OVERVIEW AND BASIC CONCEPTS

DALA methodology

Outline

1. Definition
2. Disasters in Latin America and the Caribbean
3. Disasters in Belize
4. Disaster assessments

1. DEFINITION

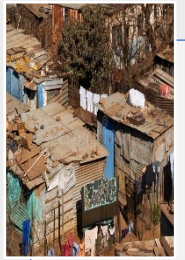
Definition

Disasters are the consequence of the combination of two factors:

(a) the **natural phenomena (threats)** that trigger processes that affect the assets and flows of an economy, and

(b) The **built vulnerability** of human settlements.

Threats are natural phenomena capable of causing damage to a territory



Vulnerability is a precondition (manifested during a disaster) and at the same time an indicator of the exposure of capital and the ability of individuals, households, communities and countries to recover after a disaster.

Definition

Natural hazards that contribute to causing a disaster are classified into the following groups: Biological, Geophysical, Hydrological, Meteorological. Within the group of biological threats are epidemics.

Disasters of biological origin are the consequence of exposure to living organisms and their toxic substances or diseases transmitted by vectors. One type in particular: animals that carry disease-causing agents such as parasites, bacteria or viruses.

In the event of an epidemic, there could be various vulnerabilities that could turn it into a disaster: the management and response capacity of the health system, overcrowding, informality, social work practices, and existing public transportation, among others.

Definition

PAHO / WHO defines an epidemic as the unusual number of cases of a disease, which may already exist in a region, for example dengue in many areas of countries in Latin America and the Caribbean, or it may be a previously non-existent one, such as COVID-19.

Definition

Epidemics are the longest-lasting disaster. An earthquake lasts for seconds, a hurricane for days, a flood for weeks, and an epidemic for years. Since an epidemic can last for years, several waves are likely to occur in that period.

On the other hand, when the epidemic occurs throughout the world or in a very wide area, crossing the borders of various countries, and generally affecting a large number of people, it becomes a pandemic (Last et al., 2001).

The etymological origin of this word means "disease of the whole people." As is the case with COVID-19, a pandemic usually occurs with the appearance of a new virus for which there is no type of immunity.

2. DISASTERS IN LATIN AMERICA AND THE CARIBBEAN

Disaster´s empirical definition

In the Emergency Events Database (EM-DAT) compiled by the Center for Research on the Epidemiology of Disasters (CRED) of the Catholic University of Leuven in Brussels, Belgium, a disaster is defined as an event that meets one of the following criteria:

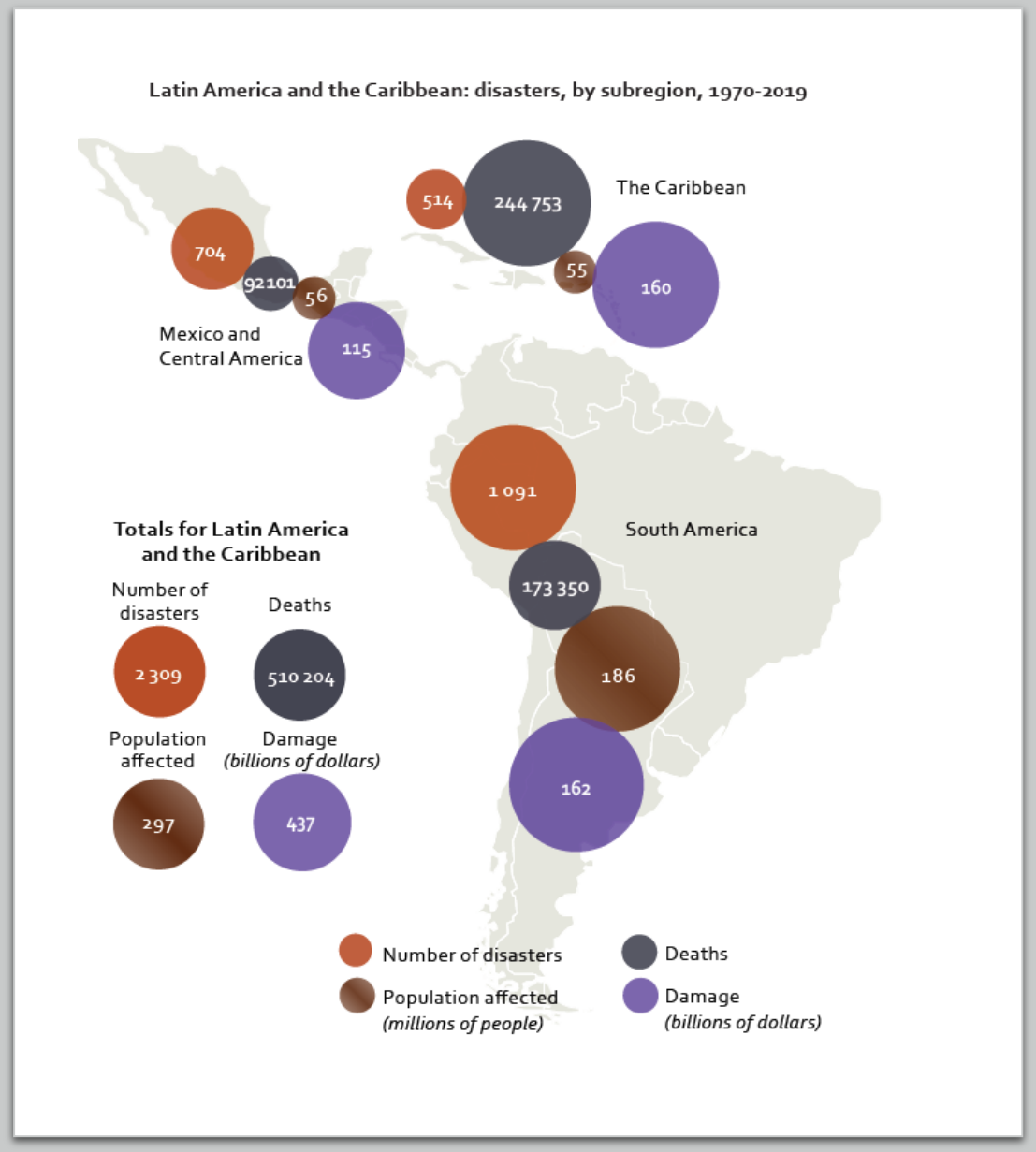
a) ten or more people are reported dead;

