Corruption Risk Maps as a Solution for the Management of Resources in the Context of Environmental Disasters

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Corruption in the public sector is an opaque phenomenon. Government reaction to disasters and its investment in economic resources constitutes a favourable opportunity for corruption. The use of corruption risk maps has been put forward as a potential solution to this problem. By collective and agreed anticipation of acts of corruption, this technique acts as a disincentive to corrupt behaviour in government processes. Corruption happens at all levels, given that economic resources for disaster relief are distributed at municipal, provincial and national levels. This tool helps detect and measure incidents of corruption in government processes and designs and executes corrective mechanisms. This paper discusses the advantages derived from the analogue and digital application of this instrument, presenting the requirements for its use, its potential and future challenges. The identification of benefits is possible from the incremental application of the tool in a process of institutional transformation of governments.

Keywords: risk management, corruption, natural disasters, Paraguay

1. Introduction[1]

Corruption, as defined by Biderbost (2016a, p. 8) refers to "all events where a position of power or influence is used to divert resources (temporal, human, economic, etc.) from public management towards private profit". This definition has three clear components: (a) use of a position of power; (b) public origins of resources and (c) private profit. Situations that display this triad of elements can, in theory, be classified as potentially affected by corrupt behaviour.

Episodes of natural disasters constitute an ideal brewing ground for these components. Natural disasters are usually linked to a series of potentially lethal consequences with regard to corruption (Alexander, 2017; Bang, 2013; Klitgaard, 2009; Yamamura, 2014). Firstly, these events activate

[1] This article is the result of research carried out in the framework of the Jean Monnet Eulatafpol module of the University of Salamanca, co-funded by the Erasmus+ program of the European Union (611881-EPP-1-2019-1-ES-EPPJMO-MODULE). For similar information for a Spanish speaking audience see: Biderbost, Boscán, & Rochin (2020).

the extraordinary flow of public resources to attend to different contingencies. Secondly, the levels of anxiety and desperation among citizens due to the disaster may lead them to employ various (il)legal means to achieve public benefits or services. Thirdly, institutionalised controls are usually deactivated during these emergencies so that aid can be more easily provided to the people in need. Fourthly, organised civil society and the media, given the gravity of the situation, may temporarily suspend their reports on abuses regarding the use and consumption of public resources in favour of activating solidarity mechanisms.

When faced with an analysis of this type, it is essential to possess instruments that help reduce episodes of corruption during natural disasters (Sovacool, 2021). In this sense, the present study proposes a methodology based on strategic planning techniques as the best means to ensure this reduction. This methodology includes the implementation of corruption risk maps, a technique which seeks to measure potential vulnerability to corruption in a system. Building corruption risk maps is a simple but powerful solution (Secretariat of Transparency, 2015). It consists of a tool that, by means of collective and agreed-upon anticipation of corruption, acts to disincentivise corrupt behaviour in processes at all levels of government (taking into account that economic resources for disaster management are distributed in all of them). Corruption risk maps allow us to detect and measure the prevalence of incidents of corruption in governmental processes, and at the same time design and implement corrective measures.

This article discusses the advantages of both analogue and digital applications of this instrument and presents the requirements for its use, its potential and challenges for the future. The structure of the article is as follows: the first section observes recent examples to determine the lines of communication between the emergence of natural disasters and the activation of mechanisms of corruption. The second and third sections explain the proposed methodology and describe the elements that constitute corruption risk management providing a detailed description of corruption risk maps, respectively. The fourth section provides a systematic list of the concrete advantages of applying this strategic planning technique to generate responses to environmental catastrophes. Finally, the article presents some preliminary conclusions.

2. Corruption and Natural Disasters

There have been accusations related to the rebuilding process of the coastal provinces of Esmeraldas and Manabí after the 2016 earthquake in

Ecuador. Specifically, it is said that public funds have been misappropriated, and illegal assets laundered (Univisión, 2018). A Senate Commission in Haiti has detected the existence of potential bribes relating to public resources, derived from Petrocaribe, which were meant to rebuild the nation after the earthquake of January 2010 (El Nacional, 2017). With regard to the earthquakes in Mexico in September 2017, the National Risk Agenda stated that one of the major weaknesses of the country was the political use of state and municipal authorities in the distribution of resources from the Natural Disasters Fund (Contralínea, 2017).

As may be observed from this brief overview of recent events, natural disasters can put into motion several mechanisms of corruption.[2] Local and regional levels of government are characterised by lower requirements of accountability and therefore exposed to a greater risk of corruption. There is empirical evidence showing that limited political competition and electoral accountability at the third level of government are associated with higher risks of corruption (OCDE, 2021). Some studies confirm with their empirical findings that corruption can be higher at the local level in countries where state institutions are weak because in those scenarios, monitoring actions and performance is more difficult and abuses are more likely to occur (Recanatini, Prati & Tabellini, 2005). Scholars have also found that the factors that explain corruption lie both in the size and the composition of public spending at the local level, as well as the relevance of informal institutions and patronage networks which can pervert local governments (Jiménez, Villoria & Garcia-Quesada, 2012).

