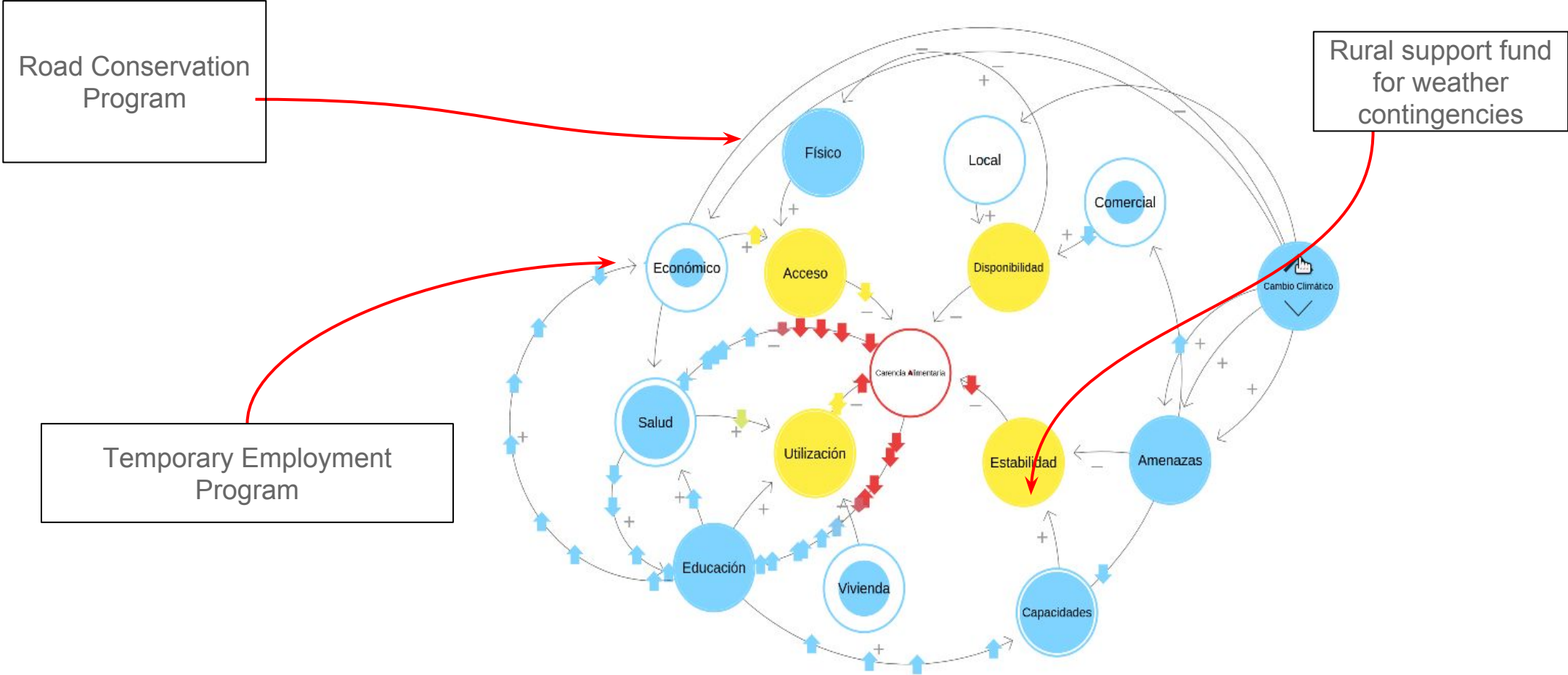
SECRETARÍA DE  
DESARROLLO SOCIAL

Temporary Employment  
Program



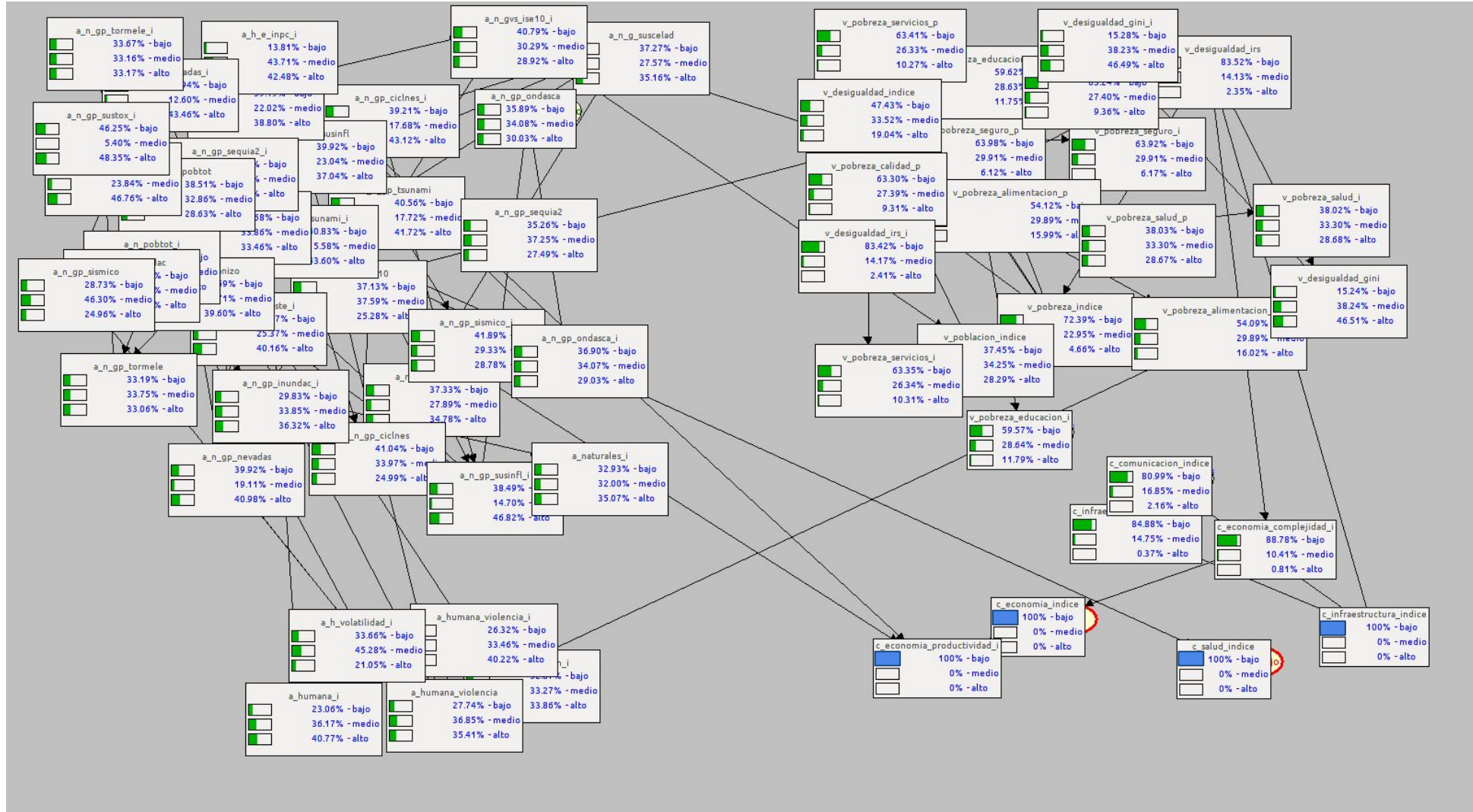