b) one hundred or more people are reported as affected;

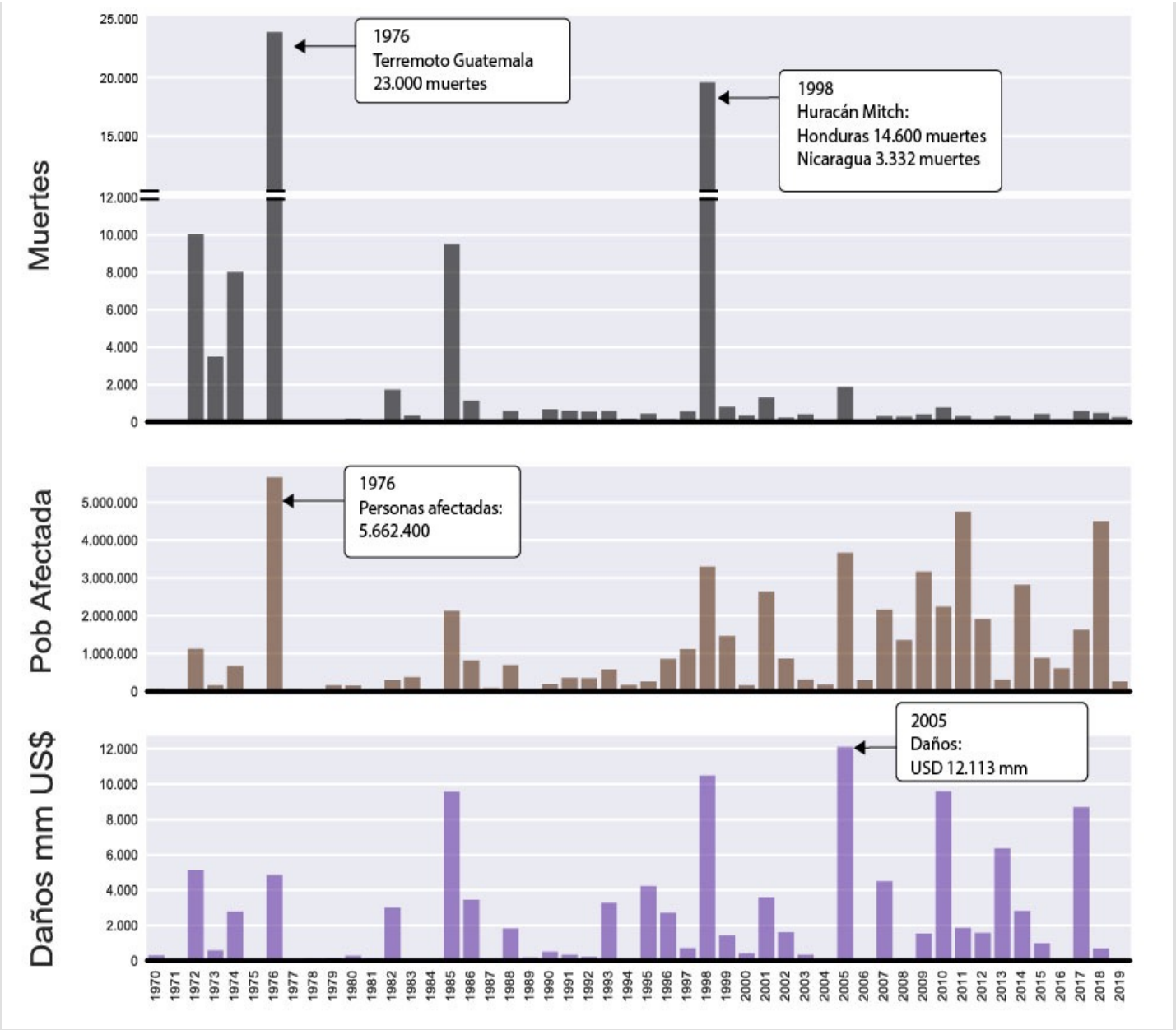
c) a state of emergency is declared; or

d) a request for help is made.

