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NOTE DE L'AUTEUR

The views expressed herein are those of the authors and do not necessarily reflect the views of the United Nations Office for the Coordination of Humanitarian Affairs nor of the United Nations Development Programme.

- 1 Mountain ecosystems present particularly challenging physical conditions. Social groups that rely on such ecosystems are obliged to enhance capacities that permit complex and comprehensive processes of human adjustment. These relate not only to prevailing physical and spatial aspects, but more importantly to the social order of the communities. And, these are particularly related to the temporality and rhythm of the process of construction of that social order.
- 2 The case of drought and freezing related risk and disaster in the piedmont rural region of the Bolivian Chaco allows different interpretations of how “extensive disaster risk” (see UNISDR, 2011) manifests itself as a prolongation of every day, chronic risk (Hewitt, 1983, 1996, 1997; Sen, 1983). This prolongation from every day to extensive disaster risk is employed to help explain the humanitarian crisis experienced in the Chaco between 2009 and 2011. And, it is also used as a background for analyzing the content and deficiencies in the types of response to this crisis.

Conceptual framework

- 3 An understanding of disaster in the Chaco requires a close consideration of the relationship between the disaster risk construction process as such, and the complexity

of the development challenge in mountain ecosystems, where poor communities face very specific social, political and environmental conditions.

- 4 In this context, Wisner *et al.*'s (2004) progression of vulnerability model and Hewitt's (1983) early conceptualization of disaster risk as a continuity of every day risk conditions and normalcy are used as major theoretical reference points.
- 5 Every day risk factors represent "non-development". They are associated with the way 'development' concentrates wealth and power, and regularly predisposes the population to adverse effects of a physical/material, social and psychological nature. They thereby impede human beings from achieving a state of well-being and include such conditions as unemployment, malnutrition, unhealthiness, individual and social violence. The existence of these conditions, which are not only confined to the poor (although it is in this population group that more serious and prevailing repercussions are felt), guarantee that poverty is often transformed into hazard, vulnerability, and disaster risk (Lavell, 2007, p. 16).
- 6 The notion of a "risk continuum" is a second aspect central to our analysis (Lavell, 2003). This notion posits three major interrelated categories of disaster risk. Firstly, primary or structural risk, which comprises the conditions that pre-exist any particular disaster triggering event and which is materialized as disaster once the event occurs. Secondly, derived or contingent risk, which comprise the specific risk conditions that arise, many times relatively abruptly, with the impact of a damaging physical event on society. Examples of this would be outbreaks of illness, malnutrition, lack of access to potable water, etc. And, future, reconstructed risk which can derive from badly conceived reconstruction and recovery measures. Reconstructed risk will constitute part of future primary or structural risk. The classification of risk into these three categories is, of course, a heuristic and pedagogic device.
- 7 The time framework and the geographical distribution of the conflicting or harmonious relations between communities and ecosystems are seen to be determinant in the progression of vulnerability (Wisner *et al.*, 2004). They are also important with regard to the ways in which socio-natural hazards—latent threats associated with the probable occurrence of physical phenomena, whose existence, intensity and recurrence are related to processes of environmental degradation and/or human intervention in ecosystems (Lavell, 1996, 2003, 2007)—constitute fundamental factors in the evolution of primary or structural risk and its transformation into contingent or derived and future evolving risk. The temporal framework should, therefore, not be underestimated when it comes to understanding the success and failure of corrective, prospective and compensatory disaster risk management mechanisms (Lavell, 1996, 1999, 2003; UNISDR, 2011).

Drought, freezing and humanitarian crisis in El Chaco

- 8 The South American Chaco covers approximately one million square kilometers in four countries (Bolivia, Paraguay, Argentina, and Brazil). In Bolivia, the Chaco spans 127,000 km² and is located in three departments: Chuquisaca, Santa Cruz and Tarija, covering seventeen municipalities (Figure 1). Ten of these correspond to the sub-Andean or foothill zones, which account for 60% of the population of the Chaco living on steep slopes or on highly fragmented and abrupt terrain.

