Project Group 3

Johnathan Salamanca, Mario Cerón,
Carol Martinez, Javier Cocunubo, Jairo Nino, Alvaro Munoz

October 26, 2019

1 Introduction

In 2012 the National System of Risk Management (NSRM) was created in Colombia. The system includes public, private, and community entities that will work closely with the government to coordinate the different risk management procedures. The NSRM is comprised of 6 instances:

- The National Risk Management Council (Consejo Nacional para la Gestion de Riesgo): coordinates the national system. At the head is the President and his govement.

- The National Risk of Disaster Management Unit UNGRD (Unidad Nacional para la Gestin del Riesgo de Desastres): it coordinates the nacional system and manage the risk management system.

- Comittee Nacional para el Conocimiento del Riesgo: advises and plans the constant implementation process of risk awareness

- Comittee Nacional para la Reduccin del Riesgo: it advises and plans the implementation of the process to reduce the risk of disasters.

- Comittee Nacional para el Manejo de Desastres: it advises and plans the implementation of the process of disaster management

- Consejos Departamentales distritales y municipales para la Gestin del Riesgo: coordinate, advise, plan and controls the processes of the Risk management in each territorial subdivision.

All six instances are responsible of preventing and managing possible disasters that occur in the country.

In April 2018, the National Planning Department (DNP) presented a report [2] that shows the national situation of the Risk Management in Colombia. The report presents a general overview of Disaster Risk in the world and the situation of Colombia in that matter.

Some of the information from that report is summarized as follows:

International Situation

- From 1980's the disasters have triplicate worldwide. 90% of disasters are hydrometeorological and generate 74% financial losses (e.g. Japan Tsunami, Katrina Hurricane, Japan Earthquake).

- The number of deaths due to disasters is higher in developing countries that in develop countries.

- Countries with high incomes are the ones that have more policy frameworks on risk management.

National Situation

- 88% of the disasters in Colombia are hydrometeorological (Inundaciones, movimientos de masa, flujo torrenciales, sequias e incendios, geologicos, otros).

- Infraestructure looses increase by Nina and Nino natural phenomena.

- Colombian departments with less incomes are the ones that have more people affected during the disasters.

Additionally, the report introduces the Risk Management Index of Colombia adjusted on the basis of capacities. The index measures the risk of a territorial subdivision under hydrometeorologic events and the capacity of that subdivision to manage the risk. The index takes into account two indexes: the risk index and the capacity index. The risk component analyzes the thread, exposition, and vulnerability to a risk. Additionally, the capacity to manage the risk is analyzed based on the economic point of view, socio-economic, and risk management.

The index was created based on the following information:

- 15% of deaths are due to slow flooding (generated by constant and heavy rain that increases the rivers levels) and 85% of the homes affected during a disaster are due to this phenomena.

- Landslide: it causes 19% of death and 1% of affected homes.

- Torrential flow: it causes 66% of death and 14% of affected homes.

- 29% of the national territory has conditions of critical thread of hydrometereological phenomena.

- 13% of the population are socially vulnerable and are highly exposed to the most critical hydrometereological threads.

- Colombia territorial subdivisions have heterogeneous capacity of risk management.