Growing research into corruption at regional and local levels has been released in the last decades (Pope, 2000; Huberts, Anechiarico & Six, 2008; Huberts & Six, 2012). Some studies show that corruption on this tier of government is more visible than corruption at the national government level (Masters & Graycar, 2016). Providing evidence from the Spanish case, Jiménez, Villoria & Garcia-Quesada (2012) show how local informal institutional features affect the working of the formal rules and regulations. At local and regional levels, actors and resources to monitor and punish corruption are much more limited and, therefore, it can may go unprosecuted (Persson, Rothstein & Teorell, 2010; Jordan, 2014).

[2] This list is not exhaustive. Other types of corruption that are not enumerated here (trafficking influence, abuse of power, extortion, conspiracy to defraud the State, inappropriate use of confidential information, etc.) may also be activated as a consequence of environmental disasters.

Literature on the relation of natural disasters and corruption has traditionally examined the topic focusing on national case studies (Lewis, 2010; Green, 2005; Calossi, Sberna & Vannucci, 2012). Data demonstrate a strong correlation between the impact of these disasters on vulnerability and the prior levels of corruption (Calossi, Sberna & Vannucci, 2012). These studies provide empirical evidence and unique perspectives on specific cases. However, they lack a thorough analysis about what could be the best methods to eradicate this phenomenon.

When a natural disaster occurs, local and regional levels of government are vulnerable to the appearance of corruption patterns. Firstly, faced with the desperation of the citizens, demands for (and offers of) bribes in order to access extraordinary aid may increase. This may be a consequence of the salary limitations of civil servants who are placed at the bottom of the organisational pyramid. At the same time, the contractual and direct buying processes which are activated (obviating the pre-established sequence of bids) constitute a scenario where government agencies acquire goods at a cost that exceeds their market value. This may be produced by collusion between civil servants at medium-high levels of the government and representatives of the private sector. This is a principal-agency problem related to information asymmetry in contexts where crises test the government's resilience. Managing information uncertainty during the early stages of an environmental disaster may worsen its extent and increase damages and casualties. It is difficult when controlling a public process to be certain about the truthfulness of citizens' demands, and these situations are further complicated through information asymmetry (Clifton & Amran, 2011; Nugroho, Takahashi & Masaya, 2021; Phillips, Roehrich & Kapletia, 2023).

Secondly, the misappropriation of public funds is propitiated by the emergence of environmental catastrophes. The deactivation of institutional controls in an emergency situation, controls that are already limited in countries with lower levels of democratic health, paves the way for a distinct risk of deviation of funds meant to alleviate the effects of natural disasters. Medium and high-level members of the civil services are more likely to be involved in these dynamics.

Thirdly, another type of corruption that may exist in the afore-mentioned circumstances is linked to cronyism. This is especially linked to historical practices of established political parties and to charismatic leaders who seek to boost the electoral support of citizens by means of the delivery/distribution of assets and/or services. The existence of this pattern may be derived from the existence of vicious circles where citizens who inhabit areas at high risk of natural disasters (floods, droughts, hurricanes, earth-

quakes, etc.) associate the temporary improvement in their personal and community well-being to the (always reactive) supply of resources from the political party in power.

Fourthly, in relation to the previous point but possessing its own characteristics, is favouritism/nepotism. In these cases, when assets are exceptionally distributed after a catastrophe, the distributing agents (politicians, political parties, civil servants, non-governmental organisations that collaborate with the government, etc.) proceed to distribute them not according to universal criteria but to benefit a group with whom they have greater relations. Logically, historically excluded collectives (the indigenous population, people of African origin, sexual minorities, etc.) are those that are most likely to suffer in these circumstances, due to the unavailability of goods and/or services to compensate for their losses during the event.

In fifth place, environmental disasters can lead to increased falsification of public documentation. When faced with exceptional compensatory mechanisms provided by the state, persons who have suffered material losses due to catastrophes may be tempted to modify public documents, identity documents and other types of information registration. This may be committed by natural as well as legal persons in (non-) collusion with civil servants. The chart summarises the information on the types of corruption that may occur under circumstances defined as environmental disasters. The causes that may provoke them are also mentioned.

Chart 1: *Corruption linked to environmental disasters*

Bribery active and passive	• Salary limitations • Direct contracting/buying
Misappropriation	• Deactivation of institutionalised controls
Cronyism	• Established political parties • Charismatic leaders
Favouritism	• Existence of ethnic, sexual, religious minorities, etc.
Falsification of documentation	• Access to "juicy" compensation mechanisms

Source: Authors.

3. Corruption Risk Management[3]

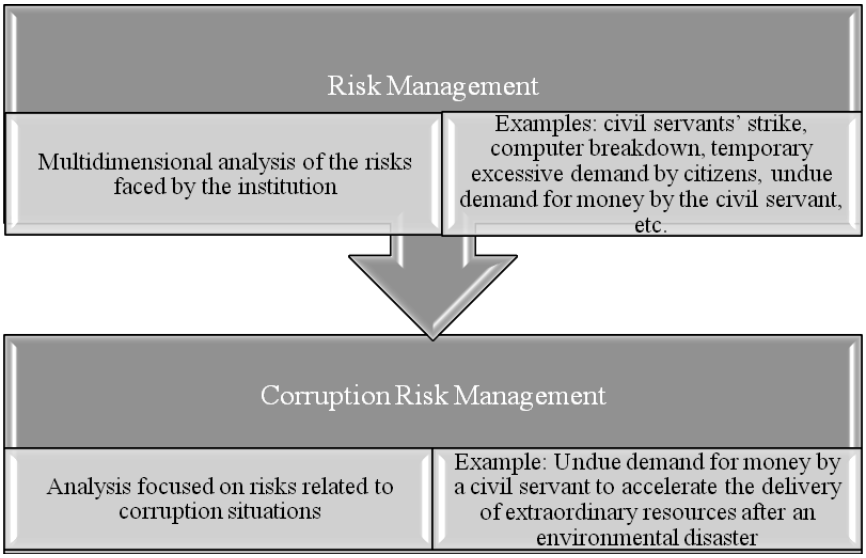
When talking of corruption risk management, we refer to the "systematic group of actions that are executed to direct and control an institution/organisation/agency/body with regard to corruption risk" (Biderbost, 2016a, p.10). It is an administration style that seeks to lower the probability of an incident of corruption, reduce its impact and consequently, promote the fulfilment of the relevant institution's organisational mission.

