

# **“Abidjan: Floods, Displacements, and Corrupt Institutions”**

## **Abstract**

Abidjan is the political capital of Ivory Coast. This five million people city is one of the economic motors of Western Africa, in a country whose democratic strength makes it an example to follow in sub-Saharan Africa. However, when disasters such as floods strike, their most vulnerable areas are observed and consequences such as displacements, economic desperation, and even public health issues occur. In this research, I looked at the problem of flooding in Abidjan by focusing on their institutional response. I analyzed its institutional resilience at three different levels: local, national, and international. A total of 20 questionnaires were completed by 20 different participants. Due to the places where the respondents lived or worked when the floods occurred, I focused on two out of the 10 communes of Abidjan after looking at the city as a whole: Macory (Southern Abidjan) and Cocody (Northern Abidjan). The goal was to talk to the Abidjan population to gather their thoughts from personal experiences and to look at the data published by these institutions. To analyze the information, I used methodology combining a qualitative analysis from the questionnaires and from secondary sources with a quantitative approach used to build a word-map with the platform Voyant, and a series of Arc GIS maps. The findings showed that the international organizations responded the most effectively to help citizens and that there is a general discontent with the current local administration. The conclusions also pointed out that government corruption and lack of infrastructural preparedness are two major problems affecting the overall resilience of Abidjan and Ivory Coast to face this shock.

“I wake up because of the feeling of the water touching my feet. It’s 3 am. I cannot see anything but just feel the cold in my body and hear the rainfall. I get out of bed. Water on my feet, water covering my shoes... water everywhere.” Idris, a citizen of the Western African country of Ivory Coast, narrates his story. He was only 24 and an undergraduate student at the University of Abidjan when the storm and the overwhelming flooding hit Abidjan and its metropolitan area in 2018. Now, he lives in Grand-Bassam, a bordering area of the capital, displaced and with no information about their former neighbors, who also had to move because of the consequences of this shock. He claims that he did not receive any help from either the local, national, or international organizations and that lack of help and assistance from these institutions motivated his decision to move. Idris’ story is one of many and, with this research project, the goal is to share these stories highlighting the significance that institutions have when dealing with flooding.

In this study, I argue that the lack of institutional preparedness and planned response at the local and national level affected Abidjan’s response to the 2018 floods that Ivory Coast suffered. This ineffectiveness caused displacements of people to inland regions, economic suffering of families relying on family businesses, and disruptions to its social networks, affecting the city’s overall social capital. However, the role of international organizations, such as the World Bank, was the most effective at assisting and contributing to a faster recovery in Abidjan, although it was not enough to counteract the lack of preparedness and inefficiency in Abidjan’s recovery process.

Currently, in Abidjan, the effects of floods and other shocks are addressed by three different institutional levels. These approaches range from the local and national governments attempting to mitigate the effect of these shocks in the city's infrastructure, to the programs pursued by international organizations addressing long-term issues and making the city more institutionally resilient. However, there are different ranges of effectiveness between these three levels due to factors such as mismanagement, corruption, or lack of accountability and transparency.

These challenges, induced by floods, highlight the need to control both the social and the economic resilience that this city must have to avoid deeper problems of socioeconomic inequality or more displacements due to the disruption of its overall stability. In contrast to the displacements, Abidjan's population is increasing, and the socioeconomic stability of these families is crucial to avoid situations of hunger or food insecurity. That is why it is relevant to look at its institutions, at the local, national, and international level, and assess whether their actions during disasters such as the 2018 floods have been effective in helping the communities of Abidjan.

**Figure 1:** Ivory Coast location in the African Map (Source: Arc GIS)





## **Research Questions**

Ivory Coast's plans to face flooding were modeled after other countries' approaches to combat this difficult shock to face. These already existing strategies complemented the followed plan by international organizations such as the World Bank and the United Nations Office for Disaster Risk Reduction (UNISDR). However, these acts and procedures raise several questions on how the approach has been pursued, and what the main differences have been when looking at the local, national, and international institutional approach to this challenge. To look at the issue of flooding and the mentioned response, two main research questions will be answered:

