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Reconstruction as an opportunity? Vulnerability and solidarity after Hurricane Irma in Saint-Martin (French West Indies)

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Résumé

Le projet CASCIRA vise la caractérisation et l'analyse des mécanismes de solidarité mis en place après le passage du cyclone Irma sur l'île de Saint Martin, afin de comprendre leur poids dans les processus de résilience et d'adaptation post-catastrophe à différentes échelles. L'originalité de ce travail réside dans l'analyse croisée des moteurs de la vulnérabilité du système socio-territorial avec celle des mécanismes de solidarité sur le territoire français de Saint-Martin. L'analyse est particulièrement pertinente sur ce petit territoire insulaire où les spécificités socio-culturelles et territoriales sont autant de leviers d'action, mais aussi de verrous si elles ne sont pas prises en compte, pour mettre en œuvre la reconstruction exemplaire voulue par les autorités nationales et locales et mise en avant dans le Rapport du préfet Gustin de novembre 2017. En analysant les « causes profondes » de la vulnérabilité du territoire, et leurs interactions avec les décisions clés de recomposition de la gouvernance en post-catastrophe, ainsi qu'en illustrant la place des mécanismes de solidarité dans le processus de relèvement, cet article vise à questionner la « fenêtre d'opportunité » de la reconstruction post-Irma.

Mots-clés : Reconstruction post-catastrophe, Irma, Saint-Martin, Réduction des Risques de Catastrophe, Vulnérabilités, Build Back Better, Solidarités, Gouvernance.

Abstract

The CASCIRA project aims at characterizing and analysing the solidarity mechanisms that were implemented after the passage of Hurricane Irma on the island of Saint Martin. Its purpose is to understand their impact on the various levels of the post-disaster reconstruction and readaptation processes. This research is distinctive in that it cross-analyses the drivers of vulnerability in the socio-territorial system and the solidarity mechanisms in the French territory of Saint-Martin. This analysis is especially relevant to this small island territory where socio-cultural and territorial specificities serve as levers for action. But they can also be obstacles if they are not taken into account in the exemplary reconstruction that the central government had planned and that was highlighted in Prefect Gustin's November 2017 report. This article examines the "window of opportunity" for post-Irma reconstruction by examining the "root causes" of the territory's vulnerability and how they have affected key decision-making on revised post-disaster governance. It also describes the role of solidarity mechanisms in the recovery process,

Keywords: Post-disaster recovery, Hurricane Irma, Saint-Martin, Disaster Risk Reduction, Vulnerabilities, Build Back Better, Solidarities, Governance.

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Introduction

Post-disaster reconstruction is a challenge for officials who must rapidly respond to people's immediate needs and plan for longer-term territorial development. With the directive issued by Build Back Better (BBB), which has been in existence for some decades, the reconstruction strategy must go beyond the rebuilding of devastated societies and should provide for the development of greater resilience through measures that can reduce people's vulnerabilities. It must also develop people's capacities to manage, respond, and adapt to present and future hazards. This directive is predicated on the idea that periods of reconstruction may be "windows of opportunity" permitting societies to adapt and strengthen their resilience. (Christoplos, 2006; Birkmann et al., 2010; Moatty, Gaillard et Vinet, 201).

The underlying idea is therefore to "leverage" reconstruction to reduce vulnerabilities, to create what Christoplos refers to as a post-disaster "window of opportunity" (Christoplos, 2006). The destruction and loss of landmarks caused by disasters generate favourable circumstances for instituting more sustainable land use planning policies that, ideally, should take hazards better into account (Moatty, 2017; Reghezza, 2020; Vinet and Leone, 2020). In addition, following a disaster, the management of programme credits and reconstruction sites is restructured, both geographically (expansion of administrative territorial boundaries), and administratively (overlap of departmental functions) (Moatty, 2020). From an economic and funding perspective, the French system is founded on national solidarity and on the pooling of costs for overcoming hazards and repairing damages through insurance coverage and the Natural Disasters Procedure (Barraqué and Moatty, 2020). The initiatives of institutions, insurance companies, and volunteer associations working with victims are thereby matched and complemented by voluntary acts of solidarity performed ad hoc on behalf of disaster victims.

These factors lend credence to the notion that reconstruction represents a "window of opportunity". However, the critical phase of reconstruction can potentially impede an impacted region from developing. The difficult balance between long-term and short-term needs, and the problems of coordination between the administrative and political levels of the government dealing with spatial and social inequalities (Aldrich, 2012; Smith and Birkland, 2012; Monteil, Barclay and Hicks, 2020; Moatty, Grancher and Duvat, 2021) are obstacles frequently encountered during the reconstruction process (Camp'Huis and Ledoux, 2008; Kennedy et al., 2009; Wisner, 2017; Collodi et al., 2019; Davidsson, 2020; Su and Le Dé, 2020). As a result, one of the challenges of post-disaster research is to identify and put into practice the principles of "ethical and preventive" reconstruction (Moatty, Gaillard et Vinet, 2017) in order to promote actions that can diminish social, economic, and territorial disparities and pass measures that can reduce vulnerabilities and exposure to hazards (Moatty et al., 2018). This work challenges the "ethical and preventive" opportunity provided by reconstruction. It proposes a cross-analysis of Saint-Martin's vulnerability and the solidarity mechanisms put in place after Irma.

Scientific framework and research challenges

Analysing the trajectories of reconstruction (Moatty, 2015) through the prism of solidarity mechanisms and their effects entails identifying the basic factors that can either obstruct or promote the initiatives for effective recovery in terms of the quality of life (social and territorial justice) and preventive adaptation, i.e., identify what can enhance resilience, ("ethical and preventive reconstruction" - Moatty, Gaillard and Vinet, 2017). Even though hazards, as well as the hardship and deteriorating living conditions of victims never cease to exist, reconstruction as a preventive opportunity has nevertheless been challenged (Nigg, 1995; Olshansky, Hopkins and Johnson, 2012; Lamond, Joseph and Proverbs, 2015; Kaniasty, 2020; Su and Le Dé, 2020) .