This type of risk management which focuses on detecting potential scenarios of corruption must not be confused with another more generic type, which views the activity of agencies from a wider perspective (and which may also include the search for situations where corruption may be present). Here is a concrete example to distinguish between the proceedings of the two levels of risk management. The generic level of risk management attempts to predict the probability that an incident will occur (civil servants' strike, computer breakdown, temporary excessive demand by citizens, undue demand for money by the civil servant, etc.), which affects the execution of a specific administrative task (issuing an identity document). The concrete level of corruption risk management seeks to identify the circumstances of corruption that affect the normal work of the body in question (Qazi, Simseker & Formaneck, 2022) such as unregulated reception of money by a civil servant to accelerate the delivery of extraordinary aid as a compensatory mechanism after environmental catastrophes. Corruption risk management is extremely relevant in context of emergency since its implementation will reduce the system's vulnerability to corruption and prevent its potential consequences when a disaster occurs. Chart 2 summarises the types of risks involved at each level of management.

Corruption risk management is achieved by a cycle which consists of different stages (or components). This does not necessarily refer to different moments in time. Some of them occur under specified circumstances while others take place throughout different instances within the process. This is of extreme relevance in natural disaster scenarios. It is important to stress that this cycle is iterative and has been designed to activate a logic of con-

[3] This section is based on the text "A Guide to Building Corruption Risk Maps" that was drafted by the authors of this article and commissioned by the UNODC and CEAMSO-USAID to be used by Executive government agencies in the Republic of Paraguay. An excellent resource in this matter can be found in the text by Regional Cooperation Council "Corruption Risk Assessment in Public Institutions in South East Europe - Comparative Research and Methodology" (2015).

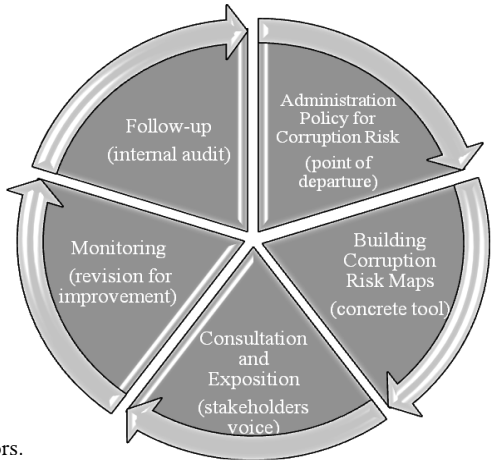
Chart 2: *Levels in risk management*



Source: Authors.

tinued improvement. Its constituent stages are the following: Administration Policy for Corruption Risk, Building Corruption Risk Maps, Consultation and Exposition, Monitoring and Follow-up. These are all illustrated in Chart 3.

Chart 3: *Corruption risk management cycle*



Source: Authors.

3.1. Administration Policy for Corruption Risk

Corruption risk management can be effective only if the Senior Leadership publicly and sustainably commits to it. This commitment must be synthesized in an internal manual. The manual must be aligned with the different documents that describe strategic planning of the government agency (Lu et al., 2019). This synchrony must especially exist independently of the level within each agency, with regard to the document that describes the institutional management of risks, i.e., which covers the different roles and organisational goals.[4] The drafting of these manuals requires the Senior Leadership to adapt government directives on preventing corruption to the specific circumstances of their agency. This process of adaptation involves paying attention to the voice/opinion of all the members of the organisation. To do so, data collection strategies, both quantitative (surveys) and qualitative (focus groups and interviews), can be used. The duration of this consultation process will depend on the dimension of the body in question. From the compiled information, authorities must draft organisational manuals[5] that include all or part of the elements described in Table 1.

Table 1: *Contents of administration policy manuals on Corruption Risk Management*

Contents	Description
Goals	The targets to be achieved by implementing a line of action focused on detecting corruption risks. The ideal strategy would be to define both general objectives (for example, generate an organisational culture that associates corruption risks to a deterioration in the quality of the services provided) and specific objectives (for example, to improve the reputation/image of the organisation among the citizens it interacts with).

[4] It is also possible to apply other techniques that civil servants in each department are familiar with, when drafting the document (manual) on Administration Policy for Corruption Risk. As this document deals with the planning of actions to be taken in this regard, the techniques recommended by the Logical Framework Approach can also be used.