Disasters in Latin America and The Caribbean (1970-2019)



- Source: Bello, Bustamante y Pizarro (2020)



Central America

(1970-2019)

Source: EMDAT

Disasters in Belize

	Disasters	Deaths	Affected	Damage
Extreme temperature	1	0	0	11289
Flood	14	1	77600	30798
Storm	5	68	491075	1875736
Total	20	69	568675	1917823

Source: EMDAT

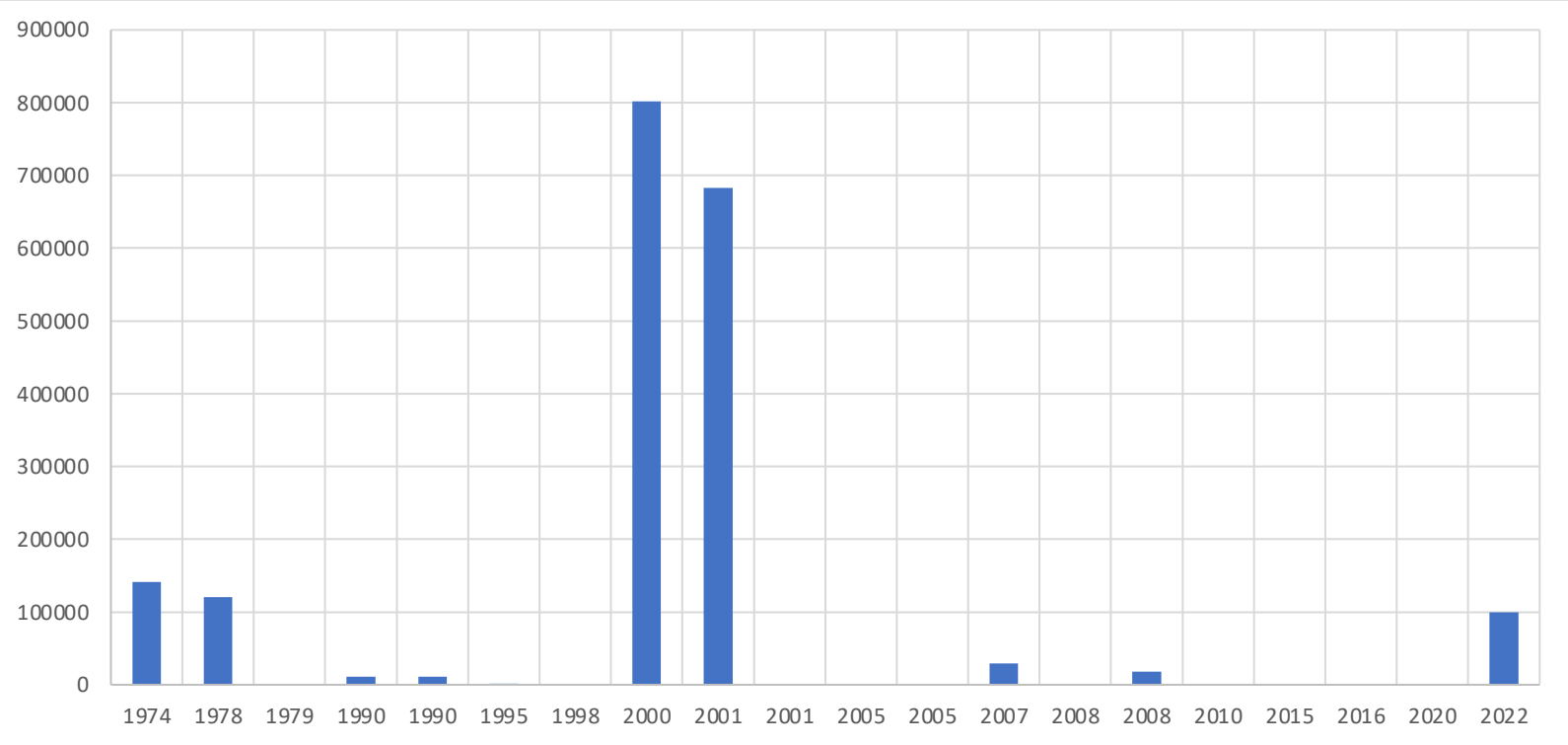
Damage expressed in 2022 USD

Disasters in Belize

	Disasters	Deaths	Affected	Damage
70s	3	5	93000	261669
80s				
90s	4	9	62600	24332
00s	8	55	150570	1531821
10s	3	0	30355	0
20s	2	0	232150	100000
Total	20	69	568675	1917823