Figure 1 describe country situation on the basis of the 3 indexes: the capacity index (image on the left), the disaster risk index (image in the center), and the risk management index that combines both (image on the left).
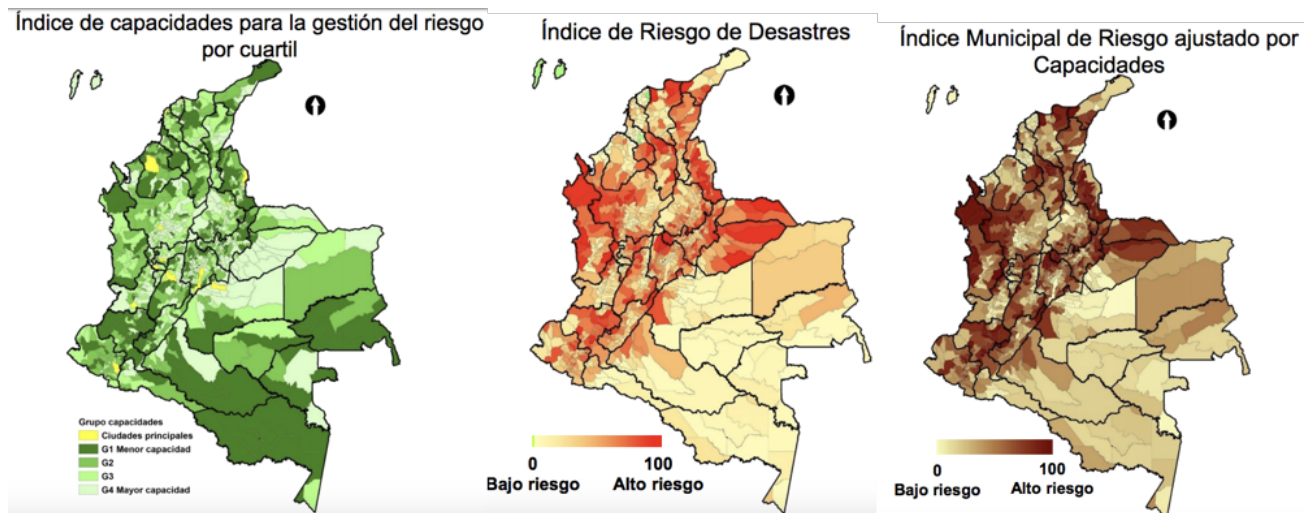

Figure 1: Risk Management Index of Colombia adjusted on the basis of capacities. The index which is illustrated on the right image combines the capacity of territorial subdivisions to manage the risk (image on the left), and their risk of a disaster (image in the center). Image taken from [**?**]

2 Multiple Problem Versions (week 3)

Version 1

- There is no information available online wit the Disaster Risks panorama in Colombia

- The information available online about Disaster Risks in Colombia corresponds to Excel files, and to some reports created by the government with insights of the Disaster Risks panorama in Colombia. However, the information is not published in such a way that anyone can use to get easy-to-see information about the current risk state of a specific area.

Lorem ipsum

2.1 Question

Based on the previously presented information different questions have arisen.

1. In 2012, the National System of Risk Management was created in Colombia. Based on the available datasets is it possible to analyze and find patterns that show (**V3**),

    - how does the risk map of Colombia changed after the creation of this system?

2. There is a disproportionate impact of similar events among Colombia's municipalities, given by disparities in available infrastructure and first response resources (**V2**).

3. Is it possible to analyze a specific event (disaster) and show how does the same event affects different zones of the country? Based on that, we can analyze (**V1**):

    - Are there factors that make some zones more vulnerable than others?
    - How does the specific infrastructure affects the impact of the specific event?

3 Datasets sourced (week 3)

The main dataset used in the project is from the Colombia Risk of Disaster Management Unit (Unidad de Gestión de Riesgos y Desastres) UNGRD [1]. The dataset contains information about the risk management associated with natural phenomena, socio-natural, technologic, and human-based non-intentional incidents reported in Colombia in the last 10 years (38626 records). Some of the fields found in the dataset are: Date, Department, Municipality, Event Name, Code, Dead, Wounded, Disappeared, Affected People, Affected Families, Affected Houses, among others.

The team will also use a dataset from the National Administrative Department for Statistics DANE. It is a time series between 1985 to 2020 and contains information, per department code about [4] .

Both datasets contain "DIVIPOL" codes, which is the codification of the Politica-Administrative Division of Colombia (Codification of the departments,). Figure 2 describes the meaning of the code. The first two numbers correspond to the department, followed by the Municipality Code and the Populated Center [[**?**]].