[5] By clicking on the following link, it is possible to consult a good practice on the topic from the Superintendence of Finance of the Government of Colombia: https://goo.gl/x9wvsi

Strategies and actions	Group of tasks that will be executed to make the Administration Policy for Corruption Risk "operational". Its "centre" includes Building Corruption Risk Maps, but also goes beyond it (including focalised training, drawing up codes of integrity, and rotation of human resources in positions exposed to potential corruption are examples of other actions that can be unrolled).
Available human and material resources	They must specify what resources will be applied to develop what actions. These tasks may occasionally require redistribution or increase of personnel and allocations.
Time schedule	There must be a clear time schedule for actions. For this, stages and goals (the concluding moments of these stages) must be specified. In the beginning, it is recommended that this activity be carried out on a bi-annual basis.
Monitoring and evaluation	It must be mentioned by who, how, by means of what indicators and when are actions to be reviewed and the conclusions to be communicated.

Source: Authors.

3.2. Building Corruption Risk Maps

This is the "key action" of corruption risk management. To build this map, a series of steps must be taken by leaders (and their teams) in relation to each institutional process/objective. Each step involves the application of concrete techniques that measure different concepts (probabilities, impacts, types of risks, etc.). These steps must be taken within a period of three months. Building corruption risk maps helps adapting each concrete technique to natural disaster situations which may differ from other types of scenarios. In the context of emergency, immediate demands received generate an environment where credibility is not easy to determine. Therefore, by identifying which and where are the potential risks, these maps will help reducing uncertainty in these contexts where time is crucial.

This sequence of steps must be repeated with certain regularity. As may be imagined, corruption risks are not static, but result from the interaction of internal and external variables related to government agencies, and are subject to change over time. One example of this is the emergence of new technologies. Over the past years, their adequate use has been a tool to modify/eliminate numerous corruption risks.[6] It is recommended

[6] For more information on the use of new technologies to eliminate risks of mismanagement of public resources, please consult the code of good practice "The Recovery Accountability and Transparency Board" in the United States: https://goo.gl/4ZsAhR.

that initially, these maps/matrices be built at a frequency of two years (bi-annual). The steps required to produce a Corruption Risk Map must be thoroughly reviewed in the section "Steps for Building Corruption Risk Maps". The different factors involved in the transparency and accountability of post-disaster scenarios should be considered in this design stage.

3.3. Consultation and Exposition

Building Corruption Risk Maps is a strictly participatory process. It is the responsibility of the Transparency and Anti-Corruption Units in each government agency as protagonists to ensure the presence of this inclusive character. They are responsible for guaranteeing that the actions described in these pages are implemented in each agency. The consultation schedules must coincide with the map building schedules (three months in total).

Different actions must be executed during this stage. Initially, the internal and external agents related to the organisation must be consulted throughout the process of building corruption risk maps. This will ensure that sufficiently representative agreements are reached, with regard to corruption risks for the organisation in question. These consultations require the application of different data collection techniques. Qualitative information may be collected by interviews, focus groups or by creating (physical/virtual) suggestion boxes. Quantitative information may be collected by face-to-face or virtual surveys. The organisation of stakeholder workshops where different work dynamics are applied may be another option for map content consultation.

From an institutional point of view, the execution of the consultation process makes positive contributions at different levels. Initially, it helps define the strategic context in which the organisational management of corruption risks is included. At the same time, it lets us measure the defined/identified risks. Additionally, paying attention to voices from different fields of knowledge and action promotes the qualitative improvement of the commitment made. Meanwhile, its application becomes a dissemination channel of the risk management techniques themselves.

Once the Corruption Risk Map is defined, it must be internally and externally shared. This sharing must last for 18 months (i.e., until a new process of administration policy building is initiated, which results in a new Corruption Risk Map).

Various mechanisms may be applied to disseminate the built map. A first means of dissemination, which is also the most frequently used, consists of publishing the matrix on the institutional website[7]. Generally, only the "mere inclusion" of the matrix is carried out. It is important to use new technologies (institutional website, open access or restricted application), so the map contents may be available in reader-friendly or citizen-centric formats. This can be achieved by presenting the matrix distributed by objectives/processes in relation to those that present associated risks, instead of presenting a large map that may result in the "virtual visitor's" disinterest, due to their perception of it as unapproachable.[8]

Another method for dissemination consists of editing and printing a small leaflet that "breaks down" the matrix by processes/objectives and thus facilitates its reading and comprehension by internal and external agents. Simultaneously, another strategy may be to schedule meetings to present the map before strategic auditors (citizens and civil associations, providers, civil servants according to categories, academics, etc.).

3.4. Monitoring and Revision

As mentioned previously, corruption risks are defined by the leaders and teams of each institutional process/objective in a constant dialogue with the members of the Anti-Corruption Units.[9] They are responsible for frequently monitoring the appropriateness of these institutional processes/objectives. When considering corruption in emergency contexts, these actors are also responsible for tracking potential vulnerable scenarios where

[7] Colombian government agencies are obliged to distribute their corruption risk maps in this manner. Consult good practices with regard to this country at the following links:

- Ministry of Home Affairs: http://www.mininterior.gov.co/la-institucion/sigi/mapa-de-riesgos

- Personería de Bogotá: http://www.personeriabogota.gov.co/planes/plan-anticorrupcion/send/548-plan-anticorrupcion-planes/6613-mapa-de-riesgos-plan-anticorrupcion-2016

[8] The experience of the National Protection Unit of the Government of Colombia (http://www.unp.gov.co/mapas-de-riesgos-de-corrupcion-2016) may serve as an example in this regard.