# 1. Long Term Capacity Development

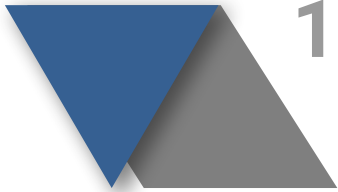




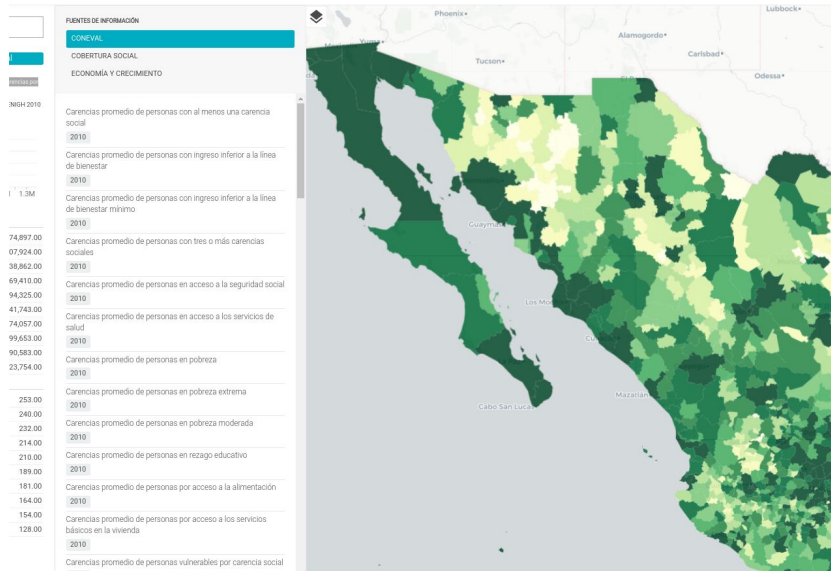
# 1. Long Term Capacity Development



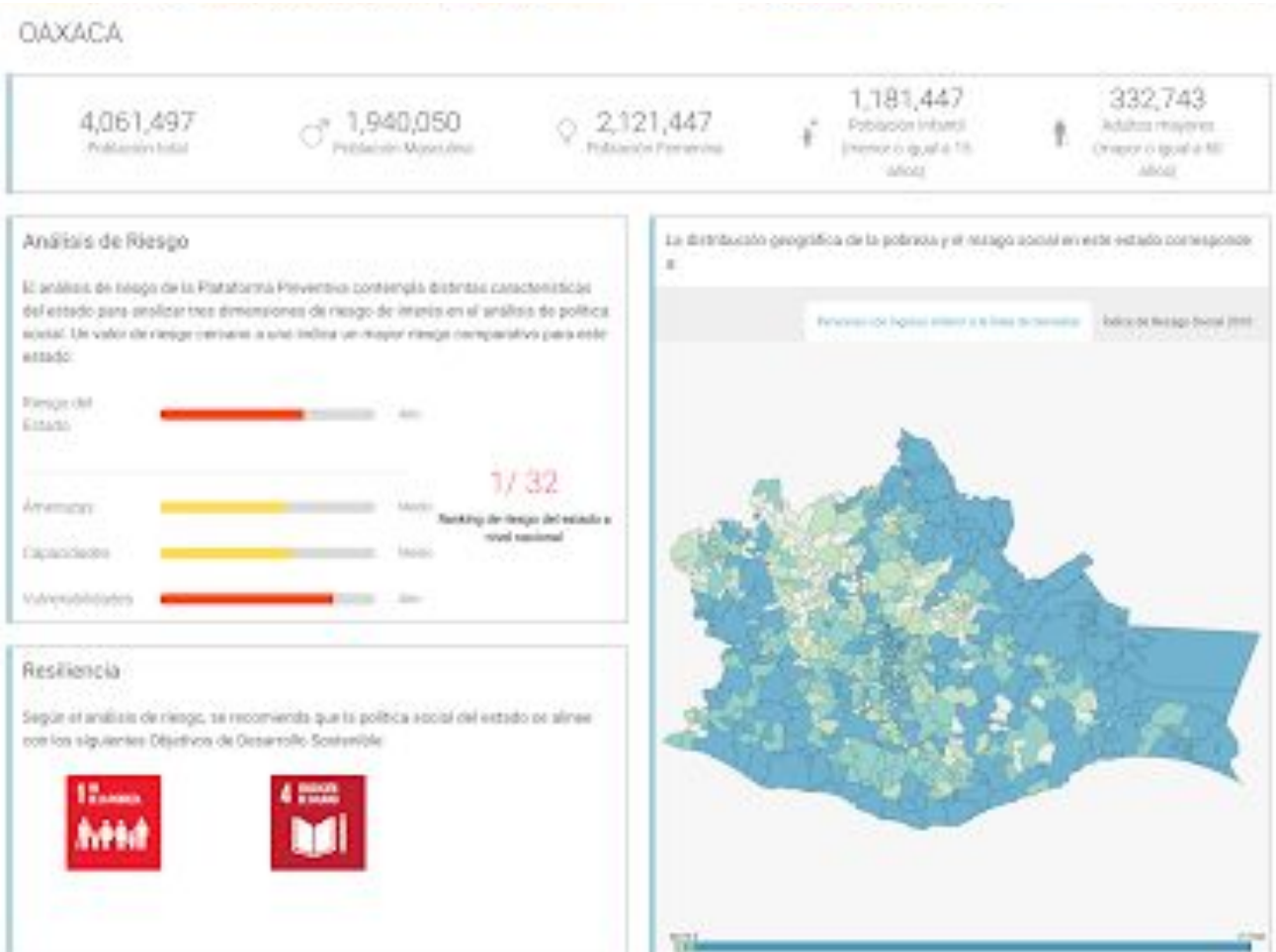