As such, disasters can be seen as the extension of everyday emergency situations (Baird et al., 1975) that lie at the heart of the "fundamental causes" of the vulnerability of individuals and communities (Oliver-Smith, 1991; Wisner et al., 2004; Adger et al., 2005; Gaillard, 2010; Magnan, Duvat and Garnier, 2012; Duvat et al., 2021). The multiple interactions between developmental aid and disasters are and can be powerful levers for influencing developmental aid programmes in impacted regions (Lizarralde, Johnson and Davidson, 2009; Lyons, 2009; Jha, 2010; Moatty, Gaillard and Vinet, 2017; Popkin and McGarvey, 2020). Monitoring a reconstruction process means examining the capacity for a territorial system to resist and adapt when coping with environmental and social hazards, particularly in a context of climate change, which has been clearly established in the French West Indies (Duvat et al, 2021; Moatty, Grancher and Duvat, 2021).

Damage and disorder in the aftermath of a disaster expose and magnify the "fundamental causes" for a region's vulnerabilities (Birkland, 1998; Plein, 2019). By identifying these causes, actions can be undertaken to reduce the pressure and the constraints that essentially render people and social groupings vulnerable. These are the actions of "Build Back Better" (BBB). BBB emerged on the international stage at the Yokohama World Conference on Disaster Risk Reduction (WCDRR) in 1994 and later reappeared at the 2005 Hyōgo Framework for Action. In 2015, BBB was finally adopted as priority number 4 of the Sendai Framework for Action (United Nations Office for Disaster Risk Reduction, 2015). BBB's agenda is based on three interacting pillars: i) the provision of relief (which includes developing the social capital¹ of individuals and communities, in addition to diversifying their means of subsistence and the market economy), ii) the reduction of organizational vulnerabilities (which includes adapting regulatory and legislative frameworks), iii) the reduction of physical and functional vulnerabilities (by limiting the exposure to risk to persons and goods and strengthening buildings and infrastructure) (Moatty, 2020).

¹ According to Bourdieu, "social capital" is defined as "all the current or potential resources tied to having a lasting network of more or less institutionalized relationships of mutual knowledge and mutual recognition; or, in other words, to belonging to a group of representatives, who not only have shared characteristics (that can be perceived by the observer, by others, or by themselves), but who are also permanently connected through beneficial links" (Bourdieu, 2006).

As for the pillar relating to community recovery, management of the transition phase between the moment of the crisis and the implementation of interim, then permanent strategies, is essential. During the transition period, solidarity plays a major role in the way it can temporarily compensate for the shortcomings of public action that have been disrupted (Moatty, Grancher and Duvat, 2021). Solidarity is expressed through different types of actions and is demonstrated at several levels. In the social sciences, the notion of solidarity covers different real-world situations (Supiot, 2015, 2018) and no single definition is universally accepted by all the fields that apply it. According to French law, solidarity is defined as "that which unites persons bound by a joint obligation" (General Collection of Old French Laws, 1693). Supiot describes a typology of solidarity broken down into three categories: family solidarity (in a system of kinship or institutional contract), civil solidarity (voluntary investment guided by ethical values), and social solidarity (pact between individuals "sharing specific common interests") (Supiot, 2015) .

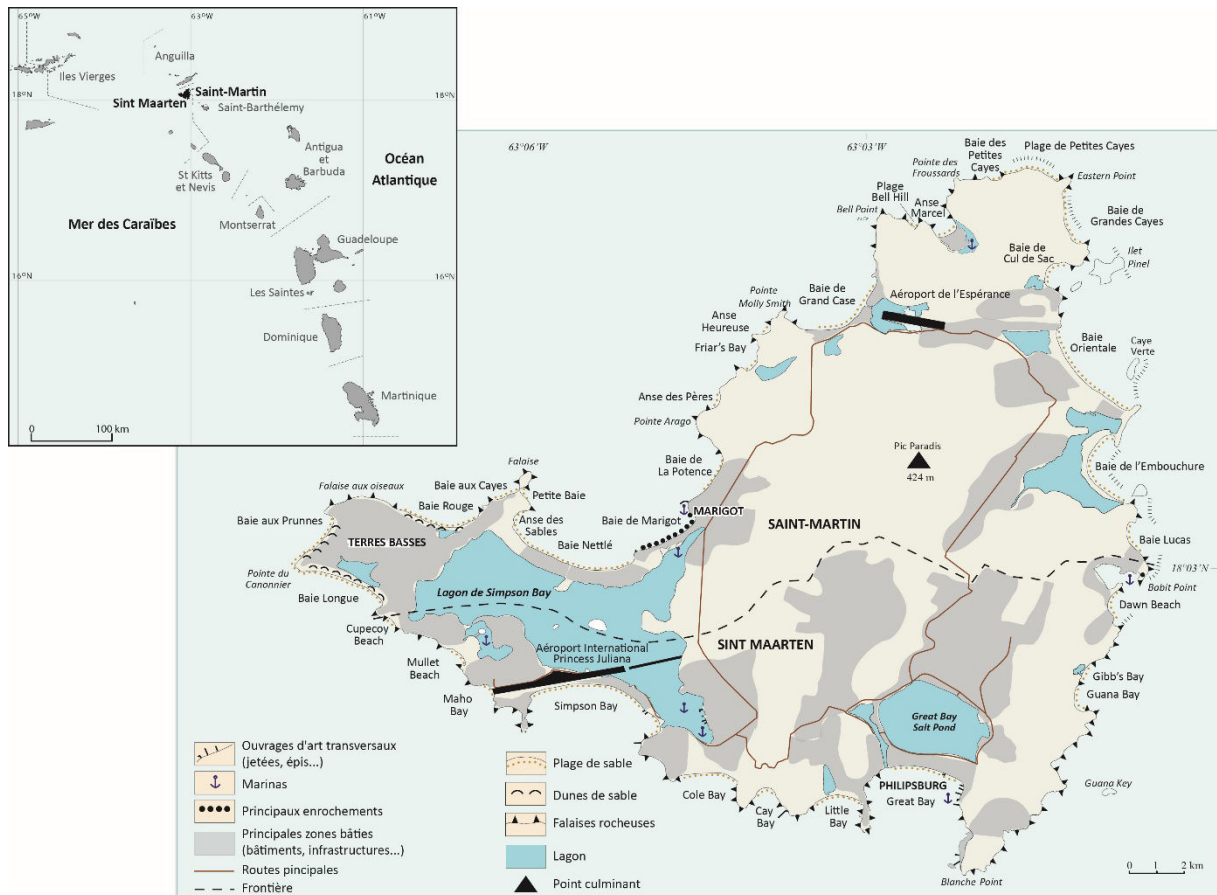
According to this typology, the different categories of solidarity can vary through time and space: contracts can be broken, compassion and empathy can diminish, and interests can evolve. In the post-disaster period, given the conditions of restricted mobility, close-ranged solidarity within a neighbourhood is first established. This locally driven solidarity can be expressed in practice (assistance with maintenance and cleaning, although limited by restricted access in some cases). Then, with the arrival of outside relief, a different kind of solidarity emerges from the initial one in the provision of mutual aid, and the sharing and active listening of personal experiences, during which time the network of connections with people outside the neighbourhood is being reactivated (Moatty et al., 2020). In addition, various methods are put into play to help to aid recipients: distribution of donations and food, administrative support, etc. In the case of Saint-Martin, the decision of American tourists (the main nationality of tourists to Saint-Martin and Sint Maarten – Grancher et al., 2002) to return to the island as soon as it is practical is also a form of solidarity that can be referred to as "consumer solidarity".