[9] A process design like this, where interaction among counterparts is the norm, is the best possible because the Anti-Corruption Units do not frequently have enough expertise in the activities being evaluated or monitored. At the same time, the leaders of other units may not be very open to let external actors understand their internal mechanisms and procedures easily.

corruption may appear both prior to the disaster and during the management process. This monitoring must take place every three months (during the 18 months when the Corruption Risk Map is active). Due to the nature of corruption itself as an activity that undergoes changes based on social and legal limitations, monitoring is therefore on a *sine qua non* basis. The result of this monitoring process is the main input for drafting a new Administration Policy for Corruption Risk, and especially for drawing up a Corruption Risk Map where the risks detected in earlier versions disappear (or are less serious), and other new risks are introduced.

The task of monitoring must focus essentially on the controls that were established for each risk. For this purpose, indicators must be defined and those responsible for verifying them must be appointed. The indicators must be validated (that they measure what is meant to be measured), reliable (their use by different persons gives similar results), specific (they must refer, as much as possible, to quantities, qualities and time periods) (OECD, 2005; Biderbost, 2016b).

Monitoring involves paying special attention to factors that enable change with regard to corruption risk management both inside and outside governmental agencies. Among other factors, this includes (a) socio-environmental transformations (economic crises, intra-governmental reassignment of economic and human resources, appearance of new technologies, severity of prior disasters); (b) legal/informational procedures referring to activities carried out by the organisation (observations, penal or fiscal investigations, cases filed by the regulatory authorities, etc.) and (c) proven incidents of corruption. This process also includes the design of maps which identify which are the most vulnerable areas to corruption after a natural disaster in terms of inequality. These will help identify whether demands are genuine and government and humanitarian aid is actually needed.

An adequate way to monitor the evolution of risks and associated controls is to use matrices where information is placed in columns covering different dimensions of the analysis. Matrix 1 may be used by leaders and teams of processes/objectives to note down changes within their areas of action. Examples of former risks (detected in the Corruption Risk Map submitted for consideration) and emerging risks (to be included in the future Corruption Risk Map) are also included.

Matrix 1: *Monitoring format for Corruption Risk Maps*

Process/ Objective	Risk	Type of Risk	Control	Indicator	Changes in the environment	Lesson
Attention to the public	Undue demand for money to accelerate the delivery of compensatoion and resources after an environmental disaster.	Former (from an existing Risk Map)	Creation of a virtual and/or physical mailbox to receive this type of complaints (bi-directional) To carry out a communications campaign to spread awareness on the existence of the mailbox (among citizens and civil servants)	Monthly number of complaints of this type received in the virtual and/ or physical mailbox (the longer the awareness campaign, the more complaints received) **Note**: The first year data is taken as the baseline.	Increased number of young citizens made aware that they do not have to pay a "bribe" to receive a public service.	Lesson 1: Providing citizens and civil servants with simple tools (mailbox) facilitates fighting against corruption. Lesson 2: Focus the campaign on insufficiently aware people (older adults)
Attention to the public	Inappropriate use by civil servants of discount vouchers meant for purchases by people affected by disasters ***Note***: This could be associated with a "selective sale of these vouchers"	Emerging (not from an existing Risk Map)	To be defined in the design process of the Risk Map	To be defined in the design process of the Risk Map	Weekly increase in the number of people who personally or virtually use these vouchers and are not registered as living in the disaster area. ***Note***: At the moment of the findings, it can also serve as an indicator.	Include new risk in the Map to be designed in the next period

Source: Authors.

3.5. Follow-up

This task corresponds to Internal Audits. Nevertheless, with regard to corruption risk management, Transparency Unit members are also expected to have access to follow-up tools. This task consists of two actions: (a) control and (b) evaluation of the drafting, dissemination, and control of the Corruption Risk Map. The first action refers to the need to monitor the implementation of the complete sequence described throughout this article in accordance with the time limits. The second action is an invitation to take a look from the outside, meant to provide a "new opinion" which contributes to an improved definition of detected risks, its causes and associated controls. This second action also involves checking whether the established controls are active and have been effective.

Follow-up actions might be undertaken every four months throughout the process which has a duration of two years (i.e., thrice per year). Follow-up reports must be prepared at the end of April, August and December. Their purpose is to provide a general report to the authorities and the citizens on observed advances and setbacks. Matrix 2 may be used to formulate follow-up actions. This will allow to monitor different processes in which corruption is involved. In natural disaster situations, corruption cannot be foreseen as an isolated phenomenon and its broader environment and context need to be considered. In this sense, these follow-up actions will help identify the appearance of new actors or factors that could eventually promote corruption.

