

ARCHITECTS AND LOCAL COMMUNITIES IN ADAPTIVE RESILIENCE

OPTIMIZING RECONSTRUCTION PROGRAMME IN POST-DISASTER CONTEXTS

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Abstract

Sint Maarten and its relation with natural disasters brings a relevance of the research into the strategies on how works a disaster relief to introduce the idea in the context of the island. This paper aims to find and understand its best possible contemporary framework, involved facilities and actors through theory part, and later on three case studies analysis involving communities, the paper shows high effectiveness of community based relief projects. The most current and relevant system for effective action is an adaptive resilience, which is local, responsive, flexible and adjustable to specific context. A key factor is the community, their knowledge, skills and capacity alongside with partnerships between the public, private and not-for-profit sectors. Co-planning and co-designing create trust among the community and other actors, therefore they should be involved in the design, research, hand-on help and building phase of the process. It can be accomplished by creating an on-spot fixed or temporary structure/building hosting facilities working on the resilience or by community facilities as an asset-based design. Both create a self-reliant communities by focusing on the long term redevelopment and become a potential impulse for a individuals to become professionally engaged in the humanitarian aid.

Keywords: *Natural Disasters, Humanitarian Architecture, Strategie, Disaster Relief, Adaptive resilience, Reconstruction, Architects, Local Communitie*

I. Introduction

The research is influenced by the primary objective of Sint Maarten/ St. Martin case on how to recover after hurricane Irma which took place in 2017. Surprisingly, the context of Sint Maarten and the image of the ‘*Caribbean paradise*’ was destroyed not only by the hurricane itself. It clearly had a tremendous influence on the numerous issues but the island had been struggling with many problems (e.g. climate, politics, economics and many social issues) far before the hurricane happened.

Local population is forced to deal with frequent hurricanes on a regular basis. The hurricane season comes back every year, with major destruction every six years and effects similar to Irma (2017) or Luis (1995) every 20-25 years. In addition, political aspects of the island complicate the setting of Sint Maarten dramatically. Oligarchic system in the local politics, significant corruption and money laundering, disrupt after-hurricane recovery programme and increase poverty ratios in the country.¹ Economic dependence of the local community on tourism is also a huge threat to its development and the social consequences can be devastating, especially after natural disasters such as hurricanes. Lack of economic diversification, low export of goods and high import create an unhealthy environment and dramatically increase risk and economic vulnerability that can undermine the development

¹Jessica V. Roitman, Wouter Veenendaal, ‘We Take Care of Our Own’: The Origins of Oligarchic Politics in St. Maarten, *European Review of Latin American and Caribbean Studies* 102(2016), p. 69-88

process.² Unemployment, poor variety of higher education system, poverty and lots of informal settlements with unregistered inhabitants do not seem to help the situation.

Furthermore, a low engagement of Sint Maarten's local population in the process and the execution of the relief programme after hurricane Irma is one of the key factors of its limited effectiveness (especially in the low income districts).³ There is also a problem of inefficiencies and lack of benefits on governmental level on both sides of the island - Dutch (i.e. Sint Maarten) and French (i.e. St. Martin). All of the above contribute to low local collaboration in rebuilding neighbourhoods with a lack of knowledge on hurricane-proof building methods among community members. This is also affected by lack of training and education programmes for hurricane resilient environment.

The above problems led me to research themes dealing with disaster relief strategies which optimize different reconstruction programs after natural disasters - within examples of projects engaging architects and local communities to the maximum. Therefore, the following research question is the area of study framed to tackle the broad problem of poor and slow outcome of the reconstruction attempts on Sint Maarten.

What could be learned from post disaster community based projects in which architects are involved?

The research aims to understand existing and most prominent methods of disaster relief programs and case studies created within these models in order to find the most effective approaches and solutions. Later on, the results of the research will help to introduce its most crucial features, from optimised disaster relief systems and case studies, to the design part of the overall project. The project will try to adapt them in the Sint Maarten context.

Therefore, it is crucial to additionally define the upcoming sub-questions within this paper on the theoretical and practical (i.e. case studies) level:

Theoretical approach:

1. *What are the characteristics of a disaster relief?*
2. *What are the methods and key factors of existing disaster relief frameworks?*

Practical approach:

3. *What is the role of architects, communities and other parties involved in such case studies?*
4. *What is the role of the architects in relation to other stakeholders involved?*

II. Methodology

This research paper is divided into two parts. Firstly, theoretical aspects of the disaster relief, positioned on overall tactics, methods, frameworks and tackles long term planning on the national level. Its research method is descriptive and based on broad literature studies. This particular approach explores methods, key factors of governing/planning/reconstruction by engaging local population in the long term, relief programs.

Second part is focused on the practical approach based on discovered frameworks and case studies that explain them in a more detailed way. Chosen case studies are based on adaptive resilience framework. It researches how this model connects local population with the whole process of the project, through its plans of establishing, designing and executing. The goal was not to research the architecture or a building itself but rather to investigate its background. It traces back all the actors involved, including architects, community, volunteers, consultants, non-governmental organizations (NGO's), government members, investors and other parties. Each case study is trying to find when and at which particular stage of the whole building process the actors were involved and how it relates to the effectiveness of the project.

²Jose Speetjens, History of St. Martin's Tourism, *St. Martin Yesterday and Today*, p.9-32

³Shahla F. Ali, Governance and humanitarian aid survey data: Program effectiveness, *Governing Disasters: Engaging Local Populations in Humanitarian Relief*, p.247

Research paper and its analysis try to find already used framework for an efficient relief programme involving local population. The research leads to the graduation project, which is based on existing disaster relief theoretical frameworks with some analysis of the case studies. It aims to create and sustain knowledge on hurricane-proof building methods through involvement of local community and architects in the designed disaster relief knowledge center.