Table 3 summarizes the information of the datasets.

4 Project scoping plan/proposal written (week 3)

4.1 Project scopes

- The Government Officials (at all levels) are our main stakeholders
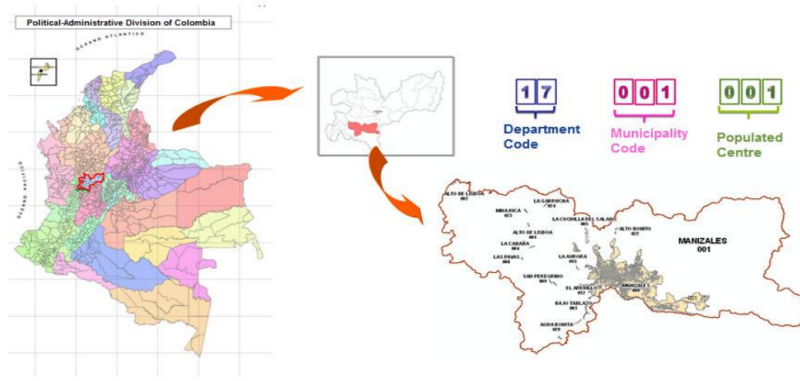
- Boundaries of the project:

Figure 2: Explanation of "DIVIPOL" code. The codes provide information of the Politica-Administrative Division of Colombia. Image taken from [3]

Data Name	Description	Type	Number	Database
Event name:	type of disaster (flooding,XX)	categorical	S	UNGRD
Date:	incident date	numerical	XXX	UNGRD/DANE
Code:	disaster ID	numerical	XXX	UNGRD/DANE
Municipality Code:	Divipol code	numerical	XXX	UNGRD/DANE
Dead:	Deads per incident	numerical	XXX	UNGRD
Wounded:	Wound per incident	numerical	XXX	UNGRD
Disappeared:	Disappeared per incident	numerical	XXX	UNGRD
Affected:	Affected people	numerical	XXX	UNGRD
Affected families:	Affected people	numerical	XXX	UNGRD

Table 1: Summary of the main information available to develop the project.

- We do not offer forecasts or modeling/ infer data.
- We only show metrics of impact of disasters at municipal level (not pin point to specific disaster event)
- We do not offer recommendations, only do support to decision making process for the stakeholders.

- Note the biggest risks to the successful completion of the project.

- Data quality issues in the datasets (non fixed easily)
- The final comparison product does not have sufficient enough information consolidated to explain the main problem to be resolved.

4.2   Project plan

Problem: there is a disproportionate impact of similar events among Colombia?s municipalities, given by disparities in available infrastructure and first response resources. Impact is defined in terms of: Inhabitants affected/Thousand Inhabitants, percentage of households affected, Deceased/ Thousand Inhabitants.

Expected Deliverable:
A dynamic map of Colombia, visually delivering the impact metric (or metrics) at the municipal level for a given category of events. Ability to display complementary metrics of interest for specific locations (utilities, healthcare facilities, first-responders facilities, etc).

How do we get there?:

- Get datasets, cleaned, wrangled and analyzed.

- Make the relevant joins on jupyter notebooks (localy), merge and generate bases to have the data (modeling, generate parameters and boundaries)

- Load the data at the database in the cloud (RDS on AWS) and the instance (EC2) for host the back and front end. Install and review the environment.

- Make the back end: review databases, environment and set jupyter / notebooks for run the cloud

- Make the front end : Interactive Colombian Map in Dash and tested on AWS.

- Make the final presentation

- Make the final report

References

[1] Colombia risk management unit. Date retrieved 16-10-2019.

[2] Disaster risk index of colombia. Date retrieved 16-10-2019.

[3] Methodology for the codification of the politicaladministrative division of colombia -divipola-. Date retrieved 16-10-2019.

[4] National administrative department for statistics. Date retrieved 10-2019.