Figure 1. Location of El Chaco in Bolivia

Source: Jorge Espinoza

- 9 The greater part of this Chaco region is characterized by a mild and semi-dry climate. Average precipitation ranges between 600 and 1200 mm with accentuated variability in water availability and worsening conditions of soil degradation.
- 10 The Chaco population located in the mountainous zone is predominantly rural and dispersed with an average population density of 1.6 inhabitants/km². It is also fairly isolated from the rest of the country.
- 11 Of the 17 municipalities that comprise El Chaco, three are considered in the present article. These are located in the predominantly mountainous sub-Andean regions of Huacareta (Chuquisaca), Caraparí and Entre Ríos (Tarija).
- 12 Despite the enormous income generated by oil and gas exploitation in the region and the resulting royalties, the percentage of the population living in extreme poverty in the three municipalities is 82%, 51%, and 43% respectively, with infant mortality rates fluctuating between 64 and 72 for every 1,000 live births.
- 13 Among the different ethnic groups in the Chaco, the Guaraní population is dominant. A subsistence economy based on corn production for personal consumption along with lesser agricultural activities dominates. The agricultural sector is highly dependent on the climate and soil conditions.
- 14 The indigenous Guaraní population has been obliged to develop coping mechanisms to deal with successive crises associated with a lack of inputs to satisfy their most basic needs- food, water and sanitation. Some of the spontaneous adjustments implemented by the population include seasonal or permanent migration in search of salaried sources of employment in agriculture, employment in urban centers, and the renting

and selling of assets (land and livestock). Another strategy has included the accommodating of roles and functions within families and communities, including taking children out of school in order to transport water.

Land and water: from natural resources to socio-natural hazards

- 15 The biophysical conditions of the Chaco sub-Andean region make for a highly fragile ecosystem characterized by steep to moderate slopes and arid, mostly sandy, permeable soil that is low in nutrients. The soil is further affected by the varying seasonal availability of rainwater and by saline aquifers which, when utilized, pollute the arable layer of soil suitable for crops. Contaminating agents are also present from mining operations in the upper basin. These conditions explain (Figures 2 and 3) in large part why, despite a greater presence of water resources in the sub-Andean or foothill region than in the plains, conditions for agricultural activities are still critical (MDRyT, 2010).

Figure 2. History of rainfall patterns in the Sub-Andean area and El Chaco foothills

SOURCE: COMITÉ NACIONAL DE REDUCCIÓN DE RIESGOS Y ATENCIÓN DE DESASTRES (2010)

- 16 On the other hand, the fragility of dry land forests with low regeneration potential highlights the concern for the health of the ecosystem and its susceptibility to fires, even more so when considering the presence of zones of oil and gas exploitation.

Figure 3. The construction of a multi-hazard territory

The progression of vulnerability: from underlying causes to insecure conditions (table 1 and Figure 4)

17 The aforementioned conditions are reinforced by historical and social processes that account for the current state of the land. Some of the more important of these include (MPD, 2006; MDRyT, 2010):

- The conflictive process of colonization and construction of the nation whereby the dominant interests of the emerging Republic took precedence over the territorial logic of the Guaraní territory. This constituted a process of colonization which destroyed the ancient social and economic structure of indigenous people and introduced a split society where on the top there were the Hispanic people with the power and at the bottom the indigenous.
- The setting-up and subsequent consolidation over the last century of commerce based population centers, established to attract population and leading to the gradual uprooting of the indigenous population.
- Economic migration from the west towards El Chaco and, from the east towards the sugar cane harvests in Argentina in the 19th century and Santa Cruz, Bolivia, in the 20th century. This led to a reduction in agricultural capacity due to the absence of a young manual labor force in the communities.
- Capital intensive hydrocarbon investments that have had an insignificant impact on job creation. Royalties that are distributed departmentally have not brought direct benefits for the rural population.
- The relationship between the indigenous and rural populations and the State are strongly conditioned due to an agenda of political vindication and of indigenous rights especially with regard to land and territory. However, attention to, or proposals for resolving problems of community production remain absent. This has led to an accentuation of inadequate production practices, such as over and uncontrolled grazing that contribute to the worsening of the basic environmental conditions that could sustain a production chain beyond subsistence farming.
- Formal and participative research to foster adequate, relevant and socially appropriate knowledge for territorial management have merited some isolated efforts, mainly led by non-governmental organizations; but, unfortunately, little generalized impact has resulted.