The territory under study: Saint-Martin

Saint-Martin is a small binational Caribbean island (93 square kilometres), some 250 kilometres from Guadeloupe, and split between Sint Maarten to the south (one of the four constituent countries of the Kingdom of the Netherlands along with the Netherlands, Aruba, and Curaçao) and, to the north, Saint-Martin, a French Overseas Collectivity (COM) (cf. Figure 1). These two territorial entities each enjoy administrative autonomy vis-à-vis metropolitan France and metropolitan Netherlands. Saint-Martin was the 3rd *arrondissement* of Guadeloupe until the outcome of the referendum of December 2003 that brought about a statutory change of the municipality that converted it to a COM (more than 76% of the votes cast were in favour of the COM). The organic law creating the newly formed COM was adopted by the French Parliament on February 7, 2007 (law n° 2007-223 of 21/02/2007), and entered into force on July 15, 2007 (Redon, 2007; Benoit, 2015). The COM of Saint-Martin is administered by a territorial council and an executive council headed by a president with municipal, departmental, and regional authority in matters covering taxation, legislation, road

traffic and transportation, highways, issuance of foreign work permits, tourism, urban planning, construction, housing, and energy.

Figure 1: Saint-Martin, a small binational Caribbean island with densely urbanized coastal areas



Saint-Martin's development is constrained by its mountainous topography, which partially explains the concentration of buildings and infrastructure in low-lying coastal areas that include those that have been reclaimed from the sea (cf. Figure 1). In the 1980s, these coastal areas experienced sudden population growth driven by tax exemption policies that attracted a large influx of Caribbean labour (Duvat, 2008; Duvat et al., 2021). Directly linked to these tax exemption provisions, Saint-Martin's economy is almost exclusively based on tourism (Grancher et al., 2020). From a social point of view, Saint-Martin has a multinational, multi-ethnic, and multicultural population comprising more than a hundred nationalities and community lifestyles (Redon, 2007; Benoit, 2015; Moatty, Grancher and Duvat, 2021). In 2018, the unemployment rate was 35.2% of the workforce, one of the highest rates in French overseas territories (IEDOM, 2019). Only French Guyana (24%) and Mayotte (35%) have comparable employment figures (IEDOM, 2019).

Irma struck the island of Saint-Martin on the night of September 5 to 6, 2017, resulting in eleven deaths and two missing persons (Gustin, 2017; Moatty et al., 2019). Causing approximately 1.2 billion euros in damages, Irma was to be the costliest natural disaster since the creation of the French natural disaster compensation scheme in 1982 (Desarthe, Bauduceau and Quantin, 2020). By June 2019, 82% of the damages were compensated by insurance, which covered however only some 40% of households. Following this assessment, a more thorough investigation of post-Irma reconstruction in Saint-Martin has helped to clarify the extent to which structural, organizational, social, and economic vulnerabilities later developed (Duvat et al., 2021). In addition, given the scale of the damages and destruction affecting 95% of buildings and infrastructure, it should be presumably conceivable to design physical reconstruction that more fully takes the threat of cyclones into account (Moatty, Grancher, Duvat, 2021).

Methodology

This post-Irma reconstruction analysis in Saint-Martin was based on a methodological gathering of feedback on the specific characteristics of the reconstruction process that had been going on since September 2017. This methodology, based on my earlier work, is transposable from one geographical location to another and tailored to local specificities, as well as to different types of disasters, thus making it possible to examine reconstruction over a variety of time frames (Moatty, 2015; Moatty, Gaillard and Vinet, 2017; Moatty et al., 2018, 2019, 2020; Moatty, Grancher and Duvat, 2021). With the use of various survey techniques (interviews, questionnaires, gathering of observations, discussion groups, and collaborative mapping workshops), this research examines acts of solidarity as structural elements during post-disaster recovery. These survey techniques entailed interviews with numerous respondents from various backgrounds who fundamentally understood the processes of decision-making and sharing of responsibilities. A press and literature review was added to the data collection process.

For the first field mission from October 28 to November 15, 2017, the objective was to carry out an initial study on the risk factors and the available resources in the region. This effort involved identifying spontaneous acts of solidarity that had been prepared and executed by volunteer associations, NGOs, and the government, each of whom were reaching out nationally (via institutions, State services, donors) and locally (via collectivities, prefectures, communities). Our other interviews were carried out with various other organisations and associations (including the Red Cross, Secours Populaire, France Victimes, Compagnons Bâisseurs, and others locally based) that had carried out initiatives ranging from fundraising and aid distribution to administrative support, among others. The second field mission from October 29 to November 11, 2018, was a post-one-year follow-up to collect data primarily through collaborative mapping workshops².