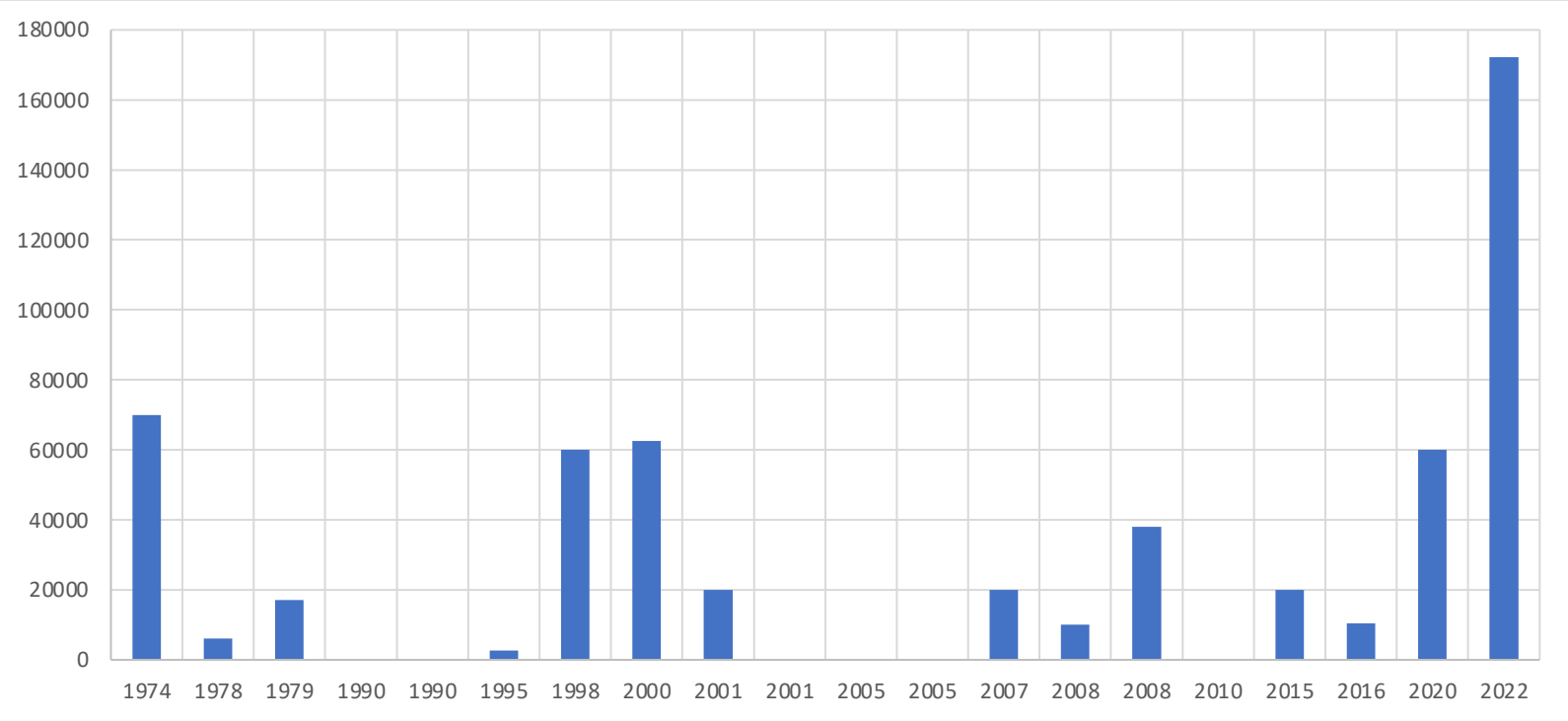
Source: EMDAT

Damage expressed in 2022 USD



Damage:

Disasters in Belize



Affected population:

Disasters in Belize

Disasters causing destruction of capital

Persons **directly** affected by the consequences of the disaster:

* Deceased
* Injured
* Sheltered
* Displaced
* Damage to property

Primary affected population

Disasters causing destruction of capital

Persons living inside the affected area that suffer other consequences:
* job loss because company was destroyed
* income loss due to destruction of crops
* mobility interruption due to damage on a road