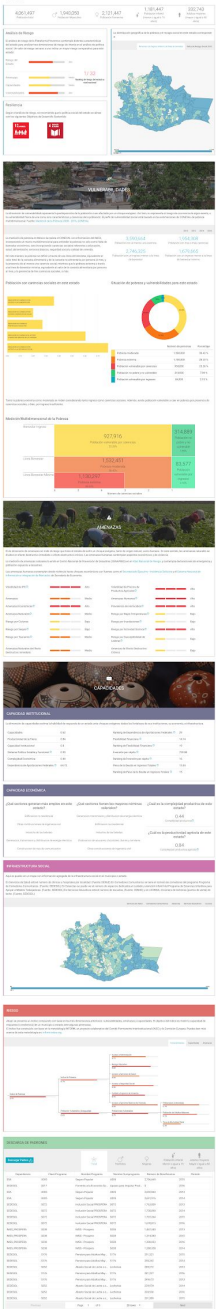
# 1. Long Term Capacity Development



Detalle de ubicación

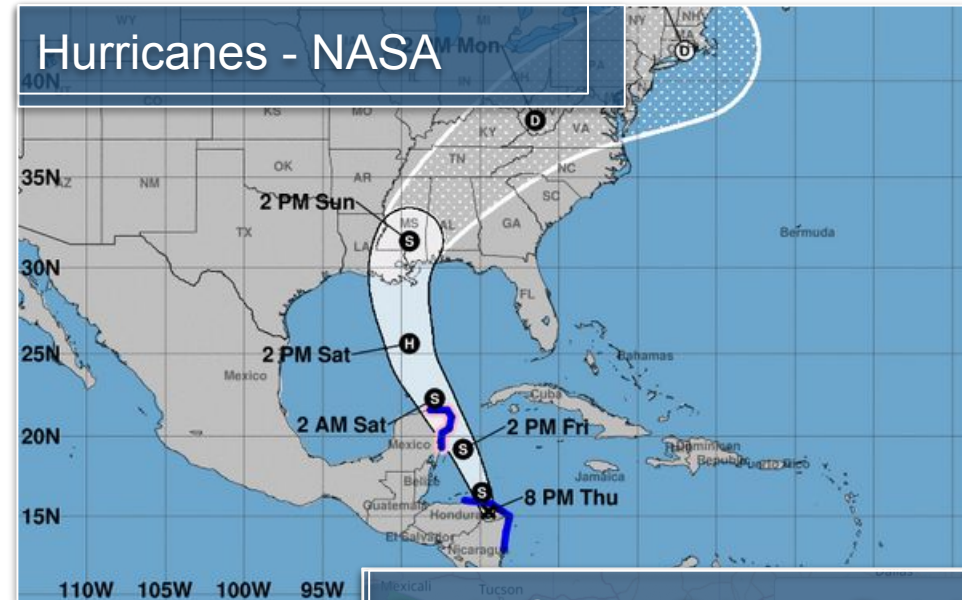
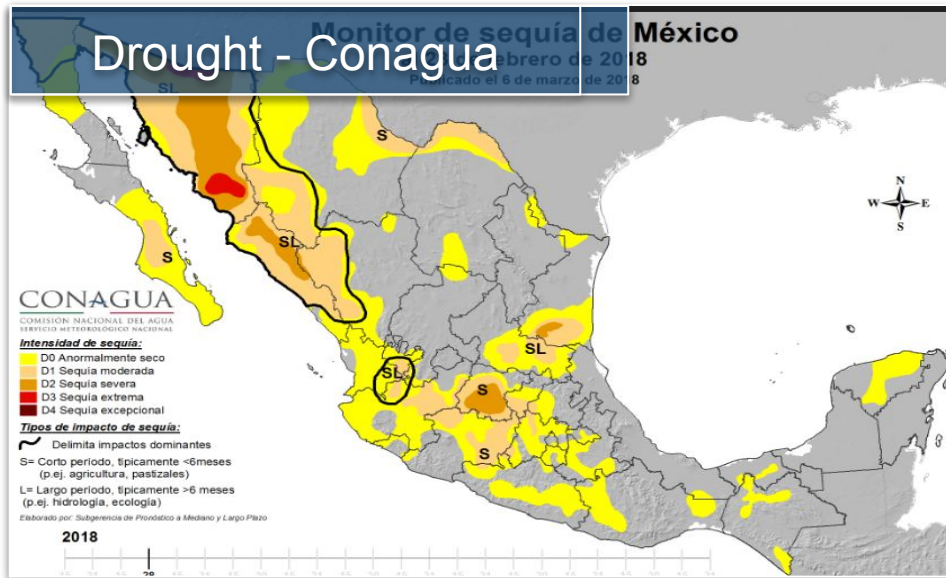