III. Theoretical approach

3.1. Introduction to humanitarian action

There are many discernible contemporary challenges in the international humanitarianism, among others, a need for worldwide aid due to the higher frequency within natural disasters. Moreover, mushrooming self-proclaimed humanitarian actors from non-governmental parties, precarious financial aspects as a consequence of unstable global economic developments and a worldwide political interference within range of humanitarian action alter contexts in which humanitarian actions operate. Above, parallel with problems on international consensus, cause a very slow progress of humanitarian community and their actions.⁴ This also involves the matter of how and by whom particular aid is provided, which is not separated from many political factors.⁵ Nowadays, relief situations seem to be extremely complex and on a large scale, therefore there is a necessity of multidimensional and well coordinated responses to begin planning process ahead of potential disasters.

The above is strongly connected to the technical and environmental hurdles that can be overcome by political will to create governance that provide protective human rights.⁶ Accordingly, that covers the range of governmental and nongovernmental actors. In most cases, the humanitarian relief is financed and provided on the 'states for other states' bases, due to their globalized engagements. Because of that, the International Law Commission (ILC) codified principles of 'Protection of persons in the Event of Disasters' with which all the international, regional and nongovernmental organizations provide relief aid. Although, there are no norms that provide a smooth disaster relief so far, existing ones try to upgrade conditions of people in the disaster event. All developed guidelines try to enhance still dysfunctional interactions between different norms' levels to improve disaster relief effects for beneficiaries.⁷

3.2. Resilience and disaster relief

With all the above humanitarian action issues, it is important to dive into the disaster resilience and explain at the beginning what it actually is, what is its conceptual overview and shortly introduce the survey of resilience definitions. 'Resilience' can be interpreted as an umbrella term that covers a range of ways in which a certain system responds to certain external stresses, like natural disasters or other new circumstances and major disruptions.⁸ The concept is currently a part of many fields including disaster risk management, sustainable development, ecology and climate change adaptation. The most crucial disaster resilience promise and aim is to pursue the impact reduction of disasters and parallel community strengthening.^{9,10} The concept of resilience was firstly introduced by Crawford S. Holling

⁴Joost Herman, International law and humanitarian space in the twenty-first century: challenged relationships, *Humanitarian Action: Global, Regional, Domestic Legal Responses*, p.12-13

⁵Jan Eliasson, The challenges of humanitarian action, Protecting people and supporting peace, *A Framework for Survival: Health, Human Rights and Humanitarian Assistance in Conflicts and Disasters*, p.187

⁶Philip Johnston, Relief and reality, *A Framework for Survival: Health, Human Rights and Humanitarian Assistance in Conflicts and Disasters*, p.225

⁷Andrzej Zwitter, Christopher K. Lamont, Hans-Joachim Heintze, Joost Herman, Conclusion, *Humanitarian Action: Global, Regional, Domestic Legal Responses*, p.480-481

⁸Naim Kapucu, Christopher V. Hawkins, Fernando I. Rivera, Emerging research in disaster resiliency and sustainability: Implications for policy and practice, *Disaster resilience: Interdisciplinary perspectives*, p.355-358

⁹United Nations, *Paris Agreement Entry into Force on Framework Convention on Climate Change (FCCC)*

in 1973 as ‘a measure of the ability of ecological systems to absorb changes of state variables, driving variables, and parameters, and still persist’. He defined it as an ability of particular ecosystem to persist in its initial state regardless of external disturbances.¹¹ Since then, resilience has been mainly describing adaptive capacities from scale of larger societies to human communities and even individuals.

Following that, range of concepts has been incorporated in many different settings. Therefore, since Holling introduced the term of resilience, there is a clear evolution of its themes collected out of different researches and policy domains (Figure 1). In particular ecological systems, hazards research, social and physical resilience along with individual, community and city resilience. Regardless of variation of themes, perturbation, recovery and ability for adaptation (towards external stress, disturbance or adversity) remain consistent. That means that resilience is the capacity of a system to persist and does not indicate development, growth or improvement, like some theories underline in the event of external disruptions. There is a risk of alteration of the whole resilience definition from what ‘is’ to what ‘ought to be’ and it is an effect of a wrongly emphasised ‘successful’ adaptation.

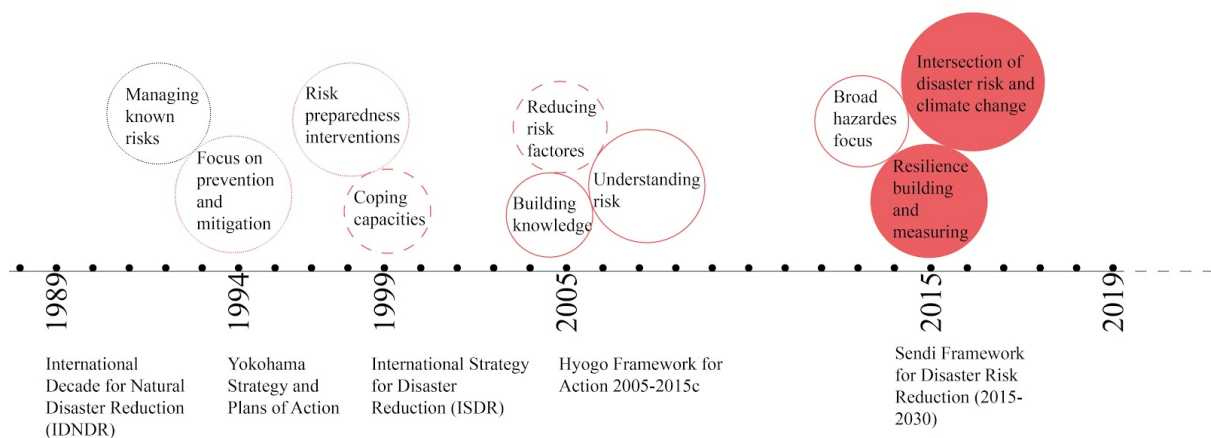


Figure 1. Progress of disaster risk reduction frameworks (Source: diagram by the author with data from Tiernan, Drennan, Nalau, Onyango, Morrisse, Mackey, *Policy Design and Practice*, 2019).