²The description of the protocol, the processing and the analysis of the results from these workshops are detailed in the article published by *EchoGéo*, "Organization of the post-disaster after Irma in Saint-Martin. Experience and perception of adolescents from crisis management to reconstruction" (Moatty et al., 2020).

The post-disaster phase showed certain characteristics in terms of data collection, both from an ethical and practical standpoint. In the weeks and months immediately following the disaster, a variety of decisions and actions had to be taken at different levels (individually or collectively) in “compressed time” in order to prepare the response and rebuild the region. Furthermore, the processes of socio-territorial systems are frequently evaluated in retrospect (Revet, 2006; Morin, 2012; Moatty, 2015; Martinez, 2019), because the post-crisis phase is more a time of action than one of reconstruction based on past experience. Retrospectivity has benefits, foremost among them the dissociation of emotional considerations brought about by the interval of time between the analysis and the event under study (Moatty, 2015; Moatty, Gaillard and Vinet, 2017). Retrospectivity has shortcomings in that information might be lost owing to factual distortions, thus requiring crosschecking of source data to confirm the accuracy of information (Moatty, 2017).

Our approach in this case was different, since we continually monitored the reconstruction process over a three-year period. Although this offered the advantage of limiting data loss compared to the retrospective approach, continuous monitoring raised issues in terms of ethical research. In fact, “gold rush attitudes” have been denounced in various disaster areas, and the Caribbean Basin was no exception (Gaillard and Gomez, 2015; Louis-Charles et al., 2020). In our field missions carried out together with D. Grancher (UMR LGP), the first being a month and a half following Hurricane Irma, we took extra care in our preparation by reading up on the region from existing literature and conducting preparatory interviews with key figures. In this way, we were able to document our research and set up a local network. In accordance with the General Data Protection Regulation (GDPR), we assured the interviewees that information would remain anonymous and confidential. Finally, we devised a flexible approach by adapting the format of the interviews (either individually or collectively), the duration (between 30 minutes and two and a half hours), the location (home, workplace, public area, café, etc.), as well as the scheduling in order to minimize the impact of the time element on our respondents as much as possible.

The data collection techniques were derived from survey methods conducted in the humanities and social sciences. The table below presents each data collection technique with details about its duration, location, general characteristics of persons surveyed (PS), and type of data obtained (cf. Table 1).

Table 1: Summary table of the main characteristics of the techniques used

Technical	Duration	Start/end date	Locations	Characteristics of PS	Type of data
Non-participating observations	4 h	09.11.17	Marigot	Members and elected officials of the territorial council	<i>Qualitative data</i> News of reconstruction projects Territorial organizations and involvement of those concerned
	4 h	14.11.18			
	3 h	30.10.17	Marigot	Representatives of the COM and associations	
	3 h	02.11.17	Marigot	Rotary Club and Lions Club meetings	
	3 h	07.11.17			
Semi-structured interviews	≈ 2 h 30'/PS	2017 to 2019	Paris	All risk management and reconstruction players at national and local levels	<i>Qualitative data</i> Progress of the reconstruction Causes of vulnerability Resources and capacities
		2 missions	Saint-Martin		
Questionnaire administration	≈ 45'/PS	2 missions	Saint-Martin	Middle and high school adolescents	<i>Quantitative data</i> Post-disaster experience and solidarity
Collaborative mapping	2h/session	2 missions	Saint-Martin	Middle and high school adolescents	Spatializing the results in terms of reconstruction and solidarity
Discussion group	3h/session	2 missions	Saint-Martin	Neighbourhood residents	Post-disaster experience and solidarity

The field survey included 118 interviews, 5 participant observations, 2 discussion groups, 8 collaborative mapping workshops, and 191 questionnaires. Eighty-eight PSs were interviewed, some several times (bringing the total number of interviews to 118). Following the field surveys, the subjects discussed in the semi-structured interviews were updated through press reviews and social media. Interview grids were drawn up according to PS profiles and put in chronological order. Questionnaires were designed accordingly, thus making it possible to compare the responses and examine what the respondents perceived and experienced at the same period of time and for the same subject of analysis. The topics covered were the same as those described in the questionnaires and the interviews and were selected according to the involvement of the persons surveyed. The semi-directive structure offered flexibility on this point and allowed us to go beyond the pre-set framework to reduce interviewer bias (cf. Infra). A matrix of the verbal transcripts was drawn up for each phase of the hurricane (before the outbreak, during the passing of the eye³, just after, and

³ Of the hurricane.

reconstruction) and for each topic (risks and resources of the population and of the territory), and this enabled us to cross-reference of interviewee responses.