[www.plataformapreventiva.gob.mx](http://www.plataformapreventiva.gob.mx)





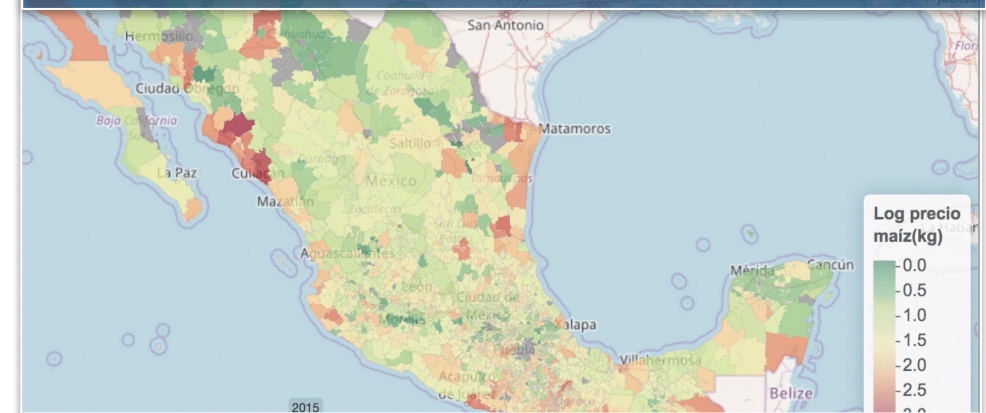
## 2. Preparation - Early Warning Systems