Moreover, the most recent and important feature of a stable resilience system is to stay about the same by being ‘flexible’ and ‘able to adjust’ in case of external stress. It opposes the traditional point of view, which defines a system as *resistant*, *static* and *strong* to given changes. For that reason, it is crucial for a system to have an effective adaptive capacity and undergo transformational change, which means that it can become a different kind of system change. Summing up, resilience encompasses a range of system responses, particularly the capacity of a system to ‘remain stable in the face of external perturbations and stresses, recover following a major disruption and adapt to new circumstances.’¹²

3.3. Adaptive resilience as an effective disaster relief model and community as its key factor

As mentioned before, the most current and relevant system of resilience is, by definition, an adaptive one (Figure 2). Model of its application was extensively described by Kapucu, Hawkins, and Rivera, which will be explained in more detail. The inclined comprehensive model is most commonly based and applied on the behaviour of a community after the disaster, which in literature is often called a

¹⁰International Bank for Reconstruction and Development, International Development Association, The World Bank, *Investing in urban resilience: protecting and promoting development in a changing world*

¹¹Crawford S. Holling, Resilience and Stability of Ecological Systems, *Annual Review of Ecology and Systematics*, p.1-23

¹²Anne Tiernan (Ed.), Lex Drennan (Ed.), Johanna Nalau (Ed.), Esther Onyango (Ed.), Lochlan Morrisse (Ed.), Brendan Mackey (Ed.), A review of themes in disaster resilience literature and international practice, *Policy Design and Practice*, p.53–56

stressor or a disturbance to a system.¹³ In brief, the adaptive resilience is divided into three inseparable aspects. First is to help reassess circumstances for the social units, second is to benefit from disaster experiences through learning from them, and finally to adjust strategies to the new situation caused by the disaster.¹⁴ The key feature of this model is that it distinguishes the recovery phase into ‘*bouncing back*’ (the reconstruction of the built environment - the engineering resilience) and ‘*adapting*’ (exploit beneficial opportunities and pursue to avoid or moderate harm).

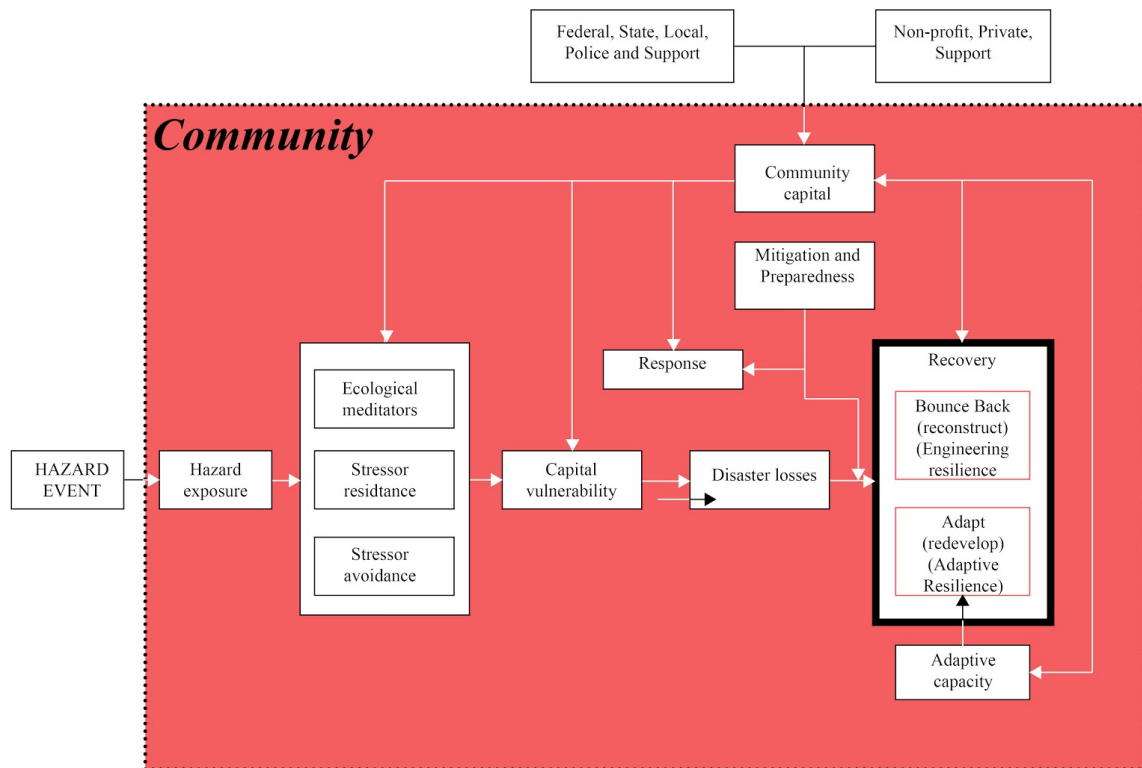


Figure 2. Adaptive resilience framework of Kapucu, Hawkins, Rivera (Source: diagram by the author with data from Tiernan, Drennan, Nalau, Onyango, Morrisse, Mackey, *Policy Design and Practice*, 2019).

