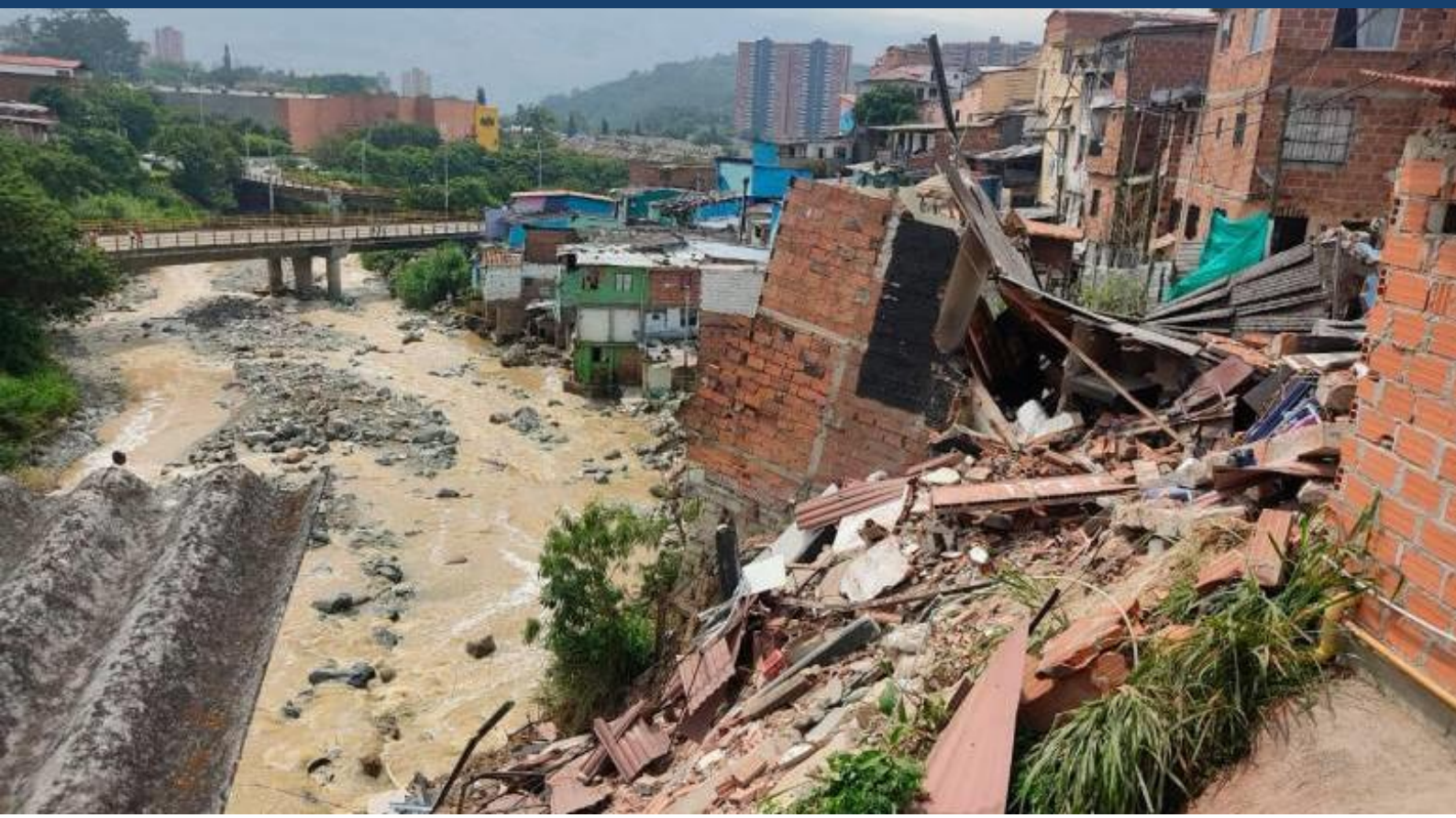

Challenges and lessons learned from the project "Enhancing urban resilience in Medellín through insurance protection for climate risks and natural disasters"

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Executive Summary

Between 2018 and 2023, the InsuResilience Solutions Fund, alongside a consortium made up of the non-governmental organization (NGO) Global Communities, the reinsurer Hannover Re, and global broker and consultancy firm Willis Towers Watson, collaborated on the project "Enhancing urban resilience in Medellín through insurance protection for climate risks and natural disasters". During this project, a parametric risk transfer product was designed to cover flooding, landslides, and earthquakes.