### Violence - SEGOB

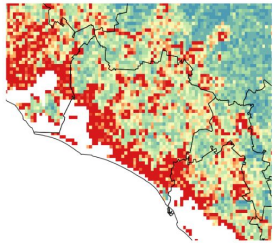
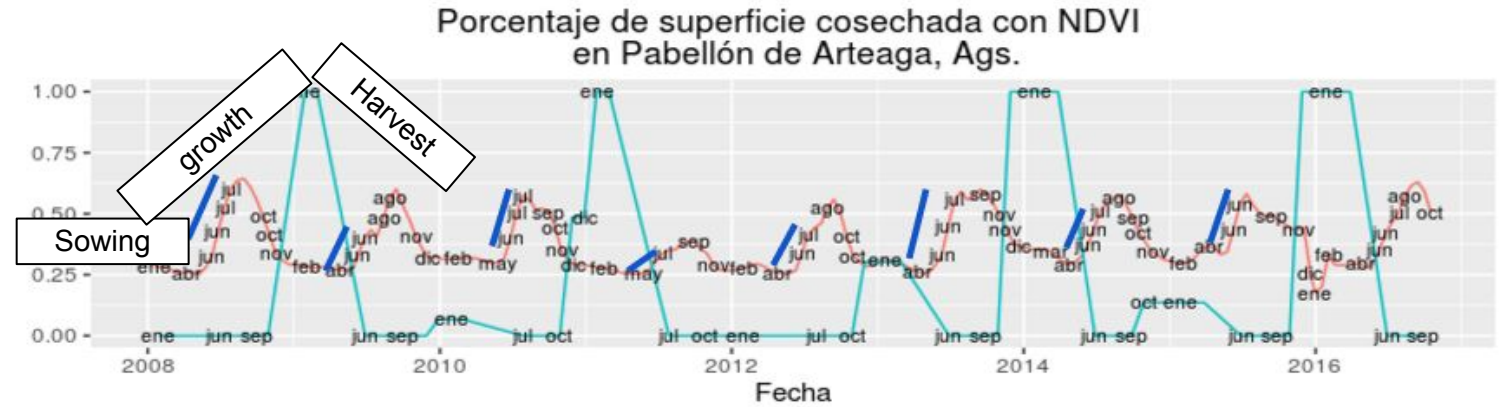
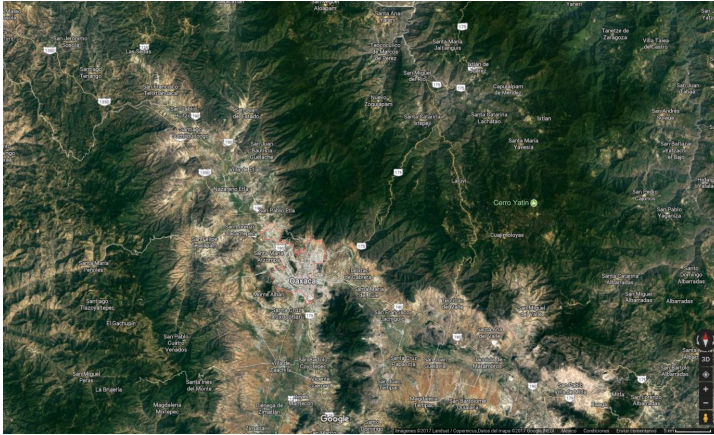


### Basic Grains Prices.- DataLab SEDESOL

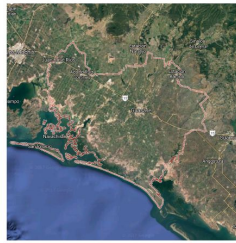




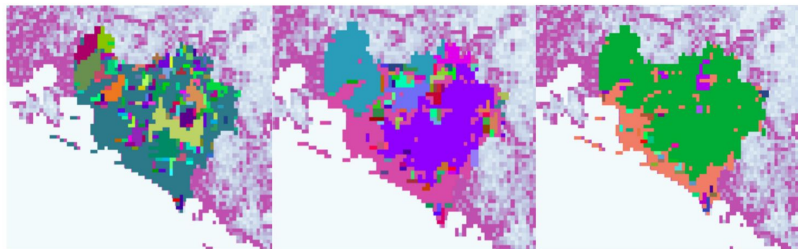
## 2. Preparation - Early Warning Systems



a) Distancias



b) Imagen

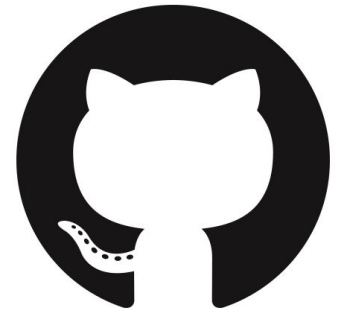


c) c=5

d) c=7

e) c=9

- Thesis Market:
  - Open repositories, Auditable Algorithms.
  - Continuous improvement.
  - Collaboration with post-graduate students of excellence.