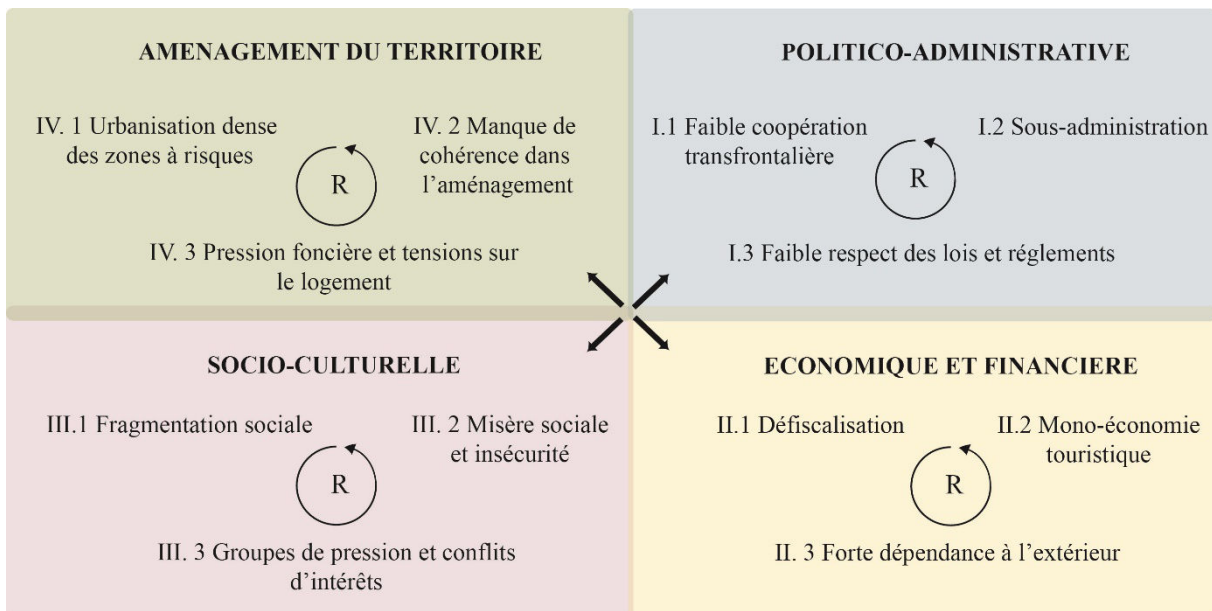
The findings are summarized below according to topic, starting with the drivers of the territory's vulnerabilities, continuing with the details on the resources for recovery that include the State's commitment to post-disaster governance, and finally the acts of solidarity that were mentioned by adolescent respondents.

Results

The drivers of vulnerabilities on Saint-Martin

We were able to characterise the key variables of the vulnerabilities of the French part of Saint-Martin island right before Irma made landfall by creating four interacting domains (Moatty, Grancher and Duvat, 2021). These domains consist of several interdependent variables, and, more especially, reinforcement loops⁴ (cf. Figure 2). The politico-administrative domain includes the variables that define the relations between the two parts of the island, the main one being cross-border cooperation. Prior to Hurricane Irma, the two collectivities had a weak and strained relationship in a context of economic competition and a need to control illegal immigration across their shared border. Weak cooperation between the two parts of the island has led to inconsistent risk management policies and strategies (Duvat, 2008), whether it comes to "natural", economic, or social hazards.

Figure 2: Interconnection of domains and their structuring variables for the Saint-Martin island



⁴A reinforcement loop represents a process in which the increase in one variable increases the others, their mutual tendencies reinforcing each other (Moatty, Grancher and Duvat, 2021).

<p>Territorial planning</p> <p>IV.1 Dense urbanization of risk areas</p> <p>IV.2 Lack of coherence in spatial planning</p> <p>IV.3 Land pressure and housing tensions</p>	<p>Political and administrative</p> <p>1.1 Low cross-border cooperation</p> <p>1.2 Sub-administration</p> <p>1.3 Low compliance with laws and regulations</p>
<p>Socio-cultural</p> <p>III.1 Social fragmentation</p> <p>III.2 Social misery and insecurity</p> <p>III.3 Lobbies and conflicts of interest</p>	<p>Economic and financial</p> <p>II.1 Tax exemption</p> <p>II.2 Tourism economy</p> <p>II.3 High dependence on the outside</p>

In the November 2017 report by the Prefect Delegate for Reconstruction (cf. Infra), Philippe Gustin highlights the fact that reconstruction can only be accomplished if the imbalances between the two sides of the island, mainly those related to illegal immigration and administrative efficiency, are resolved: "The French State can no longer allow itself to serve as a 'social shock absorber' for the people who live and work in Sint Maarten" (Gustin, 2017). Police cooperation between the island's two sides was the subject of a treaty signed in March 2015. Its aim was to improve standard institutional cooperation, i.e., the exchange of information and the investigation of crimes, the recruitment of liaison officers on both sides, the guarantee of reciprocal assistance during large-scale protests and major events that include natural disasters. In addition, the 2015 treaty also lays the groundwork for more direct cooperation, especially through the development of joint intervention plans in areas such as the maintenance of law and order, illicit trafficking, illegal immigration, and criminal activities.

Given the "limited resources" (Duvat, 2008) of the two administrative entities and the extent of the reconstruction work to be carried out in all sectors, post-crisis cooperation in terms of mutual support in applying for European funding was initially put up for reconsideration (Gothenburg summit on December 1, 2017), despite the fact that the two entities do not enjoy the same status, because Saint-Martin is an Outermost Region – OR – and Sint Maarten an Overseas Country and Territory – OCT. Also, up for reconsideration was the pooling of structural equipment for waste management, sanitation, the drinking water network, as well as electrical and telecommunications networks. As for waste management, for instance, the Gothenburg declaration provides for the joint removal and clean-up of shipwrecks stranded in the Simpson Bay lagoon. This operation received European co-financing as part of territorial cooperation projects for the years 2014-2020.

"Irma has brought to light the island's vulnerability to natural disasters, as well as the lack of a coordinated response to major hazards" (joint declaration of the Q4 of Paris, June 28, 2018). As a result, it was decided to develop the means of pooling emergency response resources, specifically through the creation of a common emergency fire action plan for both sides of the island. More generally, the agreement signed by Saint-Martin, the French

Republic, Sint Maarten, and the Kingdom of the Netherlands (the Q4) was aimed at renewing the treaty of Mont des Accords of 1648. Beyond the issue of post-Irma reconstruction, cross-border cooperation is focused around two other crucial points that illustrate the difficulties of law enforcement: knowledge of and control of flows of goods and people, and the fight against organized fraud (that seeks to control illegal immigration and illicit trafficking). Whether at the island level through the Q4, or at the territorial level, we are seeing the governments of the States in question reaffirm their commitment to their under-administered territories (Collodi et al., 2019; Fraser et al., 2020; Duvat et al., 2021; Moatty, Grancher and Duvat, 2021). The administrative status of Saint-Martin and the contentious negotiations for its administrative autonomy (Jeffry, 2010) have resulted in it being under-administrated (Gustin, 2017). The interaction of these three factors (weak cross-border cooperation, under-administration, and poor law compliance) has reinforced the processes at work that were already exhibiting an upward trend prior to Irma (cf. Figure 2).