Table 1. Progression of vulnerability

<i>Underlying Causes</i>
<ul style="list-style-type: none"> • The dominant system of property and control over natural resources, especially land and water • Conception and functioning of the State as a regulating entity. Production processes are excluded from the public agenda and dealt with as private initiatives • Restricted access to information and knowledge. • Refusal to accept the existence of diverse and different concepts with respect to territory
<i>Dynamic Pressures</i>

<ul style="list-style-type: none"> • Conflict in territorial management and organization • Inadequate production and cultural patterns • Deficiencies in the governance of land use and territorial planning: Municipal health and education service providers are disconnected from the mechanisms for territorial management and the organic decision-making structure of the Guaraní people • Unorganized migratory processes
<i>Unstable Conditions</i>
<ul style="list-style-type: none"> • Overlaps and imbalances between the nations' prevailing administrative political structure and the governance mechanisms in indigenous and rural communities • Distribution of resources and skills are deeply flawed • Lack of legitimacy in the decisions of the State from a "formal" perspective • Weakened social tissue and productive forces • Erosive processes due to unsound practices resulting in loss of arable soil • Poverty and basic unsatisfied needs • Lack of alternatives and techniques for production and water resource management

Figure 4. Correlation between the progression of vulnerability and the construction of socio-natural hazards

The disaster

- 18 Over recent years, decreases in production and well-being have implied successive crises of varying magnitudes, many of which were overcome thanks to individual and community measures taken from within. However, between 2009 and on into 2011, a significant humanitarian crisis has been experienced, requiring exceptional or novel actions in order to avoid the loss of human lives.

- 19 As part of the effects of La Niña between October 2009 and August 2010, a reduction and temporal concentration of average precipitation was reported in different regions of the country. Sudden falls in temperature were also reported in winter in the Chaco and other regions, generating problems of food availability and access. The people's livelihoods and food security were compromised. There was only limited access to safe water for human consumption and basic sanitation, and hygiene and health problems became more prevalent, especially for those living farthest away from the more populated centers.
- 20 The first warnings of the impact of deficits in rainfall and low temperatures for agricultural and livestock production were announced by the Assembly of the Guaraní People and the press at the end of 2009. Moreover, scarce rainfall in the region during the month of February helped raise public attention for the region for a while. Unfortunately, the rainy season in 2010 was also irregular, shorter than usual, and concentrated in a few days between February and March. It certainly wasn't enough to replenish the water resources needed for the poorest communities to subsist and support their livelihoods.

Contexts of risk/extensive disaster: actors, processes, and tools in evaluation and extensive decision-making