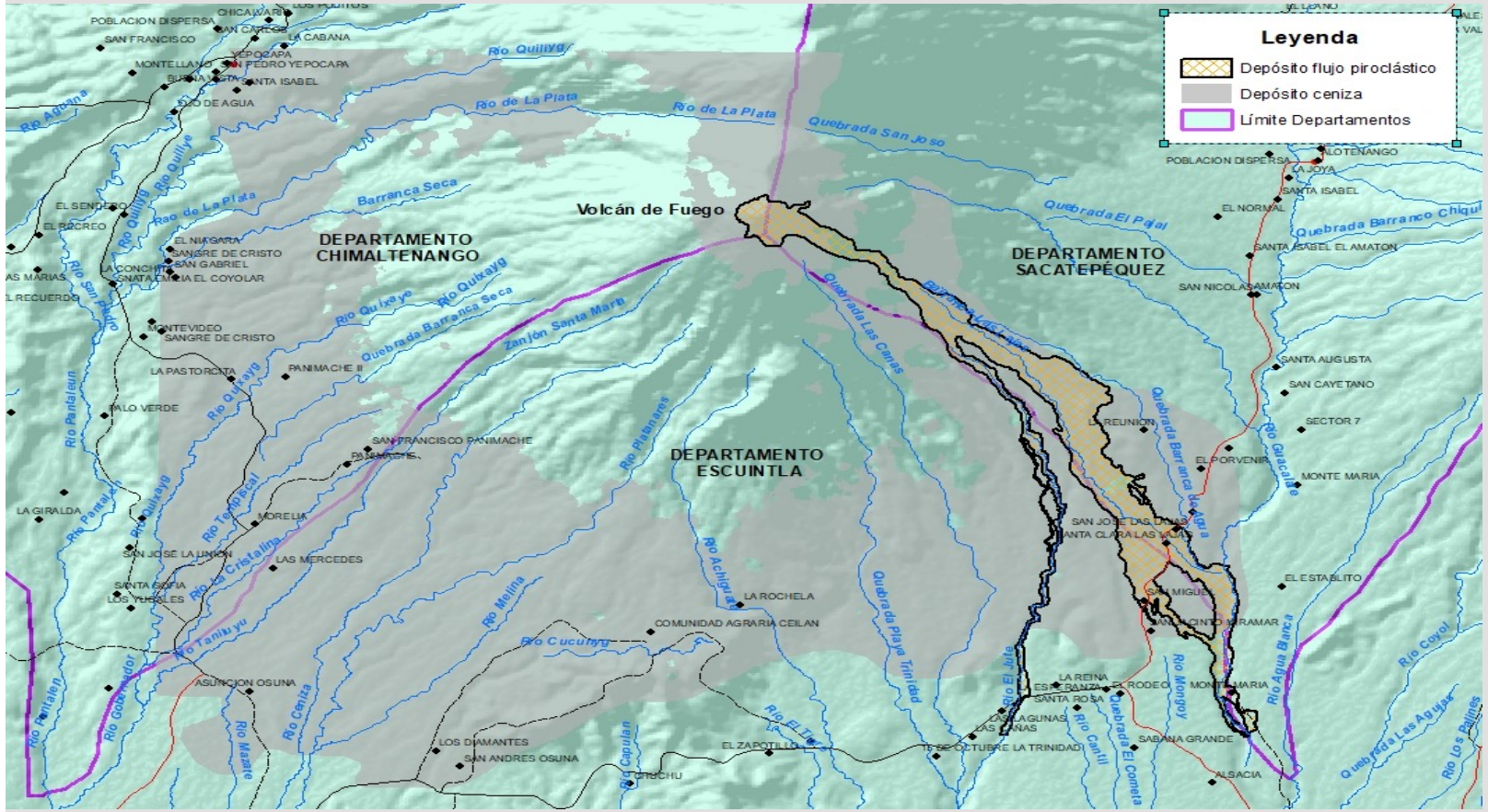
Secondary affected population

Disasters causing destruction of capital

Persons suffering indirect consequences of the disaster but where not located in the affected area

Ejemplo:
* Interruption of access to water due to damage to distribution pipelines
* Closure of roads or airports

Tertiary affected population



Example

Volcán de Fuego Eruption

In 2018, around 1.9 million people lived in the States of Sacatepéquez, Escuintla and Chimaltenango, according to population projections from the National Institute of Statistics (INE), corresponding to approximately 11 percent of the national population.

3. DISASTER ASSESSMENT

3. DISASTER ASSESSMENT

Disaster assessments

ECLAC is the pioneer institution both in assessing disasters and in compiling the methodology to do so.

From 1973 to 2019, ECLAC has coordinated more than 110 reports of disaster impact estimates in 28 countries in the region. ECLAC has carried out the evaluation of two epidemics (AH1N1 in Mexico and dengue in Bolivia)

Who have been the users of the DALA?

- Countries affected
- Multilateral organizations

Disaster Assessment

What is a disaster assessment?

Assessing a disaster consists of estimating in monetary terms the **effects and impacts** caused by the phenomenon in order to serve as a guide for the recovery processes so that the society of the affected locality returns to the situation prior to the event.

The disaster assessment includes:

1. Estimation of the effects

a. Damage

b. Losses

c. Additional costs

Effects: Hurricane Dorian
USD million

- The estimated impact of Hurricane Dorian is one percentage point of the GDP. This implies that post-disaster, the economy is expected to grow 0.9 per cent. This will result in a decrease in salaries of USD 51.3 million and profits of USD 60.9 million.

- The situation is different when the focus is on local economic activity. In the case of Abaco, the impact was estimated at 7.3 percent of its GDP. Taking place on that island, 47 percent and 60 percent of the country's worker remunerations and profits decrease, respectively. In Grand Bahama, the impact was 2.0 percent of its GDP.

	Damage	Losses	Additional Costs
Social	**1,597**	**92**	**82**
Housing	1,487	65	58
Education	72	6	19
Health	38	21	5
Infrastructure	**239**	**197**	**16**
Power	131	69	6
Telecommunications	42	54	1
Water and Sewerage	15	37	2
Transport	51	37	7
Productive	**621**	**400**	**20**
Tourism	530	325	15
Commerce	78	65	5
Fisheries and Agriculture	14	10	0
Environment	**7**	**27**	**102**
Total	**2,464**	**717**	**221**

Disaster Assessment

2. Estimation of **impacts**: the consequences of the effects on different social and economic variables; such as family income, unemployment, GDP growth and the fiscal balance, among others.

3. If required, the disaster assessment also includes the estimation of financial needs for recovery

Estimación sectorial

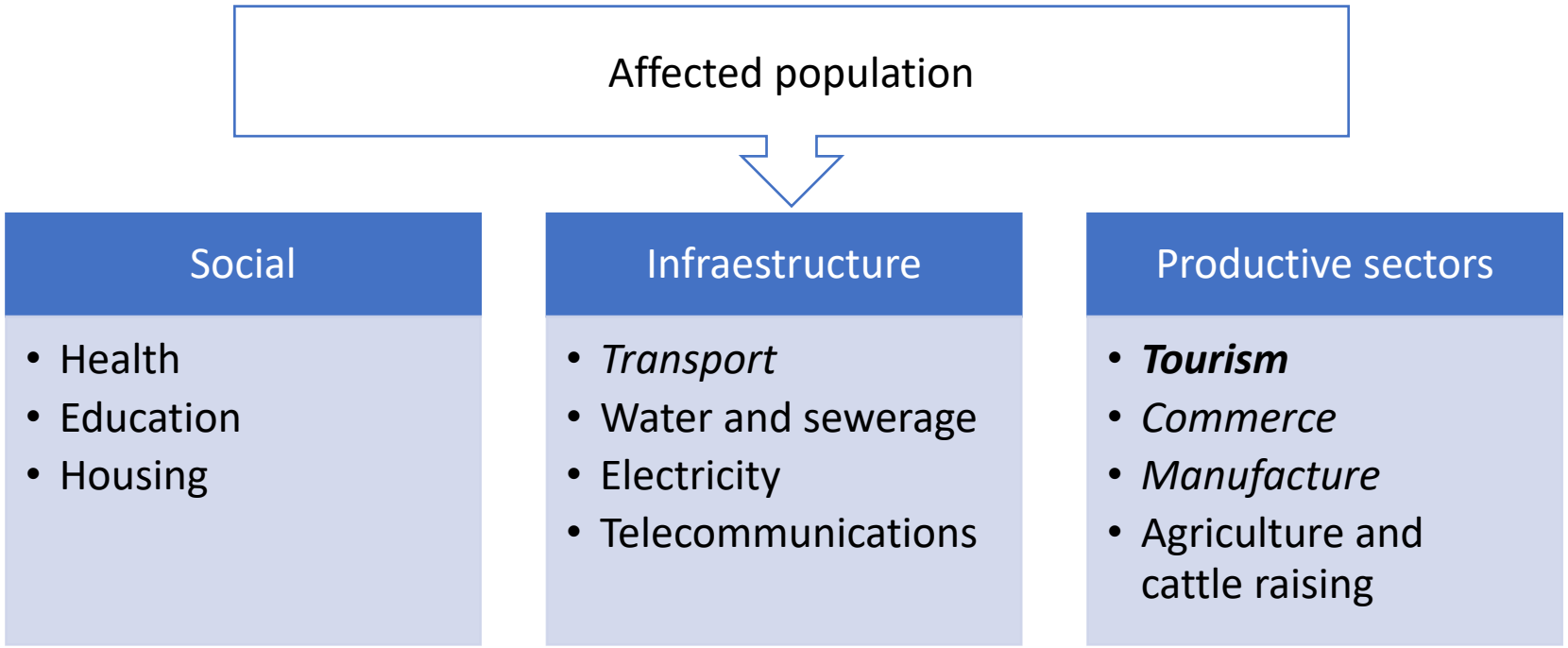
In this methodology, the estimation of **damage, losses** and **additional costs** is carried out by sectors:

- Social
- Infraestructure
- Productive sectors

Additionally, two transversal sectors are included:

- Gender
- Environment

Sectoral estimates



Damage

Damage refers to the effects the disaster cuases on the assets of each sector, expressed in monetary terms. These occur during the event giving rise to the disaster. Depending on the sector, assets may include:

a. Physical assets such as buildings, installations, machinery, equipment, means of transportation, storage facilities, furnishings, irrigation systems, dams, road systems and ports.

b. Stocks of final and semi-finished goods, raw materials, materials and spare parts.

Two pieces of information are needed to set a monetary value on damage: **the physical scale of the effect, and a price to convert it into a value**. The monetary estimate of the damage is calculated by the *replacement price*, which is the current price (before the disaster) of an asset equivalent to the one destroyed.

Disaster as a local phenomenon

The quantification of damages must be circumscribed to a specific territorial area, the region affected:

- Province, department or island, depending on the political and geographical division employed in the country concerned.

Although it is true that a disaster can affect a whole country (in the region, for example, hurricanes have affected entire Caribbean islands), this is the exception rather than the rule.

Damage

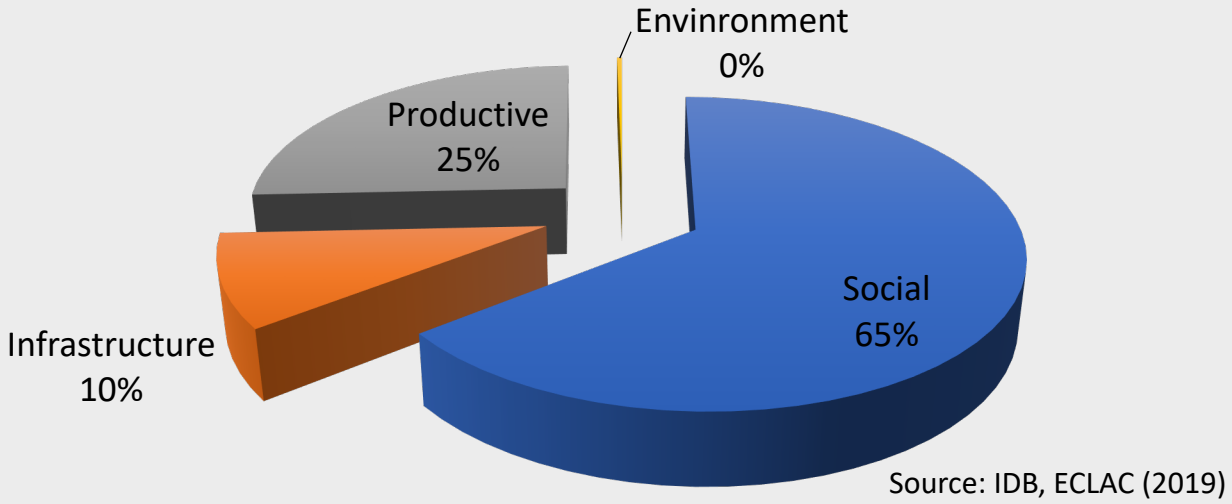
Institutional agents

For public policy it is important to estimate damage as a result of the event by **differentiating the wealth impact experienced by institutional agents such as households, public- and private-sector enterprises and levels of government**.

The effects on a sector implies effects on one or more institutional agents. The institutional agent affected by the destruction of assets will not necessarily be the one financing restoration, owing to the possibility of public-sector action

Damage

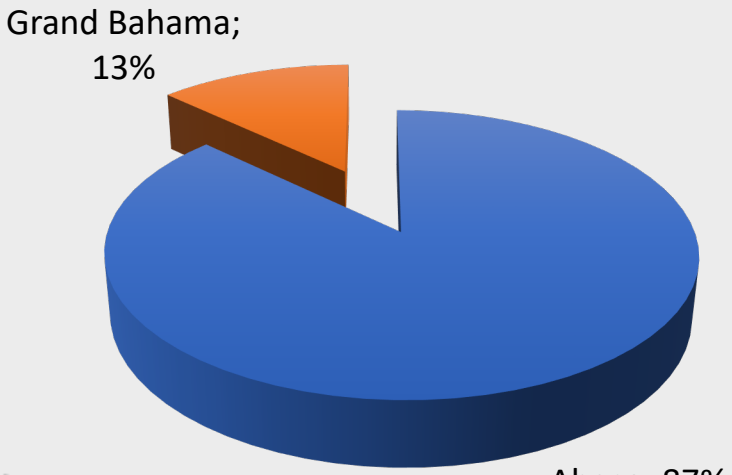
Damage (Hurricane Dorian, 2019)



