Resilience and risk management: natural disasters as a public policy challange

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Abstract

The first part of the paper analyzes the importance of transversal rehabilitation after natural disasters; it is vital to harm reduction in cases of severe hydro meteorological contingencies. What's more, transversal rehabilitation can provide the foundation for the efficient management of a disaster and, as a result, it may increase institutional credibility.

The paper questions the skewed perception of such reconstruction processes, which are generally assumed to be dominated by financial players, either as a battle over federal resources or a debate between investors and individuals. Rather, the argument is that a successful rehabilitation depends on local institutional structures and resilient societies.

Guided by successful international experiences and a comparative exercise with 85 axes of observation, through the indirect method of difference, the study concludes that the establishment of a positive rehabilitation process—one based on emergency actions and project development-- allows the population to respond efficiently to a natural disaster.

Key words: *Resilience, reconstruction, public policy, co-responsibility.*

Resumen

El artículo analiza la importancia de llevar a cabo una rehabilitación transversal tras un desastre natural. Parte de la necesidad inaplazable de la reducción de daños en casos

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de contingencias hidrometeorológicas severas. Destacamos que, una rehabilitación transversal puede proporcionar la base para la gestión eficaz de un desastre y, en consecuencia, se puede aumentar la credibilidad institucional.

El documento cuestiona la percepción sesgada de la percepción común de los procesos de reconstrucción, que generalmente son dominados por los actores financieros, que constantemente se ven involucrados en discusiones sobre los recursos federales o, en ocasiones, se ve concentrado en debates entre inversores y particulares. El argumento central sostiene que una rehabilitación exitosa depende de las estructuras institucionales locales y grupos resilientes.

Guiados por experiencias internacionales exitosas y un ejercicio comparativo con 85 ejes de observación, a través de la aplicación del método indirecto de diferencia, el estudio concluye que el establecimiento de una rehabilitación positiva, basado en un proceso integrador de las acciones de emergencia y los proyectos para el desarrollo, permitiría a las comunidades responder de manera eficiente a los desastres naturales.

Palabras clave: *Resiliencia, reconstrucción, políticas públicas, corresponsabilidad.*

Introduction

During the United Nations Conference on Sustainable Development Rio+20 in 2012, it was declared that natural disasters and economic crises have worsened already high levels of economic, social, and environmental fragility throughout the Pacific. According to the Inter-American Development Bank (IDB), hazards and natural disasters have a substantial impact on economic and social development in Latin America and the Caribbean.

The latest edition of *Indicators of Disaster Risk and Risk Management*, drawn up by IDB, emphasizes that natural disasters are indeed one of the highest risks for the region. The methodology of this IDB document reveals the use of a system of indicators made up of four components: (a) disaster deficit index; (b) local disaster index; (c) prevalent vulnerability index; and d) risk management index.[1]

[1] For further information, see Cardona (2005). "Sistema de Indicadores para la Gestión del Riesgo de Desastres: Informe Técnico Principal". Programa de Indicadores para la Gestión de Riesgos BIDIDEA, Universidad Nacional de Colombia, Manizales. http://idea.unalmzl.edu.co

The first element, the disaster deficit index, shows the risk of a particular country--reflected in macroeconomic and financial terms—in the case of likely catastrophic events, with an estimate of the most critical impact at a specific time of exposure. The local disaster index covers the issues of social and environmental risk arising from less frequent events that affect chronic local and sub-national levels, such as fragile populations, and which lead to negative effects on the country's development.

The prevalent vulnerability index consists of a series of indicators that characterize the country's prevailing conditions of vulnerability in terms of exposure, socio-economic fragility, and a general lack of resilience. Finally, the risk management index corresponds to a set of indicators related to a country's risk management performance, as reflected in its organisation, capacity, development, and institutional action to reduce vulnerability, decrease losses, prepare to respond in the event of a crisis, and recover effectively.

We focus on these indexes because of their impact during policymaking and government decisions that can reduce human, infrastructure, financial, and economic losses. Public policy challenges relating to natural disasters come before, during, and after the events. The government should be prepared to respond effectively and efficiently to catastrophes. In terms of a financial commitment, institutional involvement is crucial, but public entities must also coordinate actors, resources, and strategies. This is crucial because of the complex elements that comprise a society; after a disaster, these elements must be mended and groups must reorganize in order to face future predicaments more effectively.