# 3. Reconstruction

## Phases of Data Needs in Disaster Response & Recovery

### Phase 1

**Main Actor-** Civil Protection System/DM System

#### Data Need - Humanitarian Action Phase

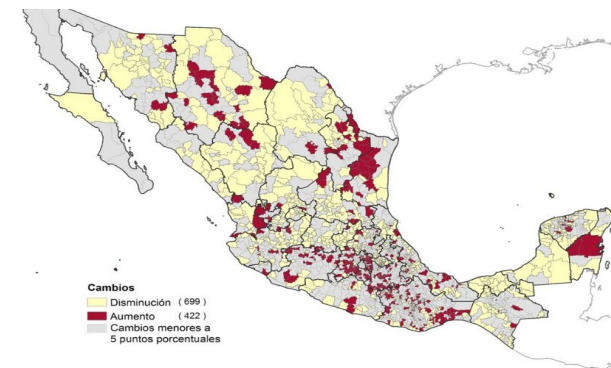
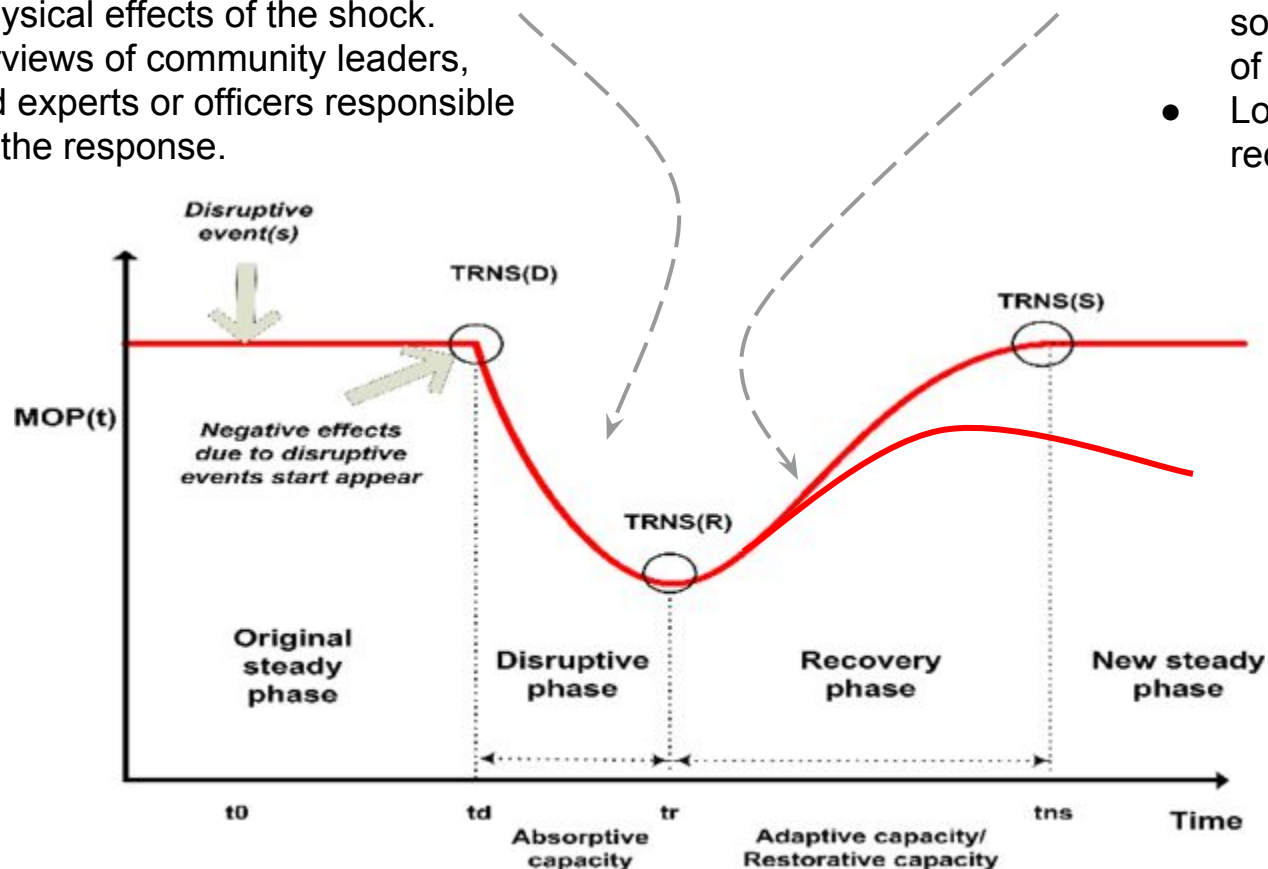
- Rapid assessment surveys.
- Focused on the physical effects of the shock.
- Backed up by interviews of community leaders, key informants and experts or officers responsible for components of the response.

### Phase 2

**Main Actor -** Social Protection System

#### Data Need - Recovery Phase

- Focused on the socioeconomic/psychological effects of the shock.
- Long term - update policy recommendations







## 3. Reconstruction

How to take advantage of what we already do and include a recovery phase tool?

### Targeting System for Development SIFODE

- ❑ All federal programs use the same survey which is integrated in the The Targeting System for Development (SIFODE).
- ❑ The information is collected by different social development programs and integrated by SEDESOL.
- ❑ SIFODE contains socio-economic information of 13.5 million households made up of 39.9 million people and identifies 66.7% of the people living in poverty conditions according to the Mexican definition of multidimensional poverty in 2016.

#### Phase 2

**Main Actor** - Social Protection System

### Problem

- ❑ Little or no coordination in the programs makes the surveys collection inefficient.
- ❑ Sometimes there are up to 7 surveys to the same household per year made by different programs.
- ❑ The impact of exogenous shocks is not measured which is why the Social Protection System makes targeting decisions with unreliable information.