Source: IDB, ECLAC (2019)

- Damage was the most important effect
- The social sector was the most damaged.
- **Housing and Public Buildings sector suffered 60 percent of the total damaged.**
- **The second most damaged sector was tourism (21 percent)**

Damage (Hurricane Dorian, 2019)



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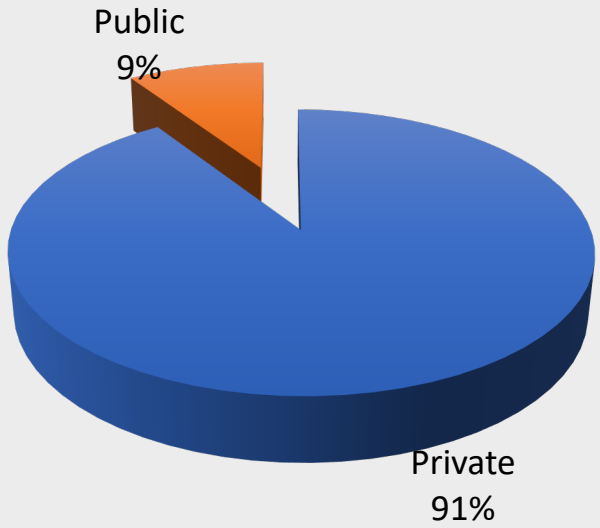

Source: IDB, ECLAC (2019)

Losses

Losses are the monetary value of goods that are no longer produced or services that are no longer provided as a result of the disaster. Losses occur from the moment the disaster happens until the affected locality returns to the situation it had prior to the event. Losses are estimated as gross income that agents cease to receive, not their earnings.

This is a concept referred to the **change of flows** as a consequence of the disaster. It is about assessing what was not produced, which has an impact on different macroeconomic variables.

Baseline

Losses are calculated as the difference between a situation that has not occurred (the supposed evolution that the sector was going to have before the disaster) and another situation that has not happened either (the behavior that will be recorded after the disaster).

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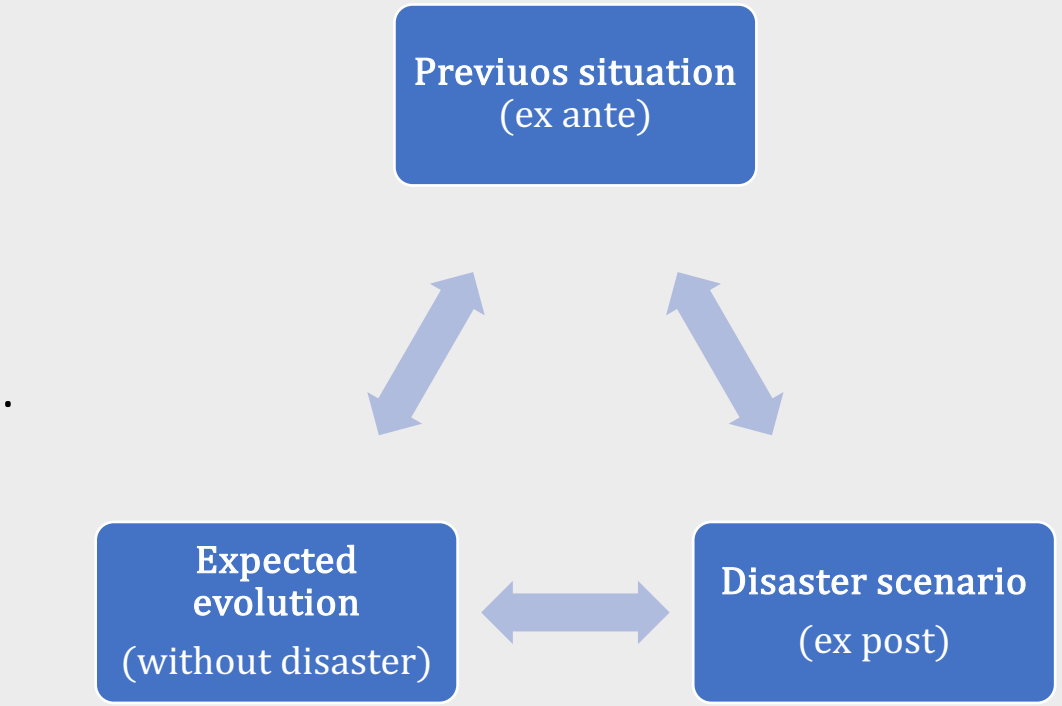
Losses

Losses estimate are done with respect to the baseline scenario. The final result will depend on the speed of recovery