The second domain concerns the economy, one of the three determining drivers in this analysis being the tax regime, and more specifically the successive tax exemption provisions (Pons-1986, Pinel-2015, Girardin-2018, 2020). These legal provisions have, in turn, stimulated the construction of residential and tourist accommodations, thus encouraging the growth of a tourism mono-economy that is highly vulnerable to coastal hazards. (There was a 40% drop in the number of visitors after the passage of Luis in 1995). The inadequately diversified economy has led to strong external dependence, both for imports (food and building materials in particular), and for tourist revenues (cf. Figure 2). In addition, the Saint-Martin collectivity is highly reliant on Sint Maarten, where the international airport and the deep-water port capable of accommodating large cruise ships are located. This reliance was stable prior to Irma (it dropped slightly and then rose again with post-disaster costs) when tax exemptions and the tourism mono-economy were expanding (Moatty, Grancher and Duvat, 2021).

The third domain includes variables that characterise Saint-Martin from a socio-cultural point of view (cf. Figure 2). The determining variables in this domain have to do with the quality of life and lifestyles. The latter are very community-oriented and, as a result, regional development reflects the lack of a broader social mix. In fact, neighbourhoods are very mixed from one to the other, but the social, cultural and economic characteristics are alike within them. Income disparities are significant, which breeds resentment and a sense of injustice in a setting of uneven rates of growth. Thus, the feeling of insecurity, whether perceived and/or experienced, is one of the elements that influences the local social climate. Consecutive to the under-administration of the territory, people do not trust the authorities, whether they be local or national, and this opens the way for the development of opposition and pressure groups that advocate for divergent, often conflicting interests. This variable, as well as the perception of insecurity and social deprivation, were on the rise before the passage of Irma. Only social fragmentation was constant feature (Moatty, Grancher and Duvat, 2021).

Finally, the fourth domain includes variables related to land use planning, which is characterised by the high exposure of densely urbanized coastal areas to marine weather hazards (cf. Figure 2). In those locations, critical infrastructure and vital networks are highly vulnerable due to their full exposure and poor maintenance, which reduce their ability to withstand shocks and quickly rebound, that is, to ensure that businesses continue to operate. Rapid and poorly organised urbanisation in the 1980s (Gustin, 2017; Veyret, 2017) generated unsystematic land use planning, and, consequently, significant tension on land and pressure

on housing. In fact, the public housing inventory was already under pressure prior to Irma (no vacancies), while the private housing inventory competed with seasonal housing, since it generates faster profits than long-term rentals (Grancher et al., 2020). All the factors in this domain were tending to rise before Irma.

The State re-committed to post-disaster governance

All the drivers of the island's vulnerability are attributable to the territory's under-administration, either because they are a direct result of it, or because under-administration is analogous to a "laissez-faire" approach that ignores the principles of social and territorial justice. Under-administration refers both to the State's disengagement and to the collectivity's feeble capacity to administer its territory. In the immediate post-disaster period, the Interministerial Reconstruction Mission that was activated on September 14, 2017, by an interministerial prefectural delegate for the Northern Islands (Saint-Martin and Saint-Barthélemy), requested that the French government reinvest in Saint-Martin. In addition, a two-part protocol was signed between the Prime Minister and the President of the COM with the intention of giving this mission the means of coordinating its actions in line with the skills and resources of the local community. This protocol is based on some twenty recommendations from the report by P. Gustin (2017), which notably mentions the fact that "the rapid increase in Saint-Martin's population and the island's occasionally haphazard urban development in recent decades call for a greater presence of public authorities" (Gustin, 2017). The first part of the protocol, relating to State funding for the operating budget of the Saint-Martin collectivity, and signed on November 6, 2017, authorized that credits be advanced to stimulate reconstruction. The second part, signed on November 21, 2017, relates to cooperation in "exemplary and united reconstruction" and clarifies the roles and responsibilities of the two parties for each reconstruction project.

The 1987 Pons law tax exemption made it possible to stimulate hotel construction (Duvat, 2008), but in the 1990s, it failed to replenish the ageing hotel stock (Gustin, 2017). The tax exemption "has indeed led to excessive investment in certain sectors and has created instability in the economic fabric without lessening the territory's inequalities" (Gustin, 2017). The structures thus built were widely resold as apartments, generating two direct consequences: placing on the market accommodations that were unsuited for the local population, and reducing the capacity of tourist accommodations. In terms of indirect consequences, our interviews revealed that the buildings constructed as a result of the tax exemption were often of poor quality due to cost-cutting on building materials and the use of low-skilled and illegal labour combined with the lack of supervision on the worksites.

In the context of the local under-administration of the territory, the reaffirmed commitment of the French government, through its involvement in the reconstruction strategy of Saint-Martin, has had a balancing effect on all the variables of the politico-administrative sphere. This has resulted in counteracting trends that pre-existed in the social and cultural spheres and in land use planning. Post-disaster price increases have heightened the already strong pre-Irma reliance on outside sources, especially for imports, and, in particular for the needy, who have appealed to solidarity actions for their recovery. Under these conditions, intra-community solidarity has developed strongly and has counterbalanced hardship situations

and social unrest. Yet it has exacerbated social fragmentation, which grew worse within the day after the disaster. In fact, the acts of solidarity carried out by the respondents, whether as individual initiatives or through volunteer associations, were centred on the community level. Actions aimed over the full extent of the territory and the population as a whole followed later and were mainly focused on cleaning the beaches, and the hiking and mountain biking trails.