The purpose of the project was to improve the city's capacity to respond to natural disasters, through a product which is adapted to the specific characteristics and needs of the city and allows for resources to be made rapidly available. Through the project, it was possible to increase the understanding and capacity of the municipality, and to link the insurance sector with the needs of the local administration. The project is pioneering within the country and region, both in technical terms and in terms of governance and stakeholder coordination. The experiences, lessons learned, and challenges faced therefore serve as a precedent and useful reference for the development of similar initiatives in the future.

The main challenges faced during the project relate to **(i)** the partial availability of historical data on landslides and floods, and the absence of a unified information system, **(ii)** the lack of specific regulation, **(iii)** the relationship between the public sector and the private and development sectors, **(iv)** initial uncertainty in adopting new ways to manage risk, and **(v)** the arrival of the pandemic and the need for remote work.

The experiences of the project in responding to these challenges provide valuable lessons for future initiatives. In particular, the learnings from this project highlight the need to: **(i)** quantify and standardize historical information on climate disasters in the country, **(ii)** ensure adequate coordination with local actors on information available at the local level, **(iii)** understand the dynamics of public administration at the local level, **(iv)** generate a "common language" between the private and public sectors by building knowledge and capacity among both, **(v)** explore various options for disaster risk transfer before settling on a proposed solution, **(vi)** maintain flexibility among the various project partners, **(vii)** introduce explicit municipal regulation on the use of funds obtained through a risk transfer product, and **(viii)** opt for in-person interaction, where possible, in public-private collaboration.

Glossary

Disaster risk management: The process of identifying, evaluating and reducing the risks associated with natural disasters. Disaster risk management includes prevention, preparedness, response and recovery.

Earthquake: The sudden and violent movement of the earth caused by the release of energy accumulated in the earth's crust. Earthquakes can be extremely destructive, causing damage to buildings, infrastructure, and people.

Financial derivative: A financial contract with a value that depends on the price of another underlying asset. Among other things, financial derivatives are used to manage risk, and can act as a tool for protection against natural disasters.

Flood: The overflow of water onto land that is normally dry. Flooding can be caused by heavy rainfall, storm surges, and breaches of embankments and reservoirs, among other factors.

Global Communities: A non-governmental organization that works globally to strengthen communities and promote social justice, equality, and sustainable development. Global Communities focuses on topics including home construction, economic development, and disaster risk reduction.

Hannover Re: A German-based reinsurance company providing reinsurance cover to (re)insurance companies worldwide.

Insurance: A legal contract in which one party agrees to pay a premium in exchange for financial protection against an uncertain risk, such as economic loss from a natural disaster.

Insurance modelling: The process of creating a mathematical model to simulate the probability and impact of insured risks, to determine the premium and terms of an insurance contract.

InsuResilience Solutions Fund (ISF): The ISF is designed to increase the capacity of developing countries to adapt to climate change through the introduction and use of climate risk insurance products by i) supporting comprehensive climate risk analysis as a vital basis for governments, businesses and households to become more proactive risk managers and take informed decisions in defining needs-based climate risk management and adaptation strategies; ii) identifying possible concepts and basic structures of climate risk transfers via insurance solutions as an integral element of a comprehensive climate risk management strategy by funding studies on wider adaptation needs based on climate risk analysis; and iii) supporting the introduction and offer of innovative climate risk insurance products by co-funding the development of concrete insurance products.

The InsuResilience Solutions Fund was set up by the German Development Bank (KfW) on behalf of and with funding from the Federal Republic of Germany, represented by the Federal Ministry for Economic Cooperation and Development (BMZ). It is administered by the Frankfurt School of Finance and Management and supported by several international donors. This project forms part of the financing granted by a tripartite agreement between the United Nations Development Program (UNDP), BMZ and the Insurance Development Forum (IDF).

Landslide: The movement of a large amount of earth or rock through the force of gravity. Landslides can be caused by heavy rains, among other factors.

Parametric insurance: An insurance model based on objective parameters, such as the intensity of an earthquake or quantity of rainfall, rather than actual losses experienced. This type of insurance can allow for a faster and more efficient response to claims.

Parametric risk transfer product: A risk transfer product that uses objective parameters, such as the intensity of an earthquake or quantity of rainfall, to determine the activation of the coverage and the payment of indemnities.

Risk transfer product: A financial contract that transfers the risk of a loss to another entity, such as an insurance company or an investor.

Willis Towers Watson: A global consulting, brokerage and solutions company that helps organizations manage risk, optimize profit and improve performance. The company operates in more than 140 countries and is headquartered in London, UK.