"Risk" can be considered a social construction: a society generates its risks, which often increase as certain sectors become more vulnerable. In the case of Mexico, the IDB affirms that the dangers are multifactorial—there is deep social, economic, and physical vulnerability, personal fragility, and undeveloped resilience. Other deleterious factors are a deficient risk management program and a high degree of threats. The geographic and geological location of Mexico makes hurricanes, earthquakes, and flooding common natural occurrences. The United Nations' International Strategy for Disaster Reduction modeling corroborates this analysis.

Even with the remarkable advances made over the last two decades in Mexico, analyzing the results of these indicators yields stark data that should affect future decision making. Keeping in mind that the disaster deficit index demonstrates the ability to confront economic trials during extreme disasters, IDB discovered that Mexico could not financially handle an extreme disaster with its own local or federal resources. Furthermore, the results —relating to death, injury, and economic strife-- showed that 95% of the major losses were concentrated in 8% of the country's municipalities. Minor disasters, in contrast, are observed to occur regularly and are distributed throughout Mexican municipalities.

Its resilience vulnerability index is around 50%, placing Mexico in the midrange for vulnerability in the region. The lack of resilience is important to consider because it reflects the ability to handle the impact of danger. This encompasses extended public safety and extended security as well as human development, human capital, economic redistribution, governability, financial protection, collective perspective, preparation to confront crisis situations, and environmental protection.

The risk management index measures management performance in Mexico based on targets and benchmarking goals. It is therefore important to identify risk, mechanisms to reduce it, disaster management, governance, and financial protection. Disaster management indicates that the country has made progressive progress in this regard, from a low level to an appreciable one (around 40%). Specifically, from 1990 to 2008, concerted efforts in planning for emergencies, alertness, equipment updating, infrastructure improvement, and simulation systems produced positive results.

Although data regarding fatalities are invariably subject to question—this due to factors as varied as geographic and technological barriers to the use of faulty measurement techniques—such figures should be considered a general reference in terms of policy- and decision making.[2]

This research was inspired by the severe flooding of 2010 in the state

[2] Example of this are, "estimates by missions of the Economic Commission for Latin America and the Caribbean (ECLAC) indicated that over the past three decades, more than 150 million people in the region have been affected by the disaster […] and 12 million of direct victims would have generated." (Comisión Económica para América Latina y el Caribe. Manual para la Evaluación del Impacto Socioeconómico y Ambiental de los Desastres, México, ONU/CEPAL/BIRF, 2003, p:v)

of Veracruz. By the end of 2010, the damage caused by these floods in Mexico's southeastern territory Hurricane Karl and Tropical Storm Matthew reached historic and staggering figures.

According to the National Center of Disaster Prevention (CENAPRED), "[...] were 6 declarations of disaster for 229 municipal contingencies, flooded cities, houses and infrastructure destroyed, more than one million people [affected] and [estimations for] reconstruction by several millions of Mexican pesos." [3] (Note that Veracruz has only 212 municipalities; this means that several municipalities had two or more declarations of disaster at the same time.) On a national and international level, official positions were questioned. It was generally held that accurate information could not be collected, and there were indications that the rate of unreported damage was high. The casualties reported one day went unmentioned the next; clearly, the state government was working with confusing data. The amount of money supposedly set aside for relief work was inconceivable. To this day, it is unclear how much damage was suffered, what funds were earmarked for reparation, and to what degree the public received effective rehabilitation.

Vast contradictions

At the end of March 2013, the United Nations asked Mexico to prioritize work on natural disaster prevention activities because of the high cost of reconstruction; figures had surpassed two million dollars per year. The international authorities considered that this financial support would be better invested in programs that fight poverty and organized crime, assuming that disaster preparedness measures could be greatly improved in order to decrease the amount needed for reconstruction.

In April 2013, the Mexican federal government declared that Veracruz was the state with the most efficient natural disaster management program. In fact, authorities pointed to Veracruz as an example that the other 31

[3] Secretaría de Protección Civil. Programa Preventivo, de Alertamiento y Respuesta Inmediata ante Lluvias y Ciclones Tropicales, Veracruz, SPC, (2011:6).

Mexico states would be wise to follow. However, while Veracruz has shown certain regionally recognition of its ability to respond quickly to emergencies, effective disaster management is a much broader rubric that requires careful consideration.