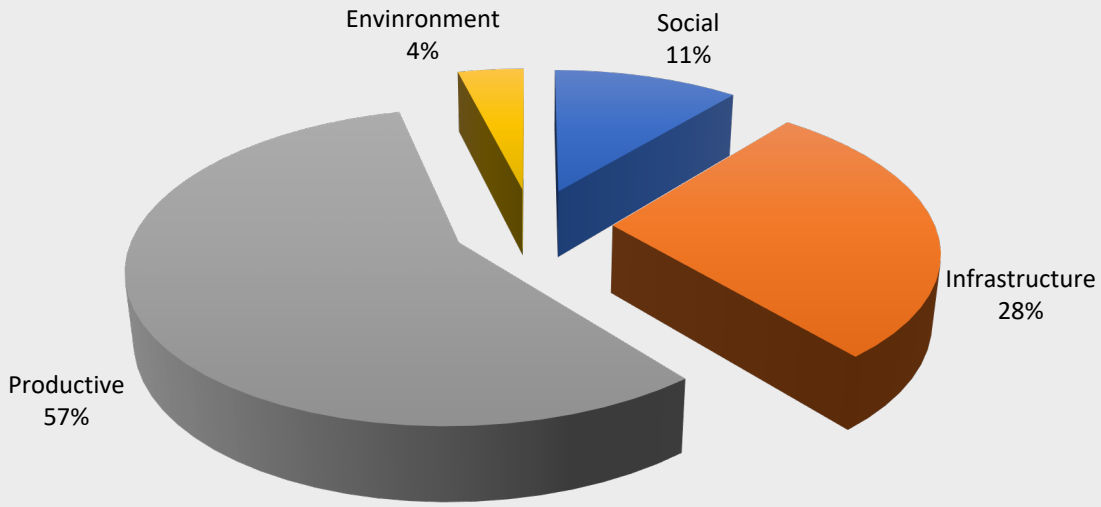


Losses

Post-disaster scenario

Post-disaster projections should be constructed for each sector. This depends on the duration of the quarantines, the invention of vaccine or treatment, among others.

Losses

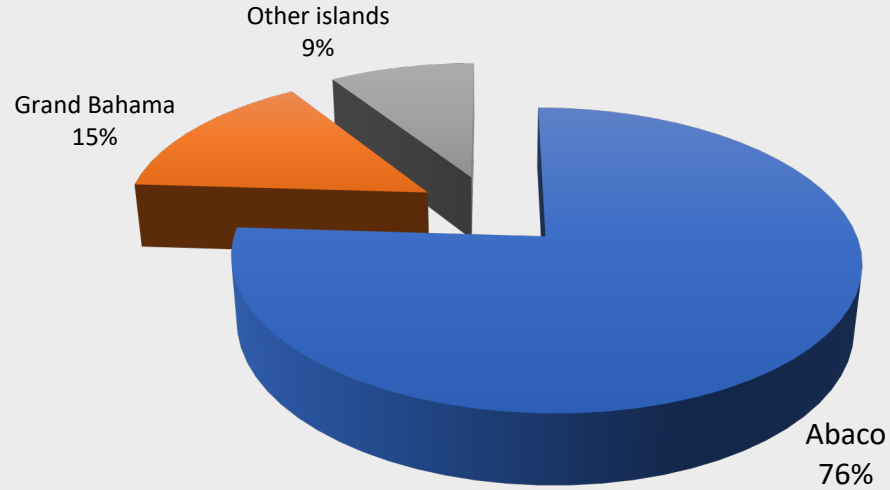


Source: IDB, ECLAC (2019)

Losses (Hurricane Dorian, 2019)

- For most of the sectors, we estimate losses for 28 months. 57 per cent of the losses took place in the productive sector being tourism the activity that was most affected, 46 per cent of the total losses.
- Abaco suffered 76 per cent of the total losses.
- Most of the losses were in the private sector, 84 per cent

Losses (Hurricane Dorian, 2019)



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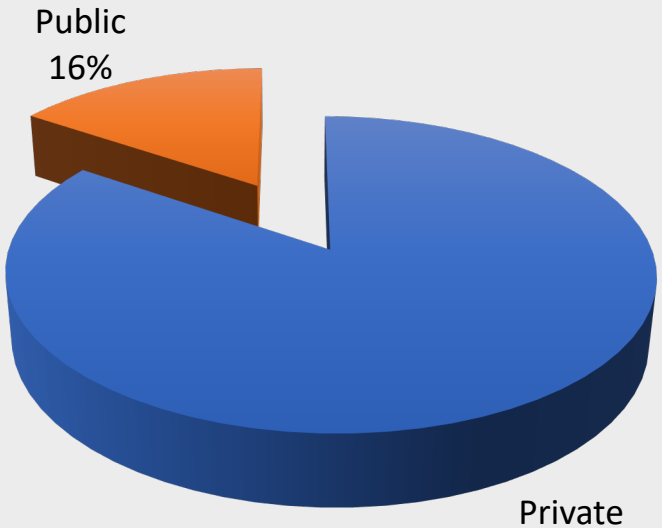

Source: IDB, ECLAC (2019)

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Additional Costs

Expenditures required for the production of goods and the temporary provision of services as a result of the disaster. These reflect a response from both the public and private sectors, which could take the form of **additional spending** or a **reallocation of spending**. A key issue in this concept is that another sector benefits from the additional expense made or rescheduled.

	Effect
The heavy rainfall caused damage to 10,000 homes, leading the local government to prepare 15 shelters. The monthly cost of operating each shelter is estimated at 5 million monetary units (MUs) and will be met by the government.	
The hurricane raised large waves that flooded and salinized 50 ha of agricultural land. It is estimated that land clean-up and recovery will cost about 100,000 MUs per hectare.	
In the telecommunications sector, two transmission towers and a control station are reported to have been brought down. In addition, the rain, landslides and wind have affected some 23 km of outdoor cables.	

Damage, Losses and Additional Costs

Practice

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OVERVIEW AND BASIC CONCEPTS

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