Project summary

The project "Improving urban resilience in Medellín through insurance protection for climate risks and natural disasters" is an international cooperation initiative established with the objective of improving the resilience of Medellín and its capacity to respond to natural disasters. To achieve this objective, the project involved the design of a parametric product to transfer disaster risk related to floods, landslides, and earthquakes.[1] The project also improved the capacity of the district to manage risk transfer products and strengthened links between the insurance sector and the needs of the district.

In this way, this project established an important precedent that can provide lessons for similar initiatives in other districts of Antioquia and throughout Colombia.

What are parametric risk transfer products?

Parametric risk transfer products are protection products based on the establishment of a parameter, or set value, for example, a level of rainfall. In the event that this parameter is met, the product generates a compensation payment, without the need for additional claim assessment. Parametric risk transfer products can be especially useful in situations where it is difficult to assess the exact damage caused by an event, such as a natural disaster, and can provide a faster and more efficient way to issue compensation.

The initiative was funded through two types of co-financiers: the InsuResilience Solutions Fund (ISF), and a consortium made up of the NGO Global Communities, the reinsurer Hannover Re, and global broker and consulting company Willis Towers Watson. Global Communities led the consortium, in close collaboration with local authorities. Willis Towers Watson and Hannover Re, on the other hand, jointly led the modelling and design of the product.

The initial step of the project was to determine the data sources that would be used for the parametric model. In particular, the project partners sought seismic and rainfall information to compare with historical information on disasters that had impacted the city, in order to determine the parameters of the product. The initial intention was to use satellite data provided by international information sources to assess flood and landslide risks. However, due to the unique topographic, orographic, and climatic characteristics of the Aburrá Valley, satellite data was not found to be sufficiently detailed for product modelling. As a result, it was necessary to include local data to improve the accuracy of the model.

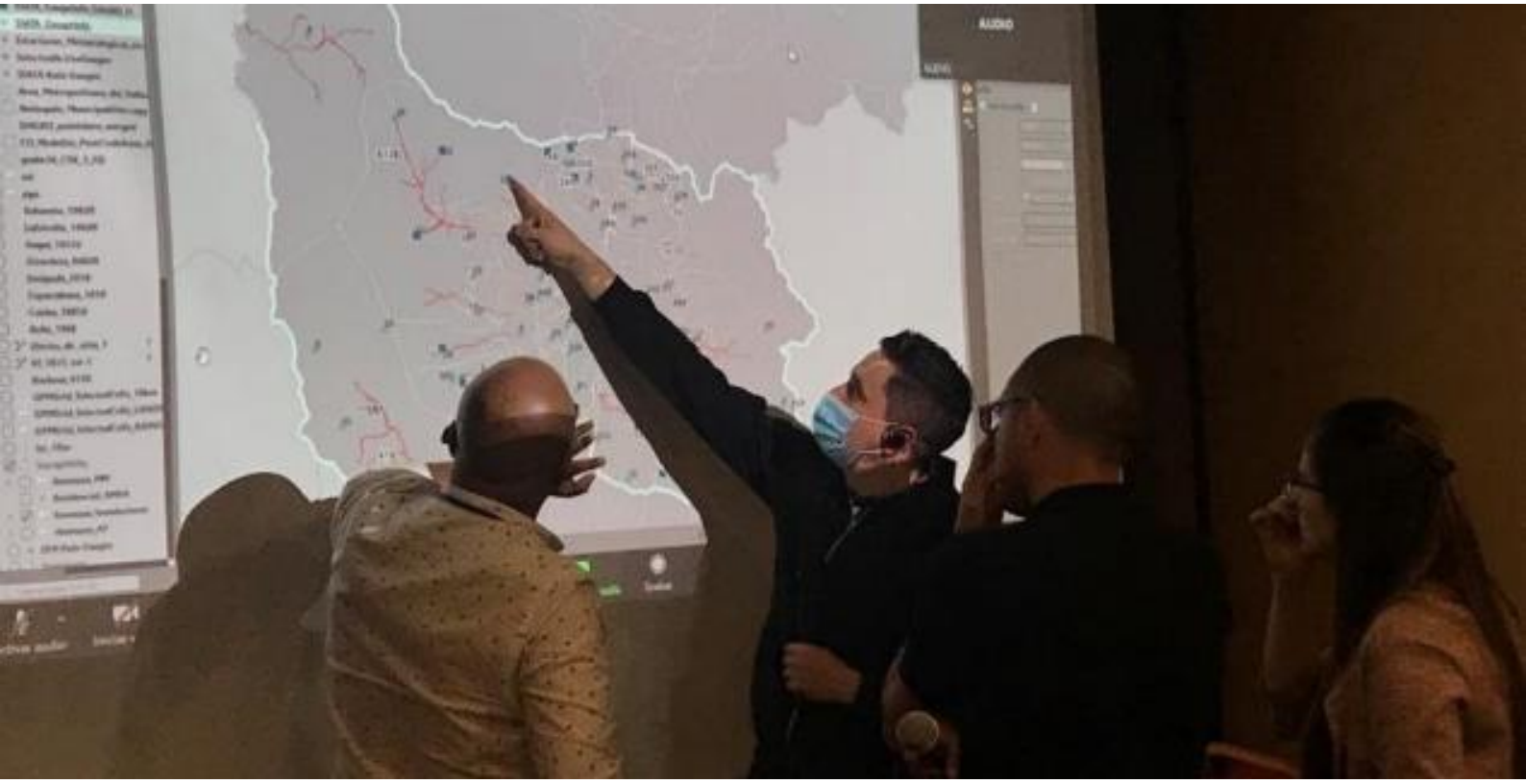
Various sources were used to obtain the necessary local data. Seismic information was collected based on data provided by the Colombian Geological Service, and the rainfall data used to measure the risks of flooding and landslides was provided by the Aburrá Valley Early Warning System (SIATA), through its network of rain gauges. In addition, data provided by the Administrative Department of Disaster Risk Management (DAGRD) was used to establish the natural disasters experienced in recent years in Medellín, and compare this information with the rainfall data. At certain stages of the project, it was necessary to rely on verbal accounts of historical disasters and their impacts from people who had retired from the municipality. Information