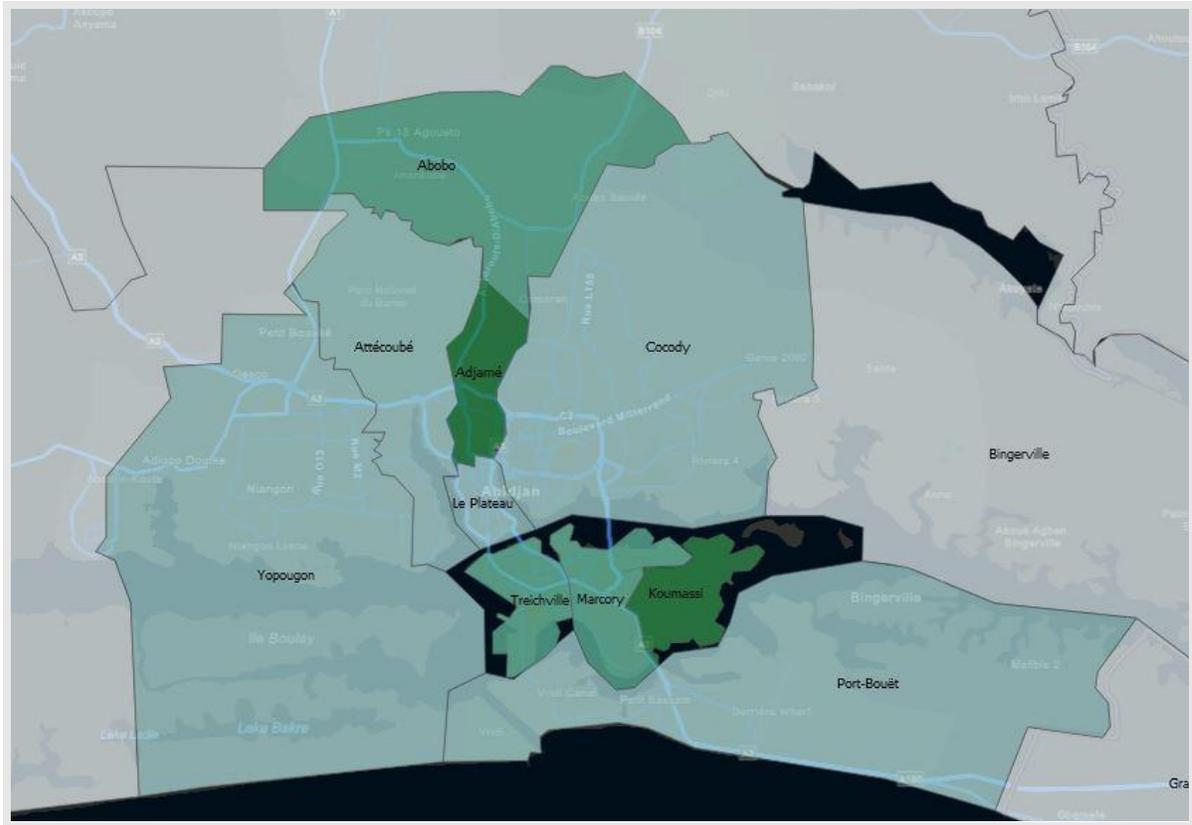
- A. To what extent was the city of Abidjan institutionally prepared in 2018 against the climate shock of floods? What was the institutional resilience of Abidjan when the 2018 floods impacted the city?
- B. Looking at the local government of Abidjan, the national government of Ivory Coast, and the role of international institutions, which one performed better in

the post-disaster? What were the major differences between these three different levels of institutional response?

### **Abidjan's Context**

People, houses, streets, communes (boroughs), and a whole city devastated by the impact of floods. This is the story of one of the ten most vulnerable cities of the world (The World Bank, 2013). Today, Abidjan, the political and economic capital of Ivory Coast, suffers from this climate effect more frequently than before as the weather has become more unpredictable. The last major floods were in 2018, leaving over 20 casualties, causing thousands of displacements, and affecting its overall social capital, particularly in neighborhoods with weak infrastructure and where financial assistance did not arrive until it was too late to avoid the closing of small-businesses and the consequent displacements (Amouin et al., 2020). This phenomenon is also significant as this city (see Figure 3) with almost 4,5 million inhabitants (see Figure 2) – the sixth most populous African capital – faces other environmental challenges such as sea-level rise—that contribute to the destabilization of the city's structure and its socioeconomic stability.

**Figure 2:** Population Density of Abidjan's 10 Communes (the darker the green color the higher the commune population density) (Source: Ivory Coast 2014 National Census/Arc GIS)



The administrative structure of Ivory Coast is composed of 14 districts (2 autonomous districts, Abidjan and Yamoussoukro, and 12 regular districts). It was most recently revised in September 2011 (World Bank, 2013). The administrative district of Abidjan is composed of Northern Abidjan and Southern Abidjan. Each has five boroughs, called “communes” as the official language of Ivory Coast is French, and each is run by a different mayor. “The territory of the Autonomous District of Abidjan is composed by 13 municipalities from which 10 communes constitute the city of Abidjan, namely: Abobo, Adjamé, Attécoubé, Cocody, Koumassi, Marcory, Plateau, Port-Bouët, Treichville, and Yopougon” (Ulrich, 2019) (see Figure A1 in Appendix A).