3.6. Graphic Summary of Anticipated Activities for Corruption Risk Management

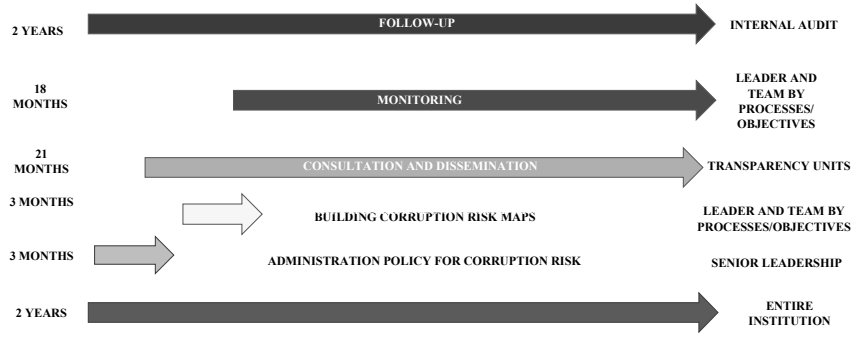
Chart 4 displays the different dimensions of the Corruption Risk Management Cycle. It outlines the activities to be carried out, the time required, and the persons in charge of these activities.

Matrix 2: *Follow-up matrix for Corruption Risk Maps*

Follow-up Format for Corruption Risk Maps							
Corruption Risk Map			CRM Timeline		Actions		
Cause	Risk	Control	Drafting	Publication	Effectiveness of controls	Actions conducted	Observations:
Tradition rooted in a vernacular political culture	Undue demand for money to accelerate the delivery of goods/ compensation money after an environmental disaster	Creation of a mailbox for submitting accusations/ complaints. Communication campaign execution for increased awareness	In time	In time	The accusations of unethical behaviour have increased as the communication campaign has advanced.	Creation of virtual mailbox. Creation of physical mailbox. Communication Campaign.	To eliminate these undue payments, it is recommended that: The transfer of funds be made entirely via banks with the support of social banking. The delivery of goods be made in the presence of a notary within administrative offices.

Source: Authors, based on the Secretariat of Transparency (2015).

Chart 4: *Tasks to be executed when drafting Corruption Risk Maps*



Source: Authors.

4. Corruption Risk Maps

Corruption risk maps are matrices built by a group process and meant to detect corruption risks in an organisation, their causes, consequences, levels of probability[10] and estimated impacts. At the same time, they ascertain that the existing controls avoid/mitigate the emergence of corruption. This is the most important instrument within the framework of "corruption risk management". Its principal goal is to prevent the emergence of incidents linked to behaviour that may be classified as corrupt.

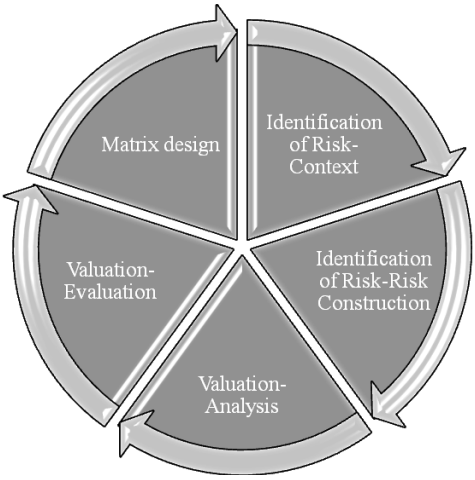
The risks included in these maps are detected according to organisational processes/objectives/areas. In other words, their identification/definition is the responsibility of the leader and the team per each process/objective/organisational area. In other words, this exercise is carried out by those who develop a "group of mutually related activities or who interact to generate a value" (ICONTEC, 2009). The members of an area (Accounting) can provide feedback, during the "Consultation and Exposition" stage mentioned earlier, on risks detected in another area (Human Resources Management). Nevertheless, they cannot define the risks of this second process/objective.

[10] In this case, probability is measured following standard mechanisms in risk assessment. Impact is also measured following frequent rules in risk assessment. For the obtention of more details, please visit these links: https://www.mapasderiesgosdecorrupcion.com/index.php/mapas-de-riesgos/valoracion-del-riesgo-de-corrupcion/analisis-del-riesgo-de-corrupcion/probabilidad and https://www.mapasderiesgosdecorrupcion.com/index.php/mapas-de-riesgos/valoracion-del-riesgo-de-corrupcion/analisis-del-riesgo-de-corrupcion/impacto.

Corruption risk maps are drafted in different organisational contexts. They can be used in the private sector and increasingly in the public sector. Within the Latin American context, they are compulsory in all Executive government agencies in Colombia (Ewins et al., 2006; WCO, 2015; Secretariat of Transparency, 2015) and optional in Paraguay (Biderbost, 2016a). As an easy-to-use tool, its use is expanding to include analysis, evaluation, contextualisation, treatment and internal and external communication of corruption risks.

Drafting Corruption Risk Maps requires executing different tasks. Firstly, it is essential to identify the corruption risks to which a government agency is exposed. This involves observing the context and constructing corruption risk. In emergency contexts, this includes the identification of the population vulnerable to corruption. Tasks to evaluate these risks must be carried out subsequently. In this second stage, the risks are analysed to obtain an "inherent value" and evaluated for a "residual value". The difference between both values emerges from the preventive, detective or corrective control designs that are meant to limit or eliminate corrupt actions. The final stage is the matrix designed to exhibit the information obtained throughout the process. Chart 5 provides a summary of these activities.

Chart 5: *Tasks to be executed when drafting Corruption Risk Maps*



Source: Authors.

4.1. Advantages of Using Corruption Risk Maps in Disaster Events

Corruption in emergency relief is a concept that has been barely discussed in academia and little empirical research on the topic has been released (Fenner, 2020; Saharan, 2015). However, corruption may be crucial in the management of a natural disaster. Even in events with no major casualties and small magnitude, corruption can lead to a poor management that will eventually cause more damages. Corruption interferes with many activities designed to achieve efficient disaster management and disaster impacts are thus likely to increase (Bo & Rossi, 2007; Hodgson & Jiang, 2007).