[1] The risk of fire was not included, because in the context of Medellín it is considered largely an anthropogenic risk (disasters caused by fire are generated in Medellín generally by human actions, and not by purely natural phenomena).

on recent natural disasters was also found in the database of the National University of Colombia based in Medellín.

Initially, the project intended to create a parametric insurance product. However, during the project, a decision was made to design the product as a financial derivative,[2] instead of an insurance product. The main reason for this change was the value-added tax (VAT) of 19% which must be paid on the premium of all insurance products in Colombia. Considering the time constraints of the project, it was not viable to seek an exemption from this tax. The municipality therefore decided to establish the product as a derivative, which is not subject to VAT. Once the final design of the product was complete, the templates for the financial derivative contracts and a roadmap for product placement were developed and delivered to the district.

As a result of this project, a parametric coverage for flood, landslides, and earthquake risks has been developed, which is a first of its kind in Medellín and in Colombia. The Mayor's Office of Medellín will be the policyholder, through the Municipal Fund for Disaster Risk Management, and the geographical coverage will be the district of Medellín. The product will complement the city's resilience and risk management plans, increasing its ability to respond to disasters that exceed its financial and operational capacities. When levels of rainfall or seismic activity exceed the product's pre-established thresholds, and without the need for damage assessment, the product will provide rapid liquidity to the municipality, allowing it to quickly respond to an emergency. With these funds, the municipality will be able to provide humanitarian assistance, rescue missions, and repair for basic infrastructure.



[2] A financial derivative is a financial instrument that derives its value from another underlying asset. Unlike the underlying assets, financial derivatives do not have an intrinsic value of their own. Among other things, financial derivatives are used to manage risk, and can act as insurance against natural disasters.

Challenges faced during the project

Climate data

An initial barrier encountered by the project was **the partial availability of historical data on floods and landslides, and the lack of an integrated and centralized system for existing data**. In particular, there was no information available on disasters that occurred more than a decade ago, and it was necessary in many cases to resort to the memory of former officials of local public entities.

In general, **specific information regarding the costs of disasters for public administration is very difficult to establish**. Not only in Colombia but in much of Latin America, there is no process in place to systematize information on the costs of disasters. In many cases, there is information available on the number of people affected, but not on the value of losses or the cost of the State's response. Key decision-makers do not, therefore, have the necessary information to assess the costs of having to deal with disasters without insurance or another risk transfer mechanism in place. In addition, it is difficult to design a risk transfer mechanism without a reasonable estimate of the cost of the risk to be covered.