Post-disaster governance in Saint-Martin took the form of an Interministerial Mission for Reconstruction (MIR) that was to "cope with the emergency and secure the government in the long term for the rebirth of the two collectivities" (government MIR website). This mission, under the authority of the delegate prefect, was composed of four work teams assigned to fundraising and financial engineering, legal expertise, IT network expertise, and coordination of communication. In addition, a territorial delegation from the Department for the Environment, Planning and Housing (DEAL) and the Office for Business, Competition, Consumption, Labour and Employment (DIECCTE) were set up in Saint-Martin. This made it possible to enforce compliance with labour laws and regional planning. One of the missions of DEAL is to examine Fonds Barnier aid applications and advise local authorities (Barraqué and Moatty, 2020). In this regard, the Senate report, corroborated by our interviews, underscores the collectivity's difficulties both in the preparation of the applications and in the expenditure of funds. These difficulties are tied to the lack of technical skills, as indicated in the 2018 report (in the 2007 to 2016 financial years) of the Regional and Territorial Chamber of Accounts: "the recruitment of poorly qualified agents [who] remain unproductive for public service (p. 5). In order to make up for these shortcomings, three agents from the French Development Agency were mobilized to help the community in the reconstruction process.

Additional police staffing has helped to reduce the number of incivilities and trafficking. Between August and December 2016 and 2017, all forms of violence against individuals had decreased by 7%, due to agents numbering five times higher than the average in Saint-Martin and Saint-Barthélemy before November 2017. At the same time, solidarity mechanisms were put in place, both within the districts, then across the districts. Adolescents were particularly active in conducting certain acts of solidarity (cf. *Infra*).

Perception of reconstruction by Saint-Martin adolescents, and participation in solidarity actions

Our work carried out with adolescents focused both on their perception of post-Irma reconstruction and on their involvement in acts of solidarity. In terms of perception of reconstruction, one year after Irma, the areas they perceived as "the most advanced" in the process were initially zones of economic interest, such as Hope Estate and Grand Case, and, more broadly, supermarkets, beach restaurants, as well as movie houses. Both airports are also mentioned by most students. Then come the wealthy neighbourhoods of the Jardins d'Orient Bay and Baie Orientale, and, to a lesser extent, the public housing complexes of Quartier d'Orléans. By tracing these areas on their maps, the students unanimously pointed out that reconstruction of housing and school infrastructure was too slow, both in Saint-Martin and Sint Maarten.

A vast majority of students consider that Sint Maarten is further advanced, especially in terms of the process of rebuilding its economy, which reflects the dynamism that they ascribe to a more effective management of insecurity. The adolescents (and most of the adults interviewed) believe that the maintenance of law and order has been better ensured in the Dutch part than in the "French part", where lootings have been widely publicized. The students interviewed had witnessed and had sometimes taken part in the lootings, and most were unaware that there had been none across the border. Road congestion during the first months and the lack of public transportation limited their displacements "to the other side", thus leading to a portrayal that was more imagined and based on hearsay than on their own experience. Adolescents living in Sint Maarten reported seeing just as much looting and incivility "on their side" of the border.

Implicitly, comparing the two sides of the island has led to discussing the reasons for reconstruction delays, of which looting is in the forefront. All the groups questioned made the distinction between "necessary looting", which covers basic necessities (food, hygiene, water), and "criminal looting" (electronic equipment, accessories, etc.). This distinction reflects a feeling of fear of running out: "At first we thought we were alone, that no one would come to help us because they knew that Maria and José were coming, so we took stuff because we were afraid! But taking phones and TVs is another matter, you have to tell the difference, that's important" (high school freshman; Moatty et al., 2020). More generally, mapped information, most often restricted to residential neighbourhoods, is accurate. It shows the perception of inertia and inequality in the reconstruction process in an age group of young people frequently away from school (de Milliano, 2015; Moatty et al., 2020).

Although Saint-Martin adolescents were undoubtedly disaster victims, they participated in the reconstruction process by helping to clean the streets and houses, distribute water and food, and look after children. They also took part in neighbourhood watch, the evacuation of the injured, and the search for missing persons, actions that are mature for their age. Geographical proximity was the predominating factor in their decision to help people and can be explained by the local way of life that is strongly centred around the district, the neighbourhood, or the housing complexes, as well as by the limited range of mobility of adolescents.

The scope of their work is also indicative of a major difference with adults, who, by virtue of their daily activities and their knowledge of the territory, carry out actions which extend over a larger area covering the entire island. Following Irma, adolescents mobilized their social commitment mainly through their family networks and at the neighbourhood level. Their relationships with friends and acquaintances outside the confines of their neighbourhood were hampered by impractical means of transportation (needing an adult to drive them somewhere) and accessibility (poor road conditions). In terms of accessibility, post-disaster waste management played a significant role. Cyclones produce huge amounts of debris that pose a real challenge for local authorities tasked with the collection and disposal of waste (Brown and Milke, 2016). The amounts involved can represent several years' worth of "normal" build-up generated in the territory. These debris (branches, sheet metal, etc.) present a danger that must be swiftly managed insofar as they can act as projectiles, hinder communication, and block escape routes just like when earthquakes happen (Rojo, Beck and Lutoff, 2017).

Conclusion

The consequences of Hurricane Irma on Saint-Martin and its society resulted in clearly demonstrating the accumulation of long-term structural, organizational, and socio-economic vulnerabilities that were later exacerbated in the aftermath of the disaster. Stronger reconstruction can be achieved by identifying the vulnerabilities associated with damage and destruction and choosing the appropriate resources to be locally deployed. The restructuring of post-disaster governance has resulted in time savings and increased efficiency through direct communication between the relevant ministries. This capacity to respond quickly and in a coordinated manner has made it possible to limit the number and duration of extremely perilous situations. In addition, the State's reaffirmed commitment and the resources deployed have generated greater respect for law and order. These facts demonstrate that Saint-Martin has served as an example of the ability and willingness of national and local authorities to seize an opportunity for change in order to build stronger collective resilience in terms of national solidarity and sectoral law.

However, renewed latent conflicts against land use planning tempers these findings, due to the failure of consultations around the first version of the natural risk prevention plan and the lack of consensus on an economic development strategy. Both have resulted in pre-existing arrangements to survive and have brought to light the system's powerful inertia in the face of strategic changes. The upshot is a deterioration of the social climate, which was already tense before the disaster. The length of the reconstruction process has varied locally in this context, thus widening social divides within Saint-Martin society.