## 3. Reconstruction

1) model that leverages all available information:

- census data (2010)
- Intercensal (2015)
- Survey data (state level) 2016
- Social Protection system questionnaire.

Hierarchical bayesian model based on a small area estimation approach with credibility scores for different data sources. (surveys, census, CUIS, etc) that updates poverty estimations at municipality level.

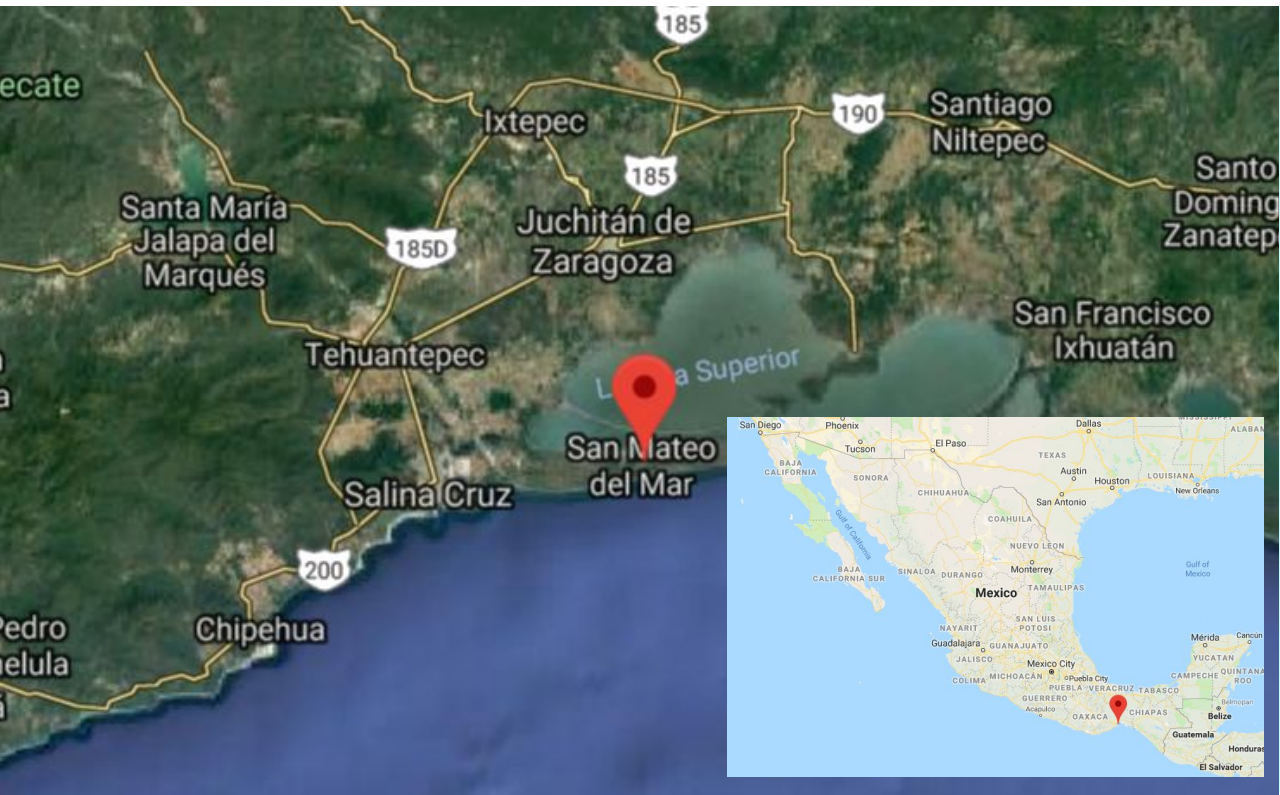
A way to update estimates with a CUIS that is gathered without any survey design.

2) Organize representative surveys at a municipality level when there is a high probability that the municipality has had a temporal drift.

- Uncertainty is evaluated and if we get a combination of high uncertainty and low income (high poverty) we would conduct a full sample survey designed to completely update municipality representativeness.