Regulation

A lack of specific regulation was also a challenge. At the beginning of the project, there was uncertainty around designing a new parametric product without such regulation in place. In Colombia, parametric products are expressly authorized by the regulator only for agricultural insurance, although the regulator intends to issue further regulation in this area. It was determined that the proposed risk transfer solution was legally viable since the authorization of parametric solutions for agricultural insurance did not prohibit parametric products in other lines of business. Nonetheless, the lack of clarity on this topic in the Colombian legal framework continues to be a concern for all parties.

Public-private collaboration

The relationship between the private sector and the public sector involved challenges for both sides. Features of the public sector, including bureaucratic administration processes and personnel changes, made interactions difficult for private sector actors. In addition, interactions were even more challenging without direct access to senior management when crucial decisions were required. Often the project went through repeated phases of interaction because conversations were initiated at relatively low levels in the public administrative hierarchy. This created delays and the need to discuss the same topics repeatedly with multiple people.

Building understanding and trust in new ways to manage climate risks was challenging in the early phases of the project. It was necessary to invest time in building an understanding of new terminology, the operation of parametric models, and the potential to design a suitable parametric product, in order to build the necessary trust between all parties involved.

The **arrival of the pandemic and the need for remote work** was an additional and unexpected obstacle in the development of the project. Remote work generated particular challenges in coordination between multiple parties.