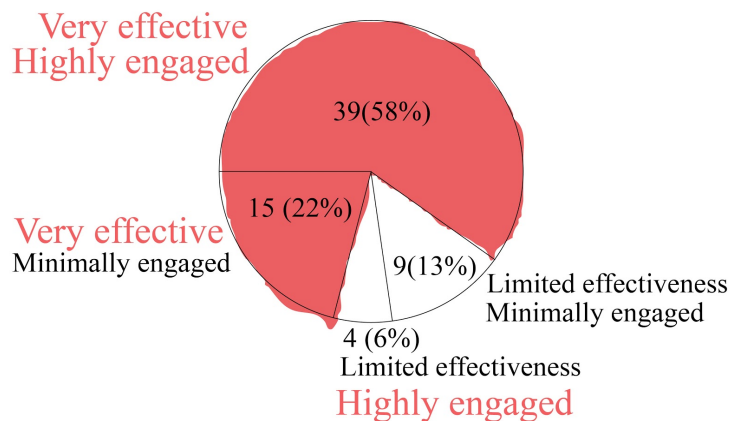
The success of disaster risk reduction is connected to deep commitment and involvement of local institutions and to assure beneficial adaptive resilience, it is important that both community and local organizations are fully engaged. Therefore, organizational and community resilience are strongly interconnected, as lack of sufficiently operating organisations (the government and private sectors) cannot provide resilient communities. In literature there are few methods shown on how to achieve that, including strategies like organising community events and focus groups, cautious planning of architectural structures and community layout, ‘community currencies’ (banking programs).

Moreover, the framework underlines the community as a key factor of adaptive resilience. The ideal and meaningful situation is when the community has knowledge, skills and capacity alongside with its full participation (Figure 3). Unfortunately, there is not much information on the resilience promoted by indigenous populations, which has extensive advantages. Improvement of the community response and resilience is not only achieved by incorporating its social structure but also through the use of local knowledge.¹⁵ Formal resilience building activities through incorporating local knowledge show

¹³Naim Kapucu, Christopher V. Hawkins, Fernando I. Rivera, Emerging research in disaster resiliency and sustainability: Implications for policy and practice, *Disaster resilience: Interdisciplinary perspectives*, p.355–358

¹⁴Anne Tiernan (Ed.), Lex Drennan (Ed.), Johanna Nalau (Ed.), Esther Onyango (Ed.), Lochlan Morrisse (Ed.), Brendan Mackey (Ed.), A review of themes in disaster resilience literature and international practice, *Policy Design and Practice*, p.60-61

¹⁵Tiernan, Anne (Ed.), Drennan, Lex (Ed.), Nalau, Johanna (Ed.), Onyango, Esther (Ed.), Morrisse, Lochlan (Ed.), Mackey, Brendan (Ed.), A review of themes in disaster resilience literature and international practice, *Policy Design and Practice*, 1(2019), p.62



ongoing movement led by the acknowledgement of local adaptive capacities and the recognition of the significance of indigenous knowledge itself.

Figure 3. Program effectiveness by level of engagement with local community (Source: diagram by the author with data from Christopher, Bacon, *Human Security and Natural Disasters*, 2014).

V. Case studies in adaptive resilience

4.1. Broussard Residence, Biloxi, Mississippi, USA

Broussard House is a project of the permanent house in Biloxi located in the East end of Biloxi Peninsula, Mississippi, USA and was built after hurricane Katrina (August 2005). Patricia Broussard's 79m² residence was completed on the 14th of March 2008 with a total cost of \$99,000. It was not possible without the help of donors (Katrina recovery funds from Department of Housing and Urban Development (HUD), the house owner's own insurance funds and some of the Federal Emergency Management Agency (FEMA) funds) and the main architect - David Perkes with Gulf Coast Community Design Studio (GCCDS) based in the USA (design team: David Perks, Jason Pressgrove, Bryan Bell, Brad Guy, Sergio Palleroni, Vincent Boudoin) (Figure 4).

The building itself is elevated around four meters above the ground because of new flood maps requirements revised after the hurricane. It has a centrally placed staircase which separates the house into two main closed rooms with the outdoor space in the middle. Moreover, the form is appropriate for the climate, responsive to its natural surrounding and gulf breeze. Additionally, project is certified with a green building program - Leadership in Energy and Environmental Design (LEED).^{16,17}

As mentioned before, a part of the Biloxi city was destroyed by Katrina and because of that city has introduced new flood elevation requirements. Therefore, the Hope Community Development Agency (Hope CDA), which was also a partner of the Broussard House project, worked on programme with over 100 houses destroyed after hurricane Katrina.¹⁸ The design part of the project started in Perkes' office in spring of 2008 followed by the construction which begun with the design build students along with the construction team of Hope CDA. A collaboration with a group of students was organized by Penn State University, under the direction of Sergio Palleroni and Bryan Bell. The whole work continued throughout the fall and spring and was additionally picked up by other students, local volunteers, as well as, largely by Perkes' design studio staff.¹⁹

When it comes to the architect and community relations, Perkes' first step was focused on moving his office from Jackson to Biloxi right after hurricane occurred. The GCCDS is working as professional, multidisciplinary practice and an extension of the University of Mississippi State College of Architecture, Art and Design at the same time. Its aim is to develop a close and pragmatic partnership with communities and local organisations in the region to create most appropriate solutions. The

¹⁶Esther Charlesworth, Broussard Residence, *Humanitarian Architecture: 15 stories of architects working after disaster*, p.99-101

¹⁷personal informal interview with the main architect of the Broussard Residence project - David Perks

¹⁸Deborah Aaronson (Ed.), Biloxi Model Home Program, Architecture for Humanity, *Design Like You Give a Damn 2: Building Change from the Ground Up*

¹⁹personal informal interview with the main architect of the Broussard Residence project - David Perks

office from its start deeply merged within the cultural and social fabric of the Gulf Coast. Perkes started to attend community meetings to understand what is an actual need for the architectural professionals.²⁰



Figure 4. Broussard House, Biloxi, Mississippi, USA.