- 21 In April 2010, the Ministry of Rural Development and Land, along with various international agencies and organizations, attempted to evaluate the effects on, and the needs of the food security, agricultural production, water, sanitation, and hygiene sectors. The results of these evaluations helped agency analysts to more closely reflect on theoretical and technical aspect closely linked to the relationship between ecosystems, marginalization, and the conditions of extensive risk.
- 22 The processes implemented to obtain and analyze information and take decisions as to the needed response, led to questions not only as to how to conceptualize and manage extensive risk scenarios, but also as to the role of local actors and external actors (*e.g.* departmental and national public and non-public stakeholders, such as international organizations) in promoting knowledge management processes that could support adequate intervention strategies. Dealing with communities, ecosystems and territories that are marginalized and physically inaccessible to, and disconnected from the State's formal structures and centers of control, whilst, at the same time, having few alternative sources of subsistence, brought serious problems when dealing with extensive risk and disaster scenarios. In such a context it is clear that more traditional methods of gathering and analyzing information on disasters associated with rapid onset phenomena such as earthquakes and landslides, could not be successfully implemented.
- 23 The process of evaluating damages and needs in the Chaco during April 2010 involved more than twenty evaluation teams using a questionnaire applied amongst key authorities and informants in the zone. At times these were departmental authorities and, at others, they came from municipalities and communities. Analysts employed an information-gathering method covering the food security, agriculture, livestock, health, and education sectors.
- 24 The process was designed for use by external actors, in other words, national and international actors who were not directly linked to local management or production

decisions, but who, at the same time, are able to implement a series of wide scale humanitarian aid measures. The visits were principally geared up to gather evidence of the substantial changes occurring in the prevailing conditions of human security. They began by defining the reduction in rainfall as the “adverse event” to be dealt with. Following this guiding principle, the damage and needs assessment attempted to distinguish between the effects of the drought as such and those deriving from the chronic conditions of shortage or poverty persistently suffered in the observed territory. They tried to maintain a focus on the impacts of the so-called “adverse physical event” and not on its causes. Only if the adverse event clearly correlated with changes in well-being would it be possible for external actors to consider mobilizing emergency resources. To the contrary, regular development mechanisms would have to be considered, using “regular” channels of planning and State investment, with the delays this would most probably bring.

- 25 This process turned out to be very difficult in practice since the evaluation was undertaken before and/or during (depending on the specific area of analysis) an obvious worsening in the basic conditions of human security that it set out to measure. Given this situation it was almost impossible to construct solid arguments using the available data to announce the presence of a “natural disaster” and, therefore, the existence of a humanitarian crisis directly associated with the deficits in rainfall or the low temperatures registered in winter. Moreover, the freezing temperatures had an even more diffuse impact and variation in different affected micro regions.
- 26 The knowledge management methodology was underpinned by concepts or notions that suppose the possibility of distinguishing a state of emergency or disaster from a “normal” or regular state of affairs related to skewed development. The method was, therefore based on a disaster management cycle concept which refers to the phases of before, during and after the impact of an adverse event and the “interruption of normality.” These notions could be justified when dealing with external actors given that they generally have certain assigned game rules and/or areas of expertise that must be respected in order to allow them to operate as humanitarian support. However, in the case of national level external actors, the role and obligation of the State in protecting and saving lives and livelihoods merits far greater attention, regardless of whether the human condition is associated with “normal” skewed ongoing development processes or a temporary emergency strictly related to the rain shortage.
- 27 In this context, the assessment mechanism employed could not appropriately establish the dimensions of the crisis in progress, nor did it immediately activate a mechanism of social protection on behalf of the State, or, where this was lacking, a humanitarian response by the international humanitarian organisms.
- 28 Moreover, the mechanism for gathering, analyzing, and disseminating information was based on visits by external actors to the affected territory and the results were analyzed “in office”. With this the teams were unable to generate an integrated process involving local actors, able to create or motivate an internal or endogenous dynamic which could hope to influence local decisions as to needed adjustments in soil, water, agricultural and livestock resource management practices. In this particular case, the difficulties faced comprised a serious gap in any attempt to correct or compensate existing risk and crisis conditions, and avoid extreme situations.