Furthermore, Abidjan is the most important economic hub of Ivory Coast, as it is in a very prominent position on the Southern Atlantic Coast. It is the main Ivorian urban center, with its

skyscrapers towering above the Ebrie Lagoon (Ulrich, 2019). This capital, although economically prosperous, faces problems such as the disappearance of forest cover, soil impoverishment, water pollution and eutrophication, air pollution, urban degradation, the persistence of environmental diseases, lack of education, corruption, and flooding (Grasham, 2019; The World Bank, 2020).

In this study, I decided to focus on two boroughs. In Northern Abidjan, I mainly focused on the neighborhood of Cocody because most people that I interviewed or who completed the questionnaire live there to be close to the universities. In Southern Abidjan, I focused on Marcory which was one of the most affected areas by the floods due to its geographic location. These are the two only boroughs led by the same political party, the Ivorian Popular Front (FPI), and two of the least populous communes of Abidjan. In the case of Cocody, its most recent census from 2014 stated a population of 351,508 inhabitants (Institut National de Statistique, 2014). For Marcory the 2014 Census states a population of around 286,392 people Institut National de Statistique, 2014). These two have major socioeconomic contrasts as well compared to the rest of the boroughs. While Marcory tends to be a residential area for low-medium income families, “Cocody is among the best-planned and most wealthy boroughs of Abidjan with relatively expensive property and a relatively high standard of living, accommodating the President and most of the government officials” (Dongo, 2015), and hosting most important universities of the city.

### **Shock of Analysis: Floods**

Ivory Coast and its coastal area are “exposed to a variety of natural and potentially damaging events that increases the vulnerability and risk levels along the entire West African coastline” (Tano et al., 2018) (see Figure 3, and Figures A3 and A4 in Appendix A): The area of Abidjan is particularly vulnerable to climate change events, such as sea-level rise and floods, affecting the poorest part of the community which tends to recover at a much lower rate than the overall economy. Extreme weather events have become more frequent and have induced a severe coastline retreat and human life and infrastructure losses. “High tides and heavy precipitation also increase vulnerability in the coastal zone through permanent processes and rapid but temporary phenomena (such as coastal flooding)” (Tano et al., 2018). These floods caused major damage in 2018, leaving over 20 casualties and causing over 10,000 displacements, pointing out problems such as the lack of economic diversification or national planning (see participants’ photos in Appendix B).

**Figure 3:** Most Vulnerable Areas to Climate in Ivory Coast (Source: World Bank/Arc GIS)<sup>1</sup>



<sup>1</sup> Figure 3 shows the areas most vulnerable to climate change, particularly to the effects of extreme rainfall, flooding, and rising sea level in Ivory Coast. The data was already in the Arc GIS universal dataset but came mainly from the World Bank and the GFDDR. The blue-colored part shows that the areas prone to be affected by climate-related issues such as floods or sea-level rise are the ones on the coast of the country.

“A flood happens when water overflows or soaks land that is normally dry. There are few places on Earth where people don’t need to be concerned about flooding” (National Geographic Society, 2012). In Western Africa, floods have become more unpredictable and stronger than in the past because of climate change. Since 1970, “the variability in rainfall and land-use changes mostly affected flow, and recent flooding has been said to be an increasingly common occurrence throughout the whole of West Africa” (Nka et al., 2015). This phenomenon already causes devastating effects in developed countries, as one can see for instance with the Gota Fria phenomenon that Spain and other Mediterranean countries tend to suffer every year (Desmet, 2020). However, these shocks that have mostly infrastructural effects in states of the Global North cause devastating effects in the economy and society of developing countries such as Ivory Coast, and this is worsened because of the lack of preparedness and an organized institutional response.

For instance, in 2018, there were major floods that caused significant damage to the small economies of families in the capital and across Ivory Coast and caused major displacements and movements of people that now see their homes, businesses, and even friends completely lost (Oura, 2012). “Following the dramatic floods in Abidjan on 18-19 June 2018, which led to at least 18 casualties and caused significant damage to infrastructure and around 1140 residential buildings, the Government of Ivory Coast requested support to address these recurrent natural hazards and support for the preparation of a Post Disaster Needs Assessment (PDNA) and Recovery Framework” (GFDRR, 2020). The role of the institutions at the various levels in the country and the city during this disaster was key for fast and quick recovery. Nevertheless, when looking at numbers related to displacements as well as how the Abidjan economy sustained

itself during and after the shock, one cannot avoid asking to what extent the role of these institutions, particularly at the local and national level, was transparent and effective.