In May, 2013, a local newspaper announced that in June, the local government would "…start to reconstruct 300 damages due to the extreme weather events of 2010." This is noteworthy, as the event had occurred almost three years earlier. After the major disaster, hundreds of roads and bridges were disabled, hundreds of crops destroyed, and hundreds of homes, schools, and hospitals rendered hazardous. In all likelihood, thousands of people are, to this day, suffering under very precarious conditions.

In Mexico, both the presence and recurrence of severe weather events constitutes an indisputable reality. Mankind has shown an accelerated development in many areas yet has become increasingly vulnerable in the face of natural disasters. There is a high probability that the effects of climate change, the excessive use of natural resources, and inadequate urban planning substantially increase hydro meteorological hazards (especially flooding and drought) in our territory, jeopardizing the quality of life and safety of our population.

Transversal rehabilitation

The importance of transversal rehabilitation after natural disasters should be considered the key to harm reduction in case of severe hydro meteorological contingencies and as the foundation of an efficient disaster management plan that, as a secondary advantage, increases institutional credibility.

Despite mankind's progress in many arenas, there is no conceivable way that we can prevent cyclical natural disasters from occurring. Our responsibility therefore lies in taking prophylactic measures to lessen the severity of the damage they cause, as well as responding efficiently during and after the event. The present study focuses on the latter goal, reconstructive measures; they require a commitment to protecting human life, which is why such measures deserve the careful assessment of planners,

executors, and evaluators of public policies as well as those devoted to related or transversal issues.

Approaching this topic requires that we place "rehabilitation" in its proper conceptual, spatial, and temporal place. An obstacle to overcome is that in the scenario of a natural disaster, no universally accepted concept of the term exists. We must therefore base our conception on the logic that damaged property or lives must be repaired and rebuilt—thus the term "reconstruction." But we must be forewarned that this does not mean reinstating the institutional, physical, and social status present before the disaster occurred. Rather, a new project must be drawn up, and it must bring about necessary transformations to existing social structures; the project must also assess factors that contributed to the calamitous event. This second element is called "resilient rehabilitation," a term that should form part of the concept and practice of reconstruction.

"The reconstruction phase includes activities, that rearrange the physical space and the environment in order to allocate resources according to the new social priorities that have emerged from the disaster, restore the functionality of economic activities, and renovate social life. The objective of this phase is to increase local capacity and strengthen the physical, economic, and social infrastructure threatened by new disasters. The decisions involved should have clarity of the level of protection desired and the definition of 'event-design' (the limit in terms of strength and recurrence of the type of event that was considered the cause of the disaster)." [4]

Behaviours related to "reordering according to new priorities," "promoting capabilities," "strengthening infrastructure," and establishing a "degree of protection" provide an added value to the rehabilitation process that we consider ideal. In ECLAC productions, the terms "rehabilitation" and "reconstruction" must be considered synonyms in order for this concept to be carried forth.

Unlike other stages in disaster response, management of the rehabilitation phase must be done with a keen sense of the region's temporal status. Ideally, the execution of integral rehabilitation projects should begin within

[4] Comisión Económica para América Latina y el Caribe, *op.cit.* p.6.

a year of the detonating events, assuming that the emergency phase has been overcome and that immediate dangers have been controlled. Another requirement is that accurate data on the extent of the damage be available, as this permits the launching of specific activities designed to regain and/or improve the conditions that prevailed before the disaster.

The temporal aspect of rehabilitation involves other close challenges associated with the need for three types of financing—constant, long term, and individualized—to cover all necessary costs during the process. Financial aid must be based on a continuous evaluation of how such actions will develop; that is to say, the amount of aid will fluctuate during the period that runs from the time of the event to, say, three or five years afterward.

If we design a time line that runs from the moment when a natural disaster hits until the initial execution of future development programs, the rehabilitation process should be placed in the middle, as it constitutes a vital link between the two.

An apparent difficulty lies in the lack of a universally accepted rehabilitation model. Each predicament requires the design and implementation of a unique process that will depend--among other factors--on the needs generated by the hydro meteorological phenomenon, the nature of the affected communities, the existence of financial resources, and institutional conditions.

It should be noted that both action and inaction have far-reaching consequences in the communities affected by severe hydro meteorological phenomenon. What we do after an event will depend on the level of security and quality of life of those affected in the short, intermediate, and long term. Local public entities are directly responsible for building and sustaining good governance, resulting in the maintenance of political stability and the resolution of emerging conflicts in response to the legitimate needs of the population. Furthermore, there are sectors that require simultaneous attention in many and varied areas, each fundamental and urgent. The political cost of a wrong decision can incur problems such as loss of institutional credibility due to the exercise of corrupt, illegal, and negligent policies.