In addition, he contacted the local non-profit organisation, which was bringing together locals and volunteers, with a goal to enable residents to become self-sufficient after hurricane events. His first tangible contribution towards long disaster recovery process was creating a grid map to introduce more efficient volunteers coordination for the previously mentioned non-profit organisation. Whenever appropriate Perkes was bringing new partners to the whole network with specific skills (e.g. coordination, building methods). Another part of the response was a research conducted for the Biloxi Housing Authority (BHA), which was a base for the parallel Woman in Construction (WiC) job-training programme.

The Broussard House was a project retrieved from a bigger holistic programme in the Biloxi region. The architect contributed with network of partners, build civic capacity and prospects of the project as ecological resilience, placemaking and economic development.²¹ The green building techniques not only provide the unique types of projects, but also deeper emotional connection between owners and their houses. Co-planning and co-designing created trust and building knowledge among the community members, which was a base for the meaningful recovery, healthy and sustainable community as well as pride of their houses and neighbourhood.²² It all was possible by an additional public-access design center by Architecture for Humanity (AfH) with Nathaniel Corum as a lead architect to enable people an easy discussion on all their problems about their destroyed community. (another of Corum's project will be further discussed as a third case study).²³

Five years of the GCCDS's co-working with the community created a long term plan. Even though the new solutions were not ideal, it helped to regain the communal energy and adaptive capacity of the local population in a holistic manner.²⁴ Perkes and the GCCDS describe this work as a '*helping to connect seemingly disparate environmental and social assets, so that East Biloxi can become more resilient on their own terms*'.²⁵

²⁰Thomas Ermacora (Ed.), Lucy Bullivant (Ed.), Architecture for Humanity, *Recorded City: Co-Creating Urban Futures*, p.110

²¹Barbara Brown Wilson, East Biloxi: Bayou Restoration as Environmental Justice, *Resilience for All: Striving for Equity Through Community-Driven Design*, p.29-33

²²Barbara Brown Wilson, East Biloxi: Bayou Restoration as Environmental Justice, *Resilience for All: Striving for Equity Through Community-Driven Design*, p.35-37

²³Thomas Ermacora (Ed.), Lucy Bullivant (Ed.), Architecture for Humanity, *Recorded City: Co-Creating Urban Futures*, p.110

²⁴Barbara Brown Wilson, East Biloxi: Bayou Restoration as Environmental Justice, *Resilience for All: Striving for Equity Through Community-Driven Design*, p.35-37

²⁵Barbara Brown Wilson, East Biloxi: Bayou Restoration as Environmental Justice, *Resilience for All: Striving for Equity Through Community-Driven Design*, p.37

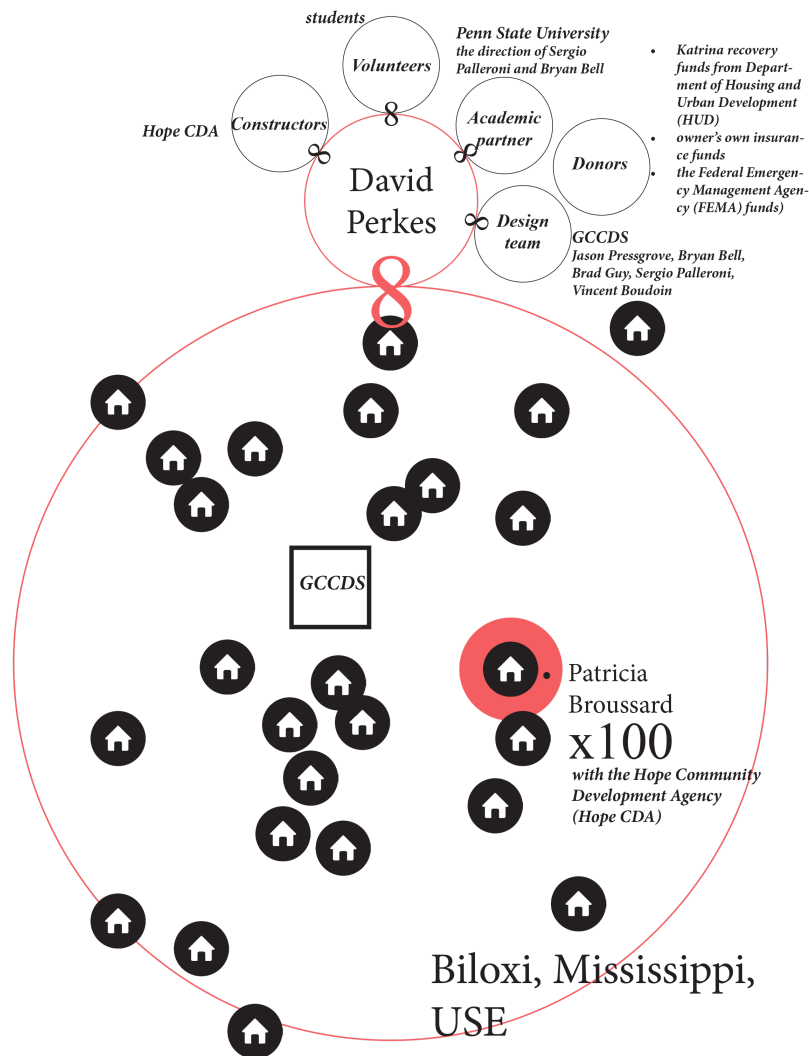


Figure 5. Broussard House and its context within adaptive resilience framework (Diagram by the author).