There are several benefits to applying the technique of corruption risk maps in processes that deal with public sector responses to environmental disasters. These benefits will only be evident when this tool is applied by a complete government agency ecosystem that, based on strategic planning, takes action against incidents of this type. It specifically refers to security forces, the military, provincial and municipal authorities, etc.

Its use is also recommended for non-public actors who coordinate their response with the public sector in emergency situations (non-governmental agencies, churches, corporate social responsibility offices, etc.). Organised and unorganised civil society must be an essential protagonist in the process of building risk maps. In other words, if the tool is only formally incorporated by the Minister/Secretary for environmental disasters at the national level, its benefits will be nominal and without any real transformative capacity.

Another contextual condition that must be fulfilled in order to benefit from this process is that the technique must be utilised in user-friendly formats. For this, BB&R (www.bbyr.com) has recently designed an application that allows process leaders to generate their matrices online and share their work quickly and flexibly. This tool (http://www.mapasderiesgosdecorrupcion.com/) has been incorporated into all executive institutions of Paraguay under the coordination of the National Anticorruption Secretary (http://www.senac.gov.py/).[11] Due to its functionality, it has

[11] This tool was created as a part of the project *Consultoría para la Elaboración de la Guía para la Construcción de Mapas de Riesgos de Corrupción* (CI/UNODC/111/2016)". It was funded by UNODC, CEAMSO-USAID and the National Anticorruption Secretary. In the context of this Latin American country, 94 Anti-Corruption Units were created in the recent decade in different government agencies. Among them, 23 have applied corruption risks

been chosen by Bogotá's District Oversight Committee as one of ten best international innovations.[12]

In the following section, we list some of the benefits produced when these two points are taken into account. Firstly, the process of identifying risks contributes to the detection of potential patterns of corrupt behaviour (Wachs, Fazekas & Kertész, 2021) that were not taken into account either completely or partially in these circumstances. The risk map is but a glossary of corruption situations that endows its users with a language/lexicon to confront unusual scenarios from the perspective of public management (using appropriate control mechanisms in non-frequent situations).

Secondly, designing and implementing corruption controls lets us make efficient use of resources used to aid people in emergency situations, as well as long-term savings due to the fact that theoretical help is converted into real aid with goods and services. At the same time, if this technique is utilised in a systematic fashion and not as isolated behaviour of an agency, control generation and application may be shared. This may lead to an additional reduction in expenses.

Thirdly, incorporating corruption risk maps involves the development of a skill among civil servants and their social counterparts who participate in the matrix design. This skill helps develop a model of thinking and reflection that is "*transferable*" to other professional and personal spheres. The instrument acts as a perfect methodological channel for the involvement of civil servants and citizens committed to social welfare development.

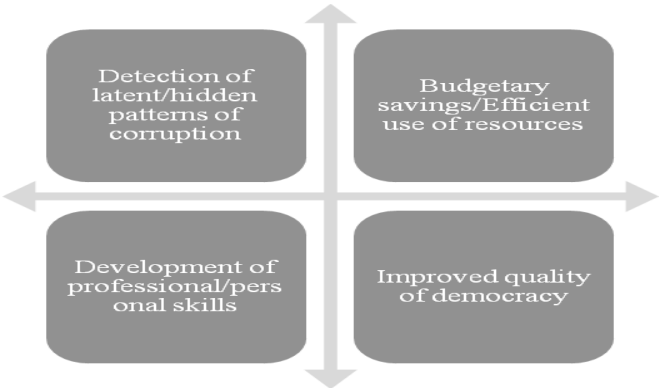
Fourthly, the application of this tool by different means contributes to improving the quality of democracy. The detection, control/treatment and elimination of incidents of corruption make a positive contribution to reduce civic disaffection which may distance individuals from the public sphere and make them withdraw into their personal lives. The technique itself requires citizens' involvement, i.e., it encourages the development of

maps. In this context, nine of these units execute, directly or indirectly, activities related to the management of natural disasters. Because of the recent inclusion of the methodology, the results of the implementation of this technique still cannot be calibrated in a long-term perspective. Nevertheless, the main benefits reside in (a) the awareness process about its usefulness among public officials and their counterparts and (b) in the multistakeholder character of the initiative. In relation to the latter, the leaders (and their teams) of each process are those in charge of the elaboration of the risk maps in a constant dialogue with the members of the Anti-Corruption Units and with relevant external actors (such as civil society, mass media or members of academia)

[12] More information on this recognition is available at the following link: https://bit.ly/2vbcPzM.

the two components included in the definition of the quality of democracy (participation and accountability) (Levine & Molina, 2011). Additionally, the progressive establishment of this technique through its repeated use contributes to generating a political culture rooted in respect of the written regulation as a mechanism that covers personal and community life projects. The instrument then becomes a modest contributor to pluralising opportunities in political and economic scenarios which, as suggested by Acemoglu and Robinson (2012), converts it into an indirect catalyst for social development. Chart 6 provides a visual summary of these advantages.

Chart 6: *Advantages derived from the application of corruption risk maps*



Source: Authors.