In addition to the practical contingencies of the COVID-19 crisis that precluded me from conducting my recent field missions, my methodologies were initially limited due to the biases of investigative techniques that are used in the humanities and social sciences. I pondered over what had been left unspoken, ignored the slick political rhetoric, and in doing so, I was able to properly fine-tune the contextualization of the results by increasing the number of interviews and using non-participant observations. I thus partially overcame these limitations by virtue of my own combination of techniques in the field.

I chose the techniques and the protocol for processing and analysing the data collected in such a way as to reduce methodological and cultural biases in the interviews, but without having been able to eliminate them all. Most of the interviews were carried out in tandem with D. Grancher, which however resulted in accumulating additional cognitive and affective biases. However, pairing up on the interviews allowed us to be more thorough in our data collection and notetaking. The topics chosen by the leading interviewer were determined prior to each interview. Despite our best efforts, our cognitive and emotional "make-up" inevitably identified us as two French metropolitan researchers visiting the island of Saint-Martin for the first time. Our knowledge of the territory gained through preliminary readings, exploratory interviews, and press releases however allowed us to build trustworthy relationships with the interviewees.

Finally, because of the short interval between the disaster and the timing of my research, I was unable to draw a conclusion on the sustainability of the post-disaster changes observed.

I can however present this study's findings at the local level, and, more generally, draw a broader conclusion on the "window of opportunity" offered during the reconstruction periods by contrasting my results with those of other studies. Yet it is difficult to say whether the decisions and actions undertaken in the post-disaster period will ever stand the test of time and ever be likely to inspire the territory and its society to commit to greater resilience, sustainability, and adaptation in the face of present and future global changes. Further study of this territory and its trajectory of reconstruction over the upcoming decade is necessary to ascertain how "root causes" of vulnerabilities might ever be reduced. The analysis of the acts and mechanisms of solidarity was completed within these time constraints.

Solidarity is expressed through different forms of actions carried out at different levels. Such activities can first include cleaning a house (usually that of a friend or family member), next comes clearing public spaces such as streets or squares. Adolescents also provided mutual aid such as caring for children, distributing food, or repairing homes. Being hindered by bad road conditions that limited their mobility, the adolescents interacted mainly close to and in their neighbourhoods before the beginning of the school year. They were also engaged in listening to and helping their relatives.

Institutions and associations are not the sole providers of relief in a post-disaster period, as acts of solidarity to help disaster victims can be spontaneously carried out ad hoc. Understanding the acts and mechanisms of solidarity of adolescents in the post-disaster period is an important matter, given that some 66.5 million children in the world experience a "natural" disaster each year. In terms of support for young people, the results of this work argue for the development of educational programmes based on examples of local historical events with a view of providing students with greater knowledge and awareness on the post-disaster phase of reconstruction. In addition, concerning acts of solidarity, the interviews resulted in affirming the added value of coming together and relying on pre-existing structures (associations, collectives, scout organizations, young people's associations, etc.) to promote reconstruction. This can be done by tailoring the work to the age and circumstances of the participants.

Post-disaster governance in Saint-Martin was characterised by the State's reaffirmed commitment to develop a strategy for the reconstruction of the territory through the Interministerial Reconstruction Mission, one of whose high points was the appointment, on September 14, 2017, of the inter-ministerial delegate for reconstruction who is responsible for coordinating the actions of State services. Locally, the State's reaffirmed commitment responds to a certain tug-of-war. According to a statement by the President of the Collectivity: "Our relations with the State must be, and are, cordial and constructive, but we will not allow ourselves to be dictated the terms of the development of our island" (Territorial Council, 2017).

This decompartmentalized governance has nevertheless saved time and efficiency in having administrative procedures adapted to the post-Irma needs of Saint-Martin society. This capacity to respond quickly and in a coordinated manner has made it possible to limit the number and duration of extremely precarious situations. In addition, the State's reaffirmed commitment and the resources it has deployed have resulted in greater compliance to current laws and standards in force, thus promoting greater social and economic equity (at least in the early stages). However, renewed latent conflicts connected to land use planning tempers this conclusion. Indeed, the difficulties of agreeing on the revision of the Natural Risk

Prevention Plan have resulted in pre-existing territorial structures to survive and brought to the forefront the system's strong inertia of the in the face of change.

A disaster does not make a clean sweep of the past, and reconstruction does not start from a blank page free of the legacies from which everything may be rebuilt for the better. Conversely, post-disaster recovery builds on existing political-administrative, economic, and socio-cultural structures (Berke, Kartez, and Wenger, 1993; Aldrich, 2012; Cretney, 2017). Thus, numerous obstacles (political, regulatory, technical, organizational, social) limit the capacity of post-disaster recovery to trigger an alternative trajectory away from the vulnerabilities of socio-territorial systems (Whittle et al., 2012; Moatty, Gaillard and Vinet, 2017; Monteil, Simmons and Hicks, 2020; Moatty, Grancher and Duvat, 2021). Therefore, the reconstruction period is a critical phase that can not only accelerate, but also hinder the development of an affected region.

The case of Saint-Martin demonstrates that, in theory, a post-disaster period can represent a "window of opportunity", because, primarily due to the State's reaffirmed commitment, the vulnerabilities attributable to under-administration and weak compliance for law and order have been substantially reduced in the post-crisis period. However, in practice, pre-existing arrangements and modes of operation – especially those reflected in the social climate and conflicts of interest – strongly limit the willingness and the capacity to conduct "ethical and preventive reconstruction". According to this research, reconstruction can occasionally generate a protective "window of opportunity" (particularly for better legal compliance), yet it can exacerbate the system's vulnerabilities and thus aggravate society's long-term inequities. Going beyond these two opposing visions, an alternative trajectory exists that seeks to achieve greater resilience against enduring social structure parameters. This would therefore result in a more sophisticated portrait of local spatio-temporal variations.

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