Lessons learned

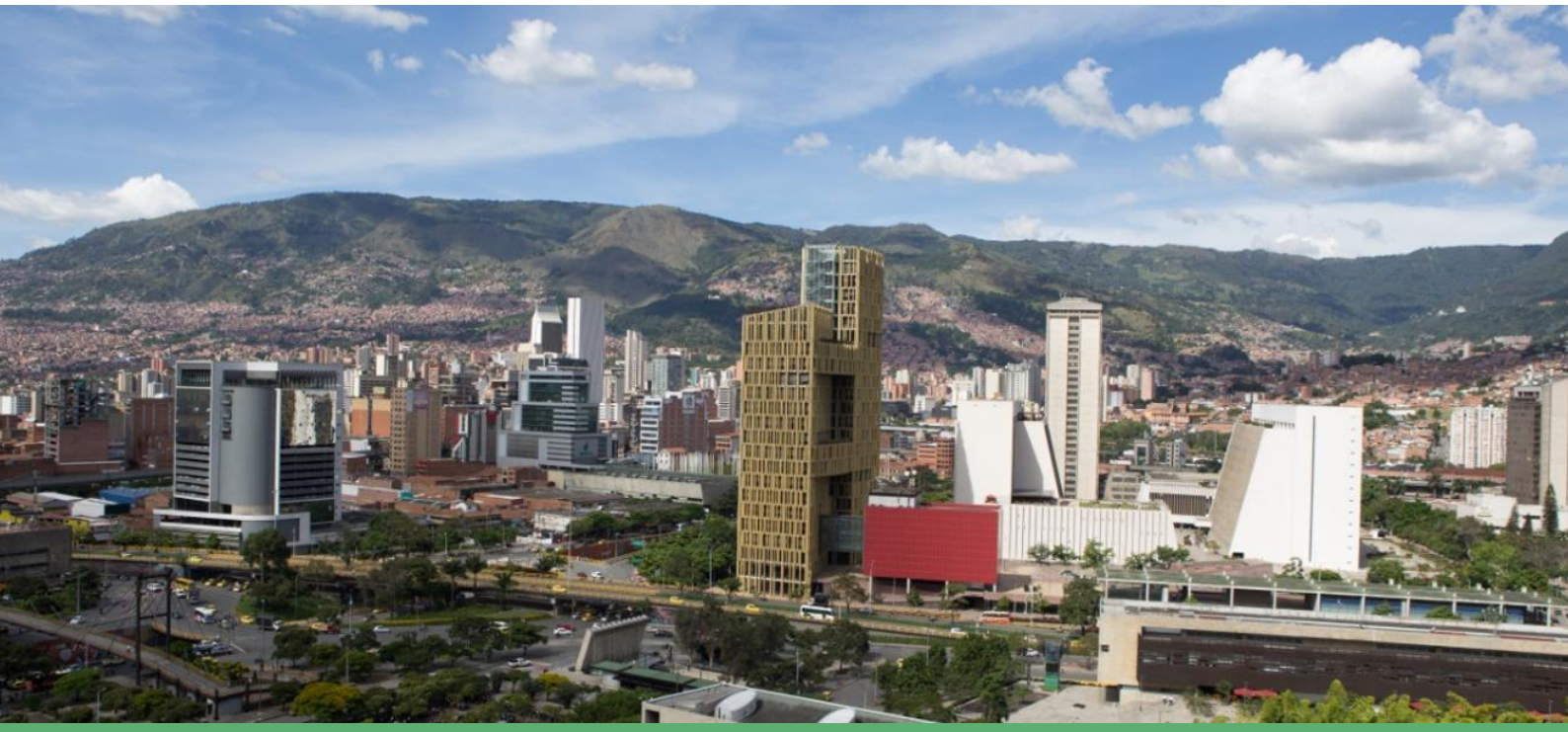
Climate data

The development of a parametric solution for Medellín made clear the need **to begin to quantify and standardize the historical information on climatic disasters in Colombia**. Emergency data is not usually quantified in a systematic way, or at the level of detail required by the insurance sector. A centralized and organized database that brings together information from local and national entities, and even unwritten information held by communities and by members or former members of institutions, is required.

At the same time, this project demonstrated **the value of local information, and the importance of coordinating with local actors on the information available.** Although there are highly reliable international data sources with continued provision of information over time (for example, satellite rainfall data measured by NASA), the level of detail they provide was insufficient for product modelling in the case of Medellín, given the wide variety of climates and geographical features of the area.

Local information was therefore essential, but it had to be systematized to be used for the project. For example, extensive information was available from the DAGRD on the occurrence of emergencies related to floods, through the records of their emergency telephone line. However, this information contained events related both to rain and pipe breaks and other non-climatic causes. To address this, a hierarchy was created of the most relevant flood emergencies brought about by natural causes, and the available data was organized on this basis. This information was then compared with the information on rainfall from SIATA, to determine if the proposed parametric model would have resulted in payments for these historical events. Without this type of data from local sources, the development of this project would not have been possible.

As a prior stage of future similar projects, a similar coordination exercise should be carried out with all local and regional entities, to map all available local information.



Product design

It is important to explore various risk transfer options before settling on a proposed solution. The need to change the focus of the project from an insurance product to a financial derivative illustrated the value of considering various modalities of risk transfer from the outset. More importantly, it demonstrated the importance of understanding the fiscal needs of the policyholder from the beginning.

In addition**, when innovating in projects of this nature, the flexibility of all actors is essential.** When the municipality opted for a financial derivative instead of an insurance product, alternative advisory support had to be sought, and new contracts needed to be established. Furthermore, the donor's approval was secured for the change in the type of product. Without this flexibility, it would not have been possible to finalise a product that met the needs of the stakeholders.

In addition, it is important to publicly establish a plan for the actions that will be carried out if a disaster activates a parametric risk transfer product. The existence of explicit municipal regulation on the use of these funds would generate a higher level of confidence in the country's control entities.

Public-private collaboration

It is vital to understand the local dynamics of public administration and to make contact as early as possible with political decision-makers. As discussed previously, the interaction between actors in public-private initiatives can be difficult if it is not based on a good understanding of the dynamics of the public sector. It is also essential that communication is established with political decision-makers at an early stage of the project, and that they are kept informed throughout. Inquiring about the political dynamics in a region, and ensuring a channel of communication is in place with high-level decision-makers, can contribute to faster progress.

A valuable lesson from this project is **the importance of generating a "common language" between the private and public sectors, based on building knowledge and capacities in both spheres.** There is real interest from the public sector in risk transfer schemes that are adapted to their needs. However, knowledge and capacity building must be carried out in both the public and the private sector, to achieve a common language between the two. The private sector must understand the practices and processes that govern public administration. The public sector, on the other hand, should continue to build, with the support of its allies in the private sector, knowledge and capacity in financial protection and disaster management. In particular, it is important that the public sector understands the role of insurance and financial derivatives in transferring risks of natural disasters. These instruments can be valuable tools to protect the finances of state agencies and the population, but they are often little known and used by the public sector.

Project replicability

The potential to replicate this project, given the particularities of the city of Medellín, is limited. The model is not fully replicable at a technical level: the parametric model is designed based on specific features that vary from one location to another, such as the weight of accumulated water chosen as the trigger for landslides. However, the general structure of the model and the methodology used can form a basis for other similar initiatives.

The project dynamics and the lessons learned during this project, on the other hand, are widely replicable, and can inspire and inform new projects to improve risk management for natural disasters.

The lessons and insights gained during this project can serve as valuable contributions to improve the way disaster risks are managed in the public sector. The results and strategies should be used as a model for other government institutions that are interested in improving their disaster risk management practices. Such innovations from the public sector could have a positive impact on reducing the negative effects of natural disasters and increasing the response and prevention capacity of relevant agencies.