One potential error is to ignore the ecological costs of natural disasters, such as pollution, damage to biodiversity, and changes in river channels. Many times, these problems are neglected until it is too late to take corrective measures, as the damage has become irreversible. Existing records indicate that to date, environmental care after a disaster is considered one of the government's lowest priorities.

International learning

The international learning in a comparison exercise to other countries in terms of the methodology of this research, and in order to comprehend the dimensions that resilient rehabilitation can reach, we analyzed the performance of four countries that are leaders in the field: the United States of America, Cuba, India, and Japan. We also turned our attention to eleven international organisations: the United Nations Disaster Relief Organisation (UNDRO); the Office for the Coordination of Humanitarian Affairs (OCHA); the United Nations Development Programme (UNDP); the United Nations International Strategy for Disaster Reduction (UNISDR); UN-Habitat; the Organisation for Economic Co-operation and Development (OECD); the World Bank; the European Union; the United Nations Economic Commission for Latin America and the Caribbean (ECLAC); the Inter-American Development Bank (IDB); and other nongovernmental organisations.

Identification of the most effective international post-disaster rehabilitation activities and assessment of their resilience presents us with a provocative scenario. By applying a comparative method, especially the indirect method of difference, we can recognize similarities and substantive differences that will lead to an understanding of how methods that have worked elsewhere can be adapted and applied in other territories.

After identifying international rehabilitation activities—be they multilateral, regional, or local—that have proven to ameliorate conditions in territories susceptible to this type of events, we gleaned valuable data on risk and crisis management. Our analysis began with a comparative exercise involving a group of 85 indicators that were divided into four

main blocks: subjects (27 variables), tasks (27 variables), resources (15 variables), and phenomena (16 variables).

Subjects

This block consists of participating parties: local, regional, national, and international donors of civic, public, intergovernmental, and non-profit sectors, either working independently or together. Total or partial intervention measures that these participants take outside of the affected communities were also taken into consideration.

Tasks

In the task block, we placed activities and programs that center on prevention, emergency response, reconstruction, restoration, and development; also included are mechanisms designed to permit structural and institutional reforms as well as coordination efforts. Here, we attempt to cover the existence or lack of specific flood-response actions, the different types of response, mechanisms for evaluating damage and for assessing needs, and ways of strengthening civic society, community organisation, and sustainable tasks.

Resources

It was vital to devote a section to resources, understood as the inclusion—or lack—of human resources, material, and financial support in the short, intermediate, and long term, as well as the identification of administrative procedures needed for the assignment of budgets for emergency work, rehabilitation, and development, budgets established before the emergency occurs. Included in this block is support provided to affected populations and promotion of national and international investment.

Phenomena

The consequences of flooding make it necessary for the block relating to phenomena to include identification of the measures that are taken to lessen the damage caused by diverse types of event (frequent, occasional, or infrequent), those that affect both urban and rural areas, and others that

provoke the most harm in particular settings—farming, livestock, forest, fisheries, infrastructures, or the environment. The amount of human settlements in high-risk zones, as compared to middle- and low-risk areas, was also taken into account here.

Findings

First and foremost, the link between natural disasters and human conduct must be emphasized, as people have either chosen or been forced to live and work in high-risk areas. In March 2013, the General Coordinator of the Secretary of State for Mexico's Office of Civic Protection proclaimed that "The population is extremely vulnerable to natural phenomena due to ignorance, neglect, and even public incompetence."

Rehabilitation is a process that requires accurate information about the damage caused by disasters. This includes knowledge of the affected region, government intervention, and community action. The speed and reliability of this assessment should be considered an early priority, as it will permit the development of transversal projects that serve a population's needs with greater impact on its safety and stability.

The study showed that the relationship between short-, intermediate-, and long-term actions taken after a natural disaster are not fully or clearly reflected in the regulations of countries or international organizations involved in the contingencies (figure 1). After reviewing 15 case studies, we are struck by the lack of consistency between proposed and executed programs. Furthermore, negative rehabilitation is favoured *de facto*, leading to superficial and exclusively short-term outcomes.

The use of the comparative method described, showed that the relationship between funding and rehabilitation was noteworthy. Full coverage of costs by the governmental entity does not produce the best results. Co-responsibility and the strengthening of local capacities offer tools that benefit the community in terms of efficiency, safety, and an improvement in quality of life.