4.2. Ecole La Dignite, Port-au-Prince, Haiti

Another case study is an extension of Ecole La Dignite in Cayes de Jacmel, Sud-Est on Haiti's Caribbean coast. It is an education facility designed by a lead architect Eric Cesal from Disaster Reconstruction and Resiliency Studio with an Architecture for Humanity (AfH) firm following a 2010 earthquake.²⁶ Interestingly, Cesal started his humanitarian architecture career during Katrina reconstruction programme (described in the first case study). He was a volunteer in the community design programme in Biloxi and New Orleans. Since then, Cesal is in charge of the global portfolio of the disaster response for the AfH.²⁷ This shows a huge influence of the post-disaster projects, which by collaboration with local and external actors, become a potential impulse for individuals to become professionally engaged in the humanitarian aid (Figure 6).

A collaboration with the design team from Haiti Rebuilding Center and help of donors (Students Rebuild, Stiller Foundation and Pechakucha for Haiti) the project was completed on the 7th of November in 2011 with a total cost of \$75, 000 (\$375/m²). The project was built for 300 Ecole La Dignite students and local community residents. The Ecole La Dignite is supporting eight different

²⁶Esther Charlesworth, Ecole La Dignite, *Humanitarian Architecture: 15 stories of architects working after disaster*, p.129-132

²⁷Esther Charlesworth, Eric Cesal, *Humanitarian Architecture: 15 stories of architects working after disaster*, p.117

regions within three kilometers distance. The researched extension consist of two-classroom for the secondary school and is built as part of the Haiti School Initiative within just three private schools in the area of Jacmel. The school facilitates around 300 students (1st to 8th grade) and additionally serves as a community center and hosts a range of local groups.



Figure 6. Ecole La Dignite, Port-au-Prince, Haiti

The users' needs are accommodated in the loosely programmed spaces in between classrooms. The project answers Haiti's rebuilding problems through incorporating, like previous case study, appropriate and responsive climate solutions. It is visible in generous, low-tech openings with hand-woven screens made from bamboo to generate an airflow and let the light in. Furthermore, it helped to keep the rodents, bugs and burglars out. The usage of scrap plywood and metal was an alternative for roof trusses (limited metal gusset plates). The use of the local stones from the nearby river and shaded outdoor spaces by the natural foliage created the prominent feature of the building its surrounding.²⁸

The AfH with Cesal as a lead architect of the school project is underlining that the the aim of their involvement in the humanitarian crisis is not focusing on the quick and immediate solutions but rather on the long term redevelopment of the particular community. He claims that if architects would do their work, the world would be a safer place. The mass destruction occurs just when buildings is not well built and cities are not well planned. First priority of Cesal and AfH projects after disaster events is usually a school, as it has great benefits for both adults and children. First, it creates a feeling of normality for parents who can send their children to school, know they are safe and have eight hours for focusing on the rebuilding. Secondly, children are the ones who can have problems with gaining basic life sciles caused by the disruption, while adults deal with such events much easier.

In addition, projects never starts after the disaster, they begin around nine months after and can last from three to five years. It is often caused by problems with the understanding and learning the local culture, what was also the case on Haiti. Therefore, needed in the bigger scope of help on Haiti, AfH together with Habitat for Humanity (HfH) created the Haiti Property Working Group to deal with cultural and oralt. They created an online land titles tracking and ownership transfers system. The organisation explained it by saying that they '*use an investigation process to avoid any preconceived notions of what the community needs. The community is the client. The best solutions are local solutions*'.²⁹

²⁸Esther Charlesworth, Ecole La Dignite, *Humanitarian Architecture: 15 stories of architects working after disaster*, p.129-132

²⁹Take Part WORD, *Rebuilding Haiti so it's better than before*, http://barbaratannenbaum.com/pdf/rebuilding_haiti.pdf, consulted 16 June 2019

Therefore, AfH with Cesal in the Ecole La Dignite project collaborated only with local building contractors, craftspeople and local labour. Through the process of the project they employed 21 full time staff members and succeeded by involving dozens of international volunteers. Cesal states that this is an innovation, not about inventing gadgets or widgets but about the process, which creates self-reliant communities, which are completely independent of an international aid.³⁰