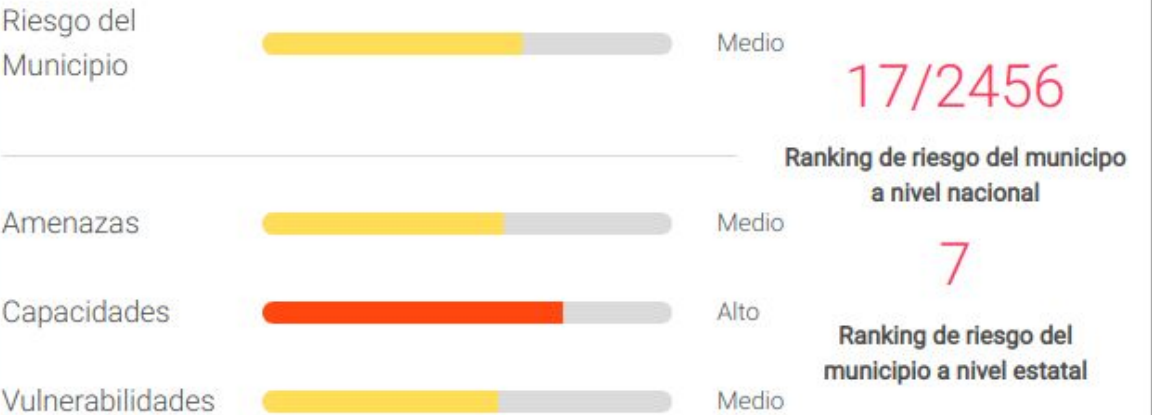


# Pilot project -> San Mateo del Mar - Oaxaca



## Análisis de Riesgo

El análisis de riesgo de la Plataforma Preventiva contempla distintas características del municipio para analizar tres dimensiones de riesgo de interés en el análisis de política social. Un valor de riesgo cercano a uno indica un mayor riesgo comparativo para este municipio:



15,293  
Población total

♂ 7,688  
Población Masculina

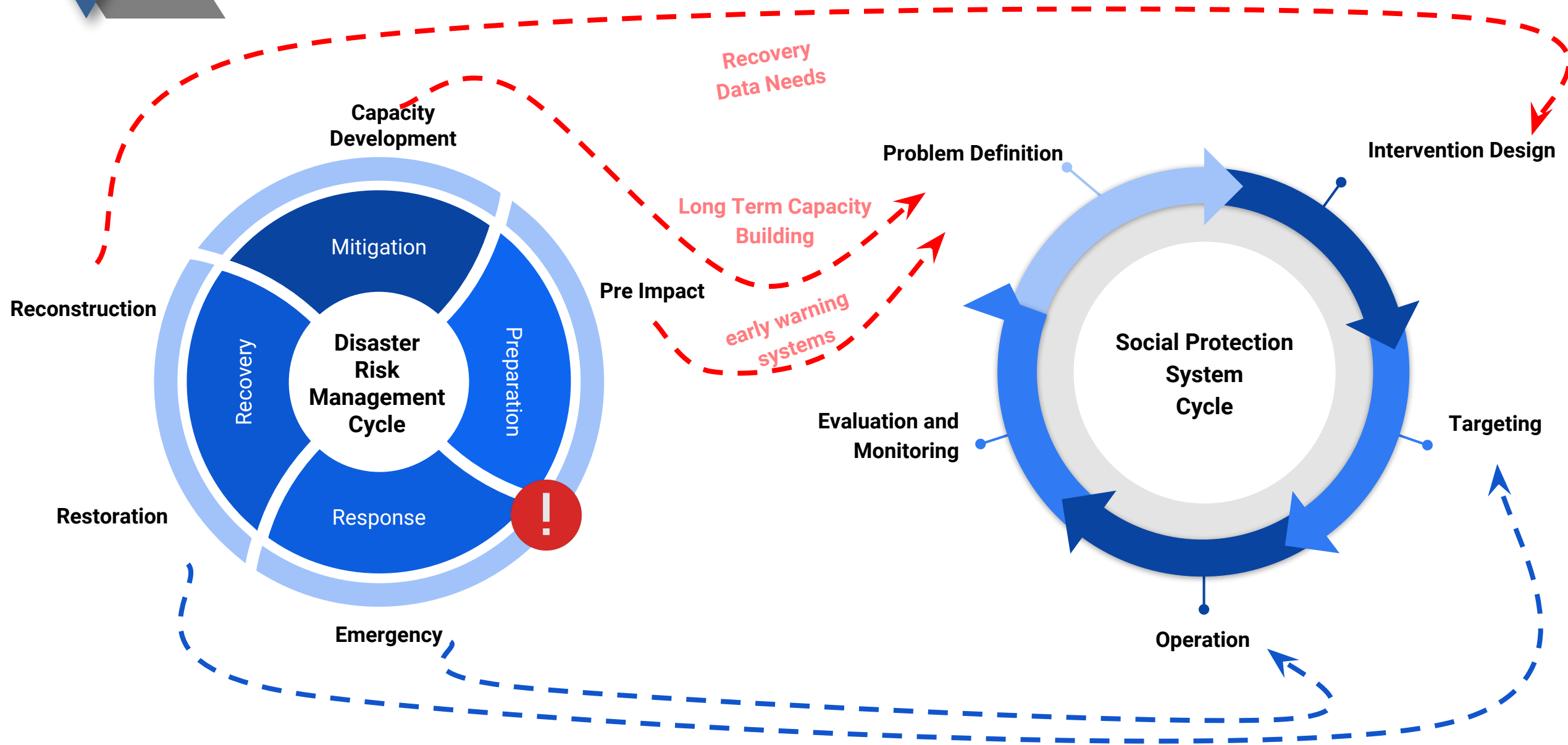
♀ 7,605  
Población Femenina

4,793  
Población Infantil  
(menor o igual a 15 años)

956  
Adultos mayores  
(mayor o igual a 60 años)



# Collaboration between Social Protection System + DRR







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