- 29 There are convincing arguments deriving from the Bolivian Chaco “extensive disaster” case as to the important challenges faced when responding to a crisis with mechanisms traditionally developed for intensive, large scale risk and disaster. Conceptual and methodological weaknesses exist for analyzing extensive risk and for evaluating the needs associated with a disaster in this type of context.
- 30 As we can infer from the difficulties encountered in the case of El Chaco, it is fundamental to understand that in an extensive risk scenario the crisis implies a sum of small and medium-sized events that interact in a gradual, recurrent, and complex manner to create hazards and vulnerability. Losses and/or damage are accumulative, and the direct link between this and the risk of losing human lives is too diffuse to be interpreted using traditional emergency response processes. An extensive risk scenario requires, on the one hand, the recognition of contingent risk closely related to every day risk, and on the other hand, innovation in terms of humanitarian actions and the instruments proposed, which must be closely linked to the social protection mechanisms offered by the State.
- 31 In the case of the Chaco, the most obvious problem was the variation in rainfall averages. But, this in itself would never have caused important losses if it weren’t for the presence of additional factors. These include adverse soil conditions and the gradual and silent processes of biophysical and environmental degradation and degradation in the conditions for social survival and livelihood replenishment. Description of the problem is simplified in the equation: water deficit + poverty = humanitarian crisis. Seen from this perspective, only if the dry periods last a long time and/or have a quick period of return and impact, will a crisis be perceived. The other less obvious underlying factors that create both hazards and vulnerability are generally hidden or simplified and expressed through the concept of poverty. Due to this they are abandoned and left to be included in longer term planning and investment processes.

Managing contingent risk and its impact on new risk

- 32 Pressure exerted by the Assembly of the Guaraní People in June 2010 led to the national government declaring a State of National Emergency. Nevertheless, as has already been commented, systematic operations could not be activated at that time to prevent the conditions of the population from worsening.
- 33 In September of 2010, international humanitarian actors, with support from the *Ministry of Water and the Environment*, completed a new evaluation and needs assessment. At the same time, the World Food Programme completed a sample study that at that time identified important nutritional problems. Using this data, they confirmed the existence of a humanitarian crisis more directly related to variations in the climate, thereby permitting national actors to direct additional financial resources to the operations in progress. However, the lack of information and visibility of the emergency in the Chaco, among other factors, impeded the government and international actors from making an international call for additional resources.
- 34 Towards the end of September 2010, the United Nations, together with the government, assessed a humanitarian gap of approximately 11,700 out of approximately 33,000 rural families in need of nutritional support, 8,150 with water, sanitation and hygiene deficits, and approximately 6,000 families in need of support for the 2010-2011 agricultural season (UNETT, 2010).

- 35 The materialization of environmental degradation and a human security crisis, recognizable through evident losses in production and deterioration in living conditions, were necessary in order for the “country’s emergency and/or disaster management” process to be activated, beyond the formal declaration of a national emergency. Both the national government and international agencies then provided new humanitarian support measures using financial resources from the European Commission and CERF funds available through OCHA. This then, at least allowed medium scale, humanitarian operations to save lives possible.
- 36 Urgent or first line humanitarian intervention has now been going on for between three to eighteen months and has been undertaken in coordination with the Assembly of the Guaraní People. However, implementation has been principally concentrated in the hands of the same external actors who led the need-based and humanitarian gap evaluations. The participation in reviewing and discussing the causes of risk of those public and private actors who are directly linked to the risk problematic in El Chaco is still pending.