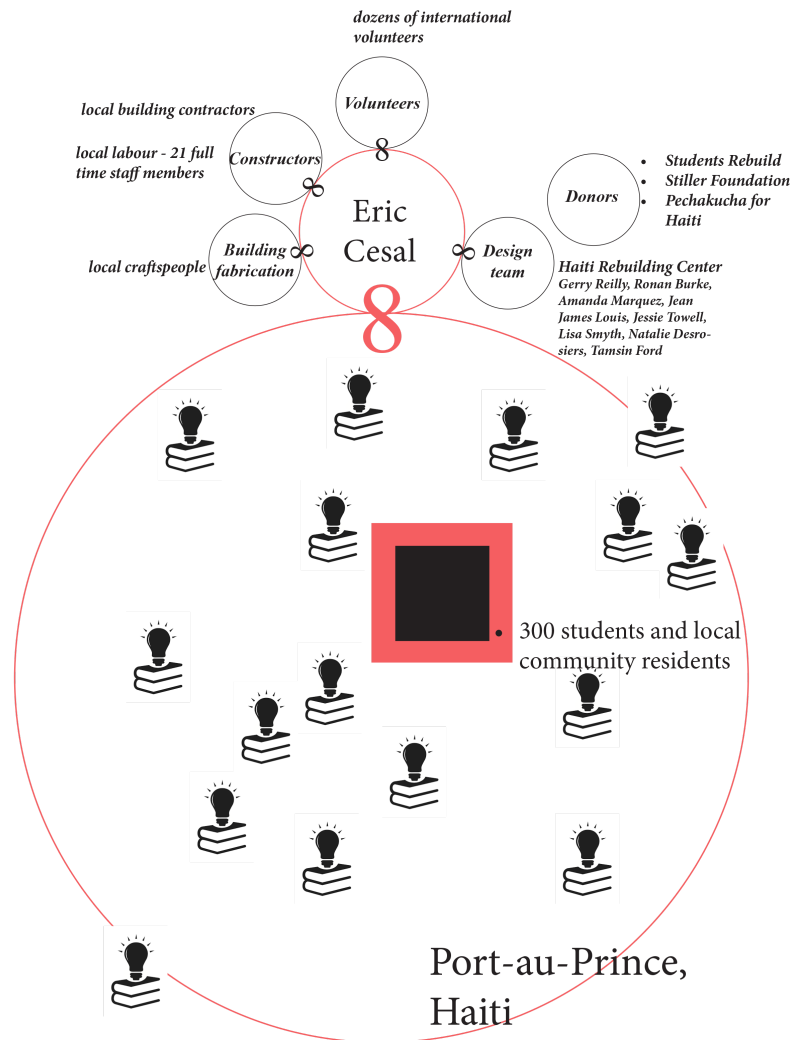


Figure 7. Ecole La Dignite and its context within adaptive resilience framework (Diagram by the author).

4.3. Shizuawa fishermen's workplace and warehouse, Shizugawa, Miyagi, Japan

The last case study is the community infrastructure for Fifteen Motohama fishermen under the Nathaniel Corum - main architect - from the Education Outreach office and a member of a team from Architecture for Humanity (AfH). The fishermen's workplace and warehouse in the Shizugawa, Minami-sariku-cho, Miyagi in Japan is an ongoing project with collaboration with Kyoto University of Art and Design as an academic partner, Daijiro Mizuno and Nathaniel Corum as design workshop facilitators and Pact as a donor. It is a 126m² building followed by the Tohoku earthquake and tsunami with a total cost of \$108,000 with Silhouette Spice's building fabrication assistance based in Japan (Figure 8).

³⁰Take Part WORD, *Rebuilding Haiti so it's better than before*, http://barbaratannenbaum.com/pdf/rebuilding_haiti.pdf, consulted 16 June 2019

The events in the Shizugawa caused huge losses in the region, in which just some materials and few boats survived. Fifteen fishermen lost almost everything and because of that AfH with students and long term residents were collaborating on a new warehouse and workplace locally called ‘*banya*’. Previously independently working fishermen, within the post-disaster project for devastated communities, started a collective aqua-farming business with an aim to re-energize local population.³¹ The asset-based design is a crucial aspect of a resilience among communities for Corum, the leading architect of the Shizugawa project.



Figure 8. Shizuawa fishermen's workplace and warehouse, Shizugawa, Miyagi, Japan.

AfH assembled as many Asian architects with suitable personnel so they could to provide technical rehabilitation support. The general approach of the Japanese rebuilding methods is completely opposite comparing to USA, it has much bigger flexibility so the building are not suppose to withstand the earthquake but rather live with it so it is allowed to break but be easy to repair. Therefore, through creating the workshops, working on the sea with fishermen and talking about their needs and their lifestyle, the community alongside with students were clarifying needs and refining designs. After the commonly discussed consensus, they decided that there is a need for a temporary building (also because of many land ownership problems) to store fishermen’s nets, place for eating and also for selling things filled with build chairs, tables, platformes all from local wood. Accordingly, Corum and his ‘*acupuncture*’ temporary project, wa built out of shipping container³²

Due to his work, with AfH and its broad reach on post-disaster context, he has five offices in San Francisco, Biloxi and Haiti (10 full-time members) with overall 30 workers including design team, consultants, international interns. Because of that, it is not rare that many of volunteers choose the humanitarian path of career and some went on to become part of the AfH team or other similar organisations or offices. The impact was visible too in the previous case study in which Cesal, after volunteering in the Biloxi projects, became highly and successfully involved in post-disaster field.

Corum and AfH’s mean of action is to not only to move to the specific location but also set the shop/workshop on the spot. Together they always work with members of the local communities to research and develop building prototypes and materials to make sure that they are culturally and climatically appropriate. The work in not only based on the local collaboration but it is part of the bigger network which consists of various partners and in many cases as well as students from different design universities. Usually it occurs by design, research, hand-on help and by creating design teams. Corum, with all the engaged parties, does not have a generic method of work, as mentioned before he aims to create an asset-based response through questions and careful consideration of answers from

³¹Esther Charlesworth, Shizugawa fishermen’s workplace and warehouse, *Humanitarian Architecture: 15 stories of architects working after disaster*, p.89-92

³²Thomas Ermacora (Ed.), Lucy Bullivant (Ed.), *Architecture for Humanity, Recoded City: Co-Creating Urban Futures*, p.110-112

locals. Indigenous knowledge and tribal intelligence is gained by close collaboration with communities to understand what can be build on with their skills, local place forms and other latent ideas.³³

The ideal way of describing Corum’s attitude towards post-disaster relief projects is his comment on how to help people to saistein themselves in the world. He explains it as not a ‘charity’ but rather ‘a mutually supportive and productive exchange across cultures - mutual understanding that build things beyond facilities themself’. Moreover, he characterizes his work as an ‘acupuncture’ and further explains: ‘we have gravitated away from housing to community facilities, which affect more people. A building that is very usable by many people shows a way to a more resilient future, not an ephemeral one’.³⁴