Currently, the most important initiative regarding any kind of threat or possible disaster is the Abidjan Urban Resilience project which “provides physical investments aiming at reducing flood risk and improving access to resilient infrastructures, such as drainage systems and waste management” (GFDRR, 2020). This plan was developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) together with the Ministry of Safety, Environment, and Sustainable Development; the Ministry of Construction, Housing and Urbanism; the Ministry of Infrastructure; and with UN Agencies, in particular UNDP, emphasizing the country ownership component of these initiatives (Green Climate Fund, 2020). This is important considering that Abidjan is vulnerable to coastal flooding due to its poor drainage system. Abidjan “is exposed to heavy precipitation during the rainy season, an increasing number of settlements is located along flood-prone banks, and the population of Abidjan has more than doubled since 2001 whereas urban planning has not kept pace with this rapid urbanization” (GFDRR, 2020).

On these problems, one of the already existing strategies in another country to counteract the effects of floods is in the Environmental Protection Agency (EPA) in the US. Since Katrina, they prepared a strategy based on three main pillars that were followed by the national government of Ivory Coast in 2018. To prepare for floods, communities, companies, or water and wastewater facilities in the US created a Flood Resilience Guide, which targeted “small and medium drinking water and wastewater utilities; General activities to help facilities plan for emergencies and natural disasters. A variety of tools and guidance for drinking water and wastewater utilities to prepare and respond” (EPA, 2020). These guidelines are copied in

Abidjan, but the institutional responses varied depending on their governmental level and the different boroughs and were constrained due to factors such as economic mismanagement, corruption, and poor planning (Salmeron, 2021, participant in the questionnaire process, and short-term consultant for the World Bank).

### **Resilience Outcome of Interest**

There are many risks that this city faces, and these are worsened by climate change, as they produce major changes in the boroughs of Abidjan such as displacements or the disruption of their social ties. These dimensions of social, economic, and infrastructural resilience depend on the power of the district government, led by the FPI (same political party leading Cocody and Marcory) and Governor Robert Beugré Mambé, and that is why Abidjan's institutional resilience and its city governance, particularly looking at the local, national, and international level of analysis within the institutions, are important when assessing the city's overall resilience to face shocks. Therefore, Abidjan's civil society, together with 2 World Bank workers, was interviewed for this project to assess this city's social and institutional resilience and their perceptions on how the different institutions respond to flooding.

**Figure 4:** Measuring City Resilience (Source: Jha and Brecht, 2011)



The resilience outcome is defined as the actual results observed in the event of a disaster, or modeled losses based on probabilities (UNDP, 2020), or how has or will this city respond to the vulnerabilities that affect them during a shock. Abidjan, to prevent the damage to institutions, infrastructure, social capital, the economy, and even displacements, has addressed the issue of floods by reinforcing their infrastructure and their social resilience with funds coming from international organizations such as the World Bank or the African Development Bank. They have mainly focused on reinforcing physical barriers to mitigate and adapt to the rising sea level, as well as new drainage systems (The World Bank, 2020), but have not pursued any sort of administrative or institutional reform to improve its governance and to have a more effective and transparent response when assisting the victims of flooding.

**Research Design/Methodology**

---

<sup>2</sup> Figure 4 shows the four components of a resilient city: economy, society, governance, and environment. For this analysis, I am focusing on the pillar of governance as well as partially on the one of society.

For the process of data collection of this study, I first contacted several institutions to gather their views on flooding and its effects on the population of Abidjan, especially the institutional response to start the recovery process and to help mitigate the socioeconomic effects of the disaster. I proceeded to contact the Ivory Coast Embassy in the US, the Spanish Embassy in Abidjan, and the US Embassy in Abidjan. However, due to the lack of participation or response from these institutions, I decided to take an alternative route to gather firsthand information. Then, I sent several friend requests on Facebook to some university groups of institutions in Abidjan, such as the University of Cocody, British University-UCL Abidjan, the International Center for Distance Learning (CIFAD, its acronym in French), International University of Grand-Bassam, and the University of Abidjan. The response was positive, and around 25 students and professors reached out, with 20 (including 2 World Bank workers) completing the questionnaire or having an informal interview with me about those questions (questionnaire attached in Appendix C).

From the success of the collected responses, I realized that the approach of using Facebook groups was effective, so I decided to request to join a couple of English-speaking groups, as most of the responses that I got had been in French, which I had to translate to English. I then collected both qualitative and quantitative data from these interviews and analyzed secondary sources from the institutions and the scholarship on floods and institutional resilience at the local, national, and international levels. Most quantitative information from the interviews was not used in the end (ranging 0-5 questions), but the tools of text analysis and word cloud were the quantifiable method for this study looking at the text and transcript responses given by the participants.