Conclusions

- 37 The case of drought and freezing in the Bolivian Chaco demonstrates how hazards and vulnerabilities, interacting together, slowly and silently lead to poverty and marginalization which are then represented in every day and extensive disaster risk. The study demonstrates how small variations in the dominant physical conditions in delicate ecosystems, in a context of prevailing every day risk, can transform chronic shortages into successive crises. And, time and time again, these crises inspire individual and community level decisions and actions for overcoming them. The analysis suggests the need for special care when analyzing extensive risk in contexts where ecosystem fragility is accompanied by the increasingly marginalized conditions of the affected communities, such as in mountain regions.
- 38 This study concludes that the evaluation of crisis or disaster response was, in essence, merely an evaluation of needs and gaps related to a single risk element, the average shortages in rainfall, rather than a more complex secondary, derived or contingent risk assessment. This is the normal case where external intervention is enacted. But, if we are to advance our understanding of risk and the interventions needed to prevent and mitigate this, analysis should not be solely limited to the temporality and geography of an adverse physical event as such. To the contrary, it needs to provide a mechanism that helps create dynamic images of how resilience and capacity are constructed on an everyday basis allowing population to gradually adapt to physical conditions, thereby establishing the bases for decisions pertinent to future risk.
- 39 The analysis offers evidence to support the notion that the process of disaster risk management applied during moments of emergency or crisis should not exclusively be measured in terms of the number of lives saved or economic losses avoided. Rather, it should be seen in terms of the conditions for social survival and adjustment that are triggered or achieved and the possible structural risk conditions that are avoided in the future. A successful management process that is based on a notion of the “risk continuum” should reduce deaths and foment adjustment and social survival and wellbeing at the same time. But saving lives without paying attention to the needed integral nature of the management process employed may impede a full understanding

of risk and the ultimate end of disaster risk reduction, and its role in sustainable development.

- 40 Every shortage that a family faces in El Chaco, as well as the strategies (whether adequate or inadequate) they use to guarantee subsistence, constitute part of a complex system. This includes the fact that each crisis that occurs is, on the one hand, an effect of existing structural and every day, chronic risk conditions, but also a contributing cause to contingent and future risk. These factors comprise an endless cycle that constantly modifies the conditions for survival and wellbeing of that family. The conditions of exposure and vulnerability that typify existing structural risk in good part define the characteristics of contingent risk and condition the options for survival and security of affected populations. At the same time they help define the future risk factors to which affected populations will be subjected. The analogical and continuous character of risk makes it pointless for the affected communities to establish limits as to where these three categories of risk begin and end and, even more so, to establish boundaries for their management strategies.
- 41 Not only must reducing primary or structural risk be understood as a process. The same must be true for reducing contingent risk through disaster management. Just as disaster risk reduction, including disaster preparedness, is imperative for reducing primary, structural risk, the so-called “response and recovery phases” should be seen as processes through which future risk is also avoided or deconstructed.
- 42 In cases of intensive risk and disasters, the urgency of promoting and enacting life-saving actions and the mechanisms and decisions which allow this in a timely fashion creates tensions that are difficult to overcome. Thus, the balance of activities tilts towards compensatory or corrective actions devoid of an understanding of how risk is constructed and the prospective actions needed to control its future development. However, extensive scenarios provide the opportunity to include a guiding prospective analysis of the most pertinent compensatory and structural measures required over the medium to long term. This entails unresolved epistemological and methodological challenges. But a precautionary principle is valid here which, in the absence of sufficient prospective information, can help avoid further damage and saves lives without compromising future risk and development.
- 43 Finally, the case study demonstrates that the extensive risk scenario demands and allows for greater involvement of endogenous actors, or those directly involved in the problem. They cannot and must not be substituted by external actors.

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RÉSUMÉS

Disaster risk comprises a continuum, ranging from primary-structural (pre-impact), through contingent (resulting from impact) to future or reconstructed risk (resulting from inadequate recovery or reconstruction practices). At the same time these categories are many times constructed on the basis of existing chronic risk. These different categories are employed to demonstrate how the 2009-2011 disasters associated with the drought and freezing that affected the Bolivian Chaco region evolved and were perpetuated in cyclical manner. Additionally, the article demonstrates how preconceived notions of causal factors and post impact needs analysis, associated with large scale, rapid onset hazards, belies an understanding of the needs in slow onset and lifestyle based extensive risk crises. It also reveals how any attempt to deal with the successive, apparently sequenced categories of risk, using independent mechanisms and institutional frameworks is doomed to failure due to the relations that exist between primary, contingent and future risk and the disaster risk management and development mechanisms required to reduce them.

INDEX

Keywords : extensive risk, disaster risk continuum, chronic risk, drought

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