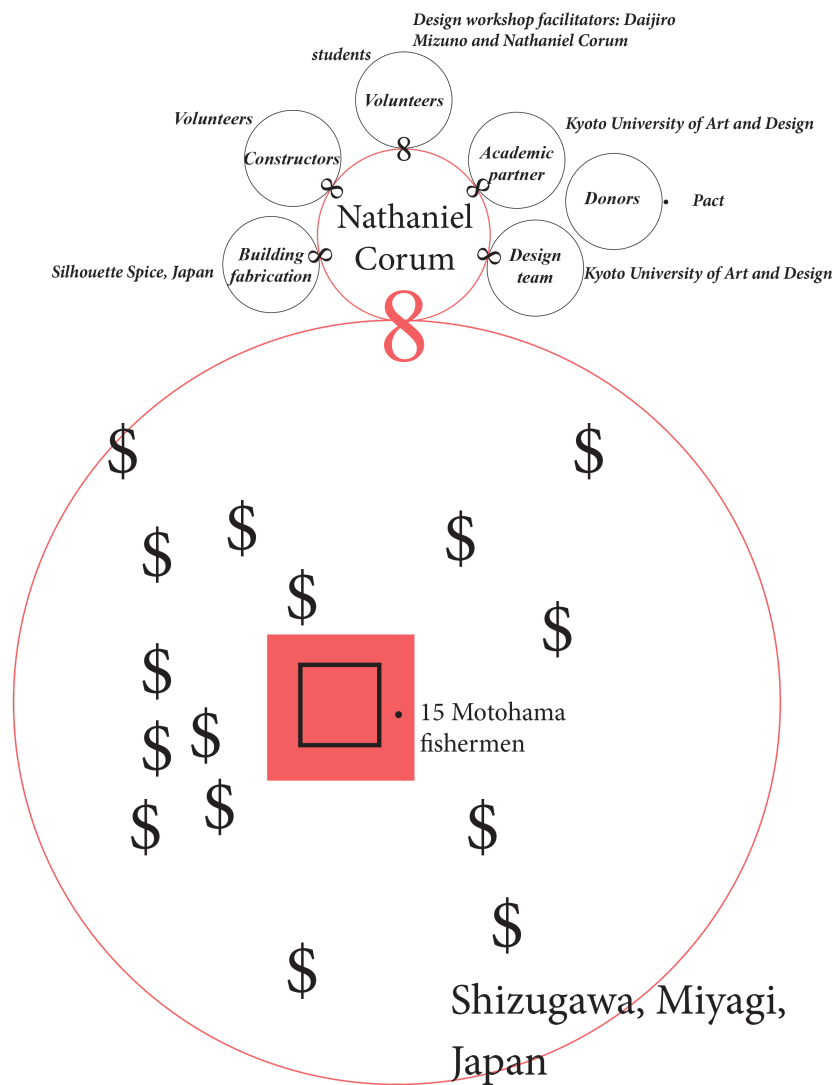


Figure 9. Shizuawa fishermen's workplace and warehouse and its context within adaptive resilience framework (Diagram by the author).

³³Thomas Ermacora (Ed.), Lucy Bullivant (Ed.), Architecture for Humanity, *Recorded City: Co-Creating Urban Futures*, p.108-110

³⁴Thomas Ermacora (Ed.), Lucy Bullivant (Ed.), Architecture for Humanity, *Recorded City: Co-Creating Urban Futures*, p.109

VI. Conclusions

Natural disasters have devastating effects on urban populations, therefore the effective action towards more resilient cities must be local, responsive and specific to local conditions. The system responding to natural disasters is the resilience which aims to reduce the impact of disasters and to strengthen communities by being flexible and adjustable. The most current and relevant system for that is the adaptive resilience which reassess circumstances for the social units, benefits from disaster experiences through learning from them and adjusts strategies to the new situation.

Beneficial adaptive resilience calls for partnerships between the public, private and not-for-profit sectors. Moreover, a key factor of the framework underlines the community, which has knowledge, skills and capacity alongside with its full participation. The ideal model emphasis community engagement rather than top-down approach from the state. At the same time communities cannot remain resilient without well functioning organizations, including the government and private sectors.

With this theoretical framework the researched case studies, which all stand by the above conditions, proved that they are highly effective. Architects, within given contexts, deeply merged to the the environmental, cultural and social fabric of local communities to understand what their actual need is. Projects answer problems through incorporating appropriate cultural and responsive climate solutions. In additions, projects were retrieved from a bigger holistic programmes with simultaneous co-planning and co-designing with locals to create trust and discover building knowledge among the community members, which is a base for the meaningful recovery for the healthy and sustainable community.

All these is based on the three researched case studies that can be a meaningful way of developing the recovery processes in any post-disaster context, including Sint Maarten. As stated in the theoretical and case study part of the research, it can be achieved through the following methods (also used in the given exemplary projects). Firstly, close collaboration with community and local actors including building contractors, craftspeople, local labour, possible international or local volunteers and also possibly external consultants, architects e.t.c. Most actors should be involved in design, research, hand-on help and building phase of the process. It can be accomplished by creating an on spot fixed or temporary structure or building which hosts all actors needed in the previously mentioned necessary phases of the relief project. As proved it can additionally become a potential impulse for a individuals to become professionally engaged in the humanitarian aid which enhances the skills of local and help in the overall humanitarian crisis.

Furthermore, a public-access design center can not only enable people an easy discussion on all their problems about their destroyed neighbourhoods but also as a community center can hosts a range of local groups. Another possible solution of resilient community is the asset-based design in which indigenous knowledge and tribal intelligence is build on with their skills, local place forms and other latent ideas. This processes create a self-reliant communities which do not have to be dependent on the international aid. Community facilities, rather than just simple housing reconstruction, affect more people create more resilient future. That means that the humanitarian crisis is focused on the long term redevelopment of the particular community in a holistic manner rather then quick and immediate solutions.



Figure 10. Comparison between Broussard House, Ecole La Dignite, Shizuwa fishermen's workplace and warehouse and their contexts within adaptive resilience framework (Diagram by the author).

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