Conclusions

The 85 variables behaved differently in the 15 cases studied; this was not surprising, as the different modalities for addressing post-disaster rehabilitation lead to patterns that cannot be homogeneous. Upon examining such behaviours in each of the categories--subjects, tasks, resources and phenomena--we find that intergovernmental international organizations prefer the participation of actors in the three orders of government when a natural disaster hits, whereas regional organisations emphasize the specification of tasks during three phases: of emergency, rehabilitation, and development.

Focusing on resources, the experiences of countries such as India and Japan have a detailed administration of human, material, and financial resources for disaster management. Most of the international agencies, both intergovernmental and non-governmental, give less weight to these elements. Meanwhile, phenomena regarding specification are the area in which the greatest variations are found.

Cases of post natural disaster rehabilitation in Japan and India proved to be the most comprehensive and integral among those observed. Cuba, in turn, is unmatched in its speed of damage assessment. On the other hand, the proposals of the National Programme of the United Nations and the Inter-American Development Bank are the most complete.

We should pay special attention to how the United States of America handles rehabilitation after a hydro meteorological contingency has occurred. Our initial perception of its efficiency was, upon further contemplation, transformed. According to our parameters of observation, the country's rehabilitation is clearly negative, leading to constant and expensive processes, unnecessary human loss, and stagnation at the level of community development.

Consideration of the tasks section illustrates the great benefit of emergency and relief actions as well as the sustainability of resources in the short and intermediate term. Inconsistencies between thorough training for rehabilitation, the strengthening of civic society, and community organization produced mixed results. When some elements were covered but others ignored, the consequences were untenable.

The outcome is also deficient when human resources are available but—either in the short or long term--material and financial support is not. Under such circumstances, the importance of donations is lessened; when one adds to this a dearth of stimuli for internal investment, the situation becomes more difficult. Thus, the link between emergency response, rehabilitation, and development phases is often weakened by ineffective planning and careless control of post-disaster work.

Analysis of the block labeled "phenomena" proves valuable because the behaviour illustrated is so variable. Urban and rural contingencies are given much attention, both on a state, federal, and international level, while when the devastation is sectorial, the response depends largely on the profile of the affected sector. Highly developed countries, in turn, tend to focus on rebuilding damaged infrastructures.

When affected communities rely on external financial aid, additional problems are created. Careful analysis must be conducted of the cost of financing for development, as well as the consequences if loans are not paid off in a timely manner. The positive and negative impact of financial aid must be considered, along with the likelihood of having the constant flow of capital necessary to make efficient use of the resources available.

It would appear that the optimum strategy involves the successful coordination of many factors on several different levels. A rehabilitation effort must be transversal and resilient in character, and it must promote co-responsibility. Furthermore, a strong link must be created between disaster preparedness, emergency response activities, and project development. These elements are vital in order to reduce the damage caused by a climate-induced disaster. Strategic rehabilitation not only yields the most effective results for affected populations but has a political benefit as well: institutional credibility grows as successful relief projects are carried out.

Throughout this research, we noted with sadness that the widely held perception of reconstruction is poor, as it is seen as dominated exclusively by financial players--a battle for federal resources or even a debate between investors or individuals. The presence of resilient societies and sound local institutional structures was generally overlooked. Integral and resilient projects are urgently needed on a large scale, and they should promote

behaviours that swiftly reorder policies based on new priorities. Such a project increases the internal capacities of the affected community, monitors the appropriate operation of infrastructures over time, and prioritizes an awareness of long-term protection.

Doubtlessly, the role played by political and administrative entities is primordial, yet social development is also of vital importance. As this study has demonstrated, after a natural disaster has occurred, community involvement permits the different mechanisms called into play to work as efficiently as possible. The time has come for public authorities to assume their responsibility in promoting social development so that resilient populations are consolidated. This could yield greater benefits for the community as well as the government, and without increasing expenditures. On the contrary, reconstruction projects would cost less if investments were made more wisely. Furthermore, even in regions that are highly vulnerable to natural disasters, communities would become safer and more efficient.

Finally, an integral and effective resilient project must promote behaviours related to swiftly reordering policies that lead to new priorities, increasing the internal capacities of the affected community, monitoring the appropriate operation of infrastructure, and fomenting an awareness of long-term protection measures. The consolidation of co-responsibility between government and citizens to build resilient societies increases the chances of strategic rehabilitation after severe natural phenomena.

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