4. Conclusions

When linked to public-sector management of environmental disasters, the consequences of corruption can be devastating. Loss of lives, spreading of diseases, diminished welfare of entire communities, loss of employment and self-employment opportunities, and political disaffection This article is the result of research carried out in the framework of the Jean Monnet Eulatafpol module of the University of Salamanca, co-funded by the Erasmus+ program of the European Union (611881-EPP-1-2019-1-ES-EPPJMO-MODULE). For similar information for a Spanish speaking audience see: Biderbost, Boscán, & Rochin (2020). are some of these negative effects.

In the past years, numerous instruments have been designed to combat corruption in general and in scenarios such the ones mentioned above. Within the scope of corruption risk management, the building of matrices called corruption risk maps can constitute a concrete obstacle to those who seek to take unfair advantage of environmental disaster situations. Building these maps will allow to identify which are the most vulnerable sectors to corruption and to tackle the problem from the root, so time does not need to be wasted by uncertainty if an environmental disaster occurs. Results obtained by the implementation of this instrument should be empirically proven by conducting longitudinal studies in countries where it has been carried out to measure its concrete impact. These studies will allow to estimate the scope of this instrument and adapt it to specific contexts in case changes are needed.

This strategic planning technique has clear advantages. Initially, this instrument allows us to build a mental plan (a compass for action) for undetected situations that foster corrupt behaviour. It also favours budgetary savings and averts the diversion of resources. It helps civil servants and citizens to develop professional and personal skills. Finally, it makes an indirect contribution to reversing deterioration in the quality of democracy. Its implementation is expected to combat corruption in natural disaster scenarios by identifying actors and contexts potentially vulnerable to corruption and demotivating its occurrence. This will limit uncertainty and reduce time-consuming processes in the disaster management stage, along with asymmetrical information patterns and the principal-agent problem.

The above-mentioned benefits will only be visible once the instrument is applied in a systematic manner, i.e., when all government agencies and social organisations involved in disaster management collaborate in its use. Another condition for its successful execution is the adaptation of the instrument to user-friendly and accessible formats. In this regard, we have described a real experience and invited readers to deepen their understanding of the same. If these two conditions are not fulfilled, the identified benefits of this process will be limited to the field of intended/desired results, without making any real changes over time.

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CORRUPTION RISK MAPS AS A SOLUTION FOR THE MANAGEMENTOF RESOURCES IN THE CONTAXT OF ENVIRONMENTAL DISASTERS

Summary

Corruption in the public sector is an elusive and opaque phenomenon. Government reaction to disasters and its consequent investment in economic resources constitute a favourable opportunity for nepotism, embezzlement and other criminal situations. Detection of these scenarios requires the application of sophisticated methodologies that should be incorporated into the processes of disaster risk management. The use of corruption risk maps has been put forward as a potential solution to this problem. This technique acts as a disincentive to corrupt behaviour in government processes through collective and agreed anticipation of acts of corruption. Corruption may happen at all levels of government, given that economic resources for disaster relief are distributed at municipal, provincial and national levels. This tool helps detect and measure incidents of corruption in government processes and simultaneously designs and executes corrective mechanisms. This paper discusses the advantages derived from the analogue and digital application of this instrument, presenting the requirements for its use, its potential and future challenges. The identification of benefits has been made possible by the incremental application of the tool within the framework of a process of institutional transformation of the national government in Paraguay with the institutional and financial support of UNDOC and USAID.

Keywords: *risk management, corruption, natural disaster, Paraguay*

MAPE KORUPCIJSKIH RIZIKA KAO RJEŠENJE ZA UPRAVLJANJE RESURSIMA U KONTEKSTU PRIRODNIH KATASTROFA

Sažetak

Korupcija u javnom sektoru teško je dohvatljiv fenomen. Reakcije vlada na prirodne katastrofe i posljedične investicije u gospodarske resurse predstavljaju povoljnu priliku za nepotizam, pronevjere i druge kriminalne aktivnosti. Otkrivanje takvih scenarija zahtijeva primjenu sofisticiranih metodologija koje bi trebale biti adekvatno uključene u procese upravljanja rizicima prirodnih katastrofa. Korištenje mapa korupcijskih rizika nameće se kao rješenje za navedene poteškoće. Tehnika kolektivnog i sporazumnog predviđanja koruptivnih djela djeluje obeshrabrujuće za korupciju. S obzirom na to da su resursi za obnovu poslije velikih katastrofa obično distribuirani svim razinama vlasti, korpucija se može dogoditi na lokalnoj, regionalnoj i nacionalnoj razini. Ovaj alat pomaže u otkrivanju koruptivnih pojava u javnim procedurama te, u isto vrijeme, kreira i aktivira korektivne mehanizme. U ovom se radu raspravlja o prednostima primjene ovog alata, kako u analognom, tako i u digitalnom obliku, prezentiraju se preduvjeti za njegovo korištenje, njegovi potencijali i budući izazovi. Identifikacija korisnosti primjene ovog alata proistekla je iz njegove postupne primjene u okviru institucionalne transformacije nacionalnih vlasti u Paragvaju, uz institucionalnu i financijsku podršku Ureda za drogu i kriminal Ujedinjenih naroda (UNDOC) i Agencije za međunarodni razvoj Sjedinjenih Američkih Država (USAID).

Ključne riječi: *upravljanje rizicima, korupcija, prirodne katastrofe, Paragvaj*