After analyzing the collected data, above 2/3 of the responses pointed out corruption and economic mismanagement, particularly at the local and national level, as one of the main factors influencing institutional resilience. However, due to the lack of information or indicators in terms of corruption measures in Ivory Coast, I decided to just focus on the institutional responses to flooding and how effective their projects and approaches have been in the overall district of Abidjan, as well as concerning the populations of Marcory (Southern Abidjan) and Cocody (Northern Abidjan), as they were the ones that had the most information in the secondary sources and where most participants of this research lived when the shock occurred.

For this final study, I included 20 mixed interviews (conversation with the participants plus completing the questionnaires) in which I ask about the different responses to flooding by the local, the national, and the international institutions. The goal was to pursue an interdisciplinary model that looks at the institutional response and the possible areas where improvement is needed. Out of the total of 20 interviews/questionnaires that were conducted, both quantitative and qualitative data were obtained. These interviews were done with 15 Abidjan citizens, 3 citizens of neighborhoods close to the capital (2 of them being displaced because of the effects of the floods); and 2 to a World Bank program director in Western Africa, Poverty Economist Franck M. Adoho, and a short-term World Bank Consultant, Daylan Salmeron, also focused on Africa (see Table 1). With this approach, I was able to gather outside information about the local and national institutional response, and both outside and inside information on the international organization response from a World Bank perspective.

<b>Table 1: Participants of the Study</b>
---

<b>Average Age</b>	45 years old
<b>Gender</b>	<ul style="list-style-type: none"> <li>● 10 Male</li> <li>● 10 Female</li> </ul>
<b>Positions of Power</b>	<ul style="list-style-type: none"> <li>● 12 University Students</li> <li>● 6 University Professors</li> <li>● 1 World Bank Director</li> <li>● 1 World Bank Short-Consultant</li> </ul>
<b>Neighborhoods where they live</b>	<ul style="list-style-type: none"> <li>● 10 in Cocody</li> <li>● 8 in Marcory</li> <li>● 1 in Yougouon</li> <li>● 1 in Grand-Bassam</li> </ul>

The qualitative analysis of this study is based on the questionnaire. It contains 17 questions that gather the experiences and testimonies of different people in Northern and Southern Abidjan. As mentioned, most respondents were part of the communes (boroughs) of Cocody and Marcory. As my first tool, I used Voyant to make a word cloud with the major issues mentioned in my interviews. I also looked at the climate impact of floods and the vulnerability level of this city looking at past events, their response, and the projects done by international organizations in collaboration with the ministries most prepared for this problem. Then, to measure the resilience of Abidjan considering their current response towards floods, I looked at flood indicators as well, which helped me to create an Arc GIS map of Abidjan Resilience to

Flood Vulnerability per borough, divided into the different neighborhoods of the Ivory Coast capital. I combined the results found on those with the information obtained from the literature and my interviews. Lastly, I used the Flood Resilience Index (FRI) to conclude with an analysis of the overall qualitative resilience of Abidjan based on existing qualitative indicators.

## **Qualitative Analysis: Institutional Resilience**

### *Local Response*

One of the areas that one must consider when looking at the effects that the 2018 floods are the institutional response from the local authorities, the City Hall, and the District of Abidjan. To contextualize this situation, since 2001, the Ivory Coast capital was divided into ten communes, each of them with its mayor and City Council (Government Mandate, 2001). Later, in 2011, Abidjan was established as an autonomous borough within Ivory Coast, with the rural sub-prefectures in Anyama, Bingerville, Brofodoumé, and Songon (Government Mandate, 2011, see Figure A1 in Appendix A). That same year, the post of Mayor of Abidjan was replaced by that of District Governor, currently, Robert Beugré Mambé, appointed by the head of state (Alassane Ouattara of the Rally of the Republicans, RDR), and who overlooks the entire administrative district of Abidjan, its ten communes, and the already mentioned rural sub-prefectures. This administrative division is complex, but due to the responses by the participants and the places where they lived in 2018, this study mainly refers to the communes of Cocody and Marcory.

On this note, when looking at the qualitative data obtained by the participants talking about the local level institutions, one of the most interesting concerns that were raised when asking the question, 'What are the main problems that Abidjan faces?' the responses of corruption,

climate, disorder, and poverty were the most frequent answers (see Figure 5, Voyant Word Cloud). The concerns were raised that Abidjan flooding is caused by the lack of infrastructure and how this is provoked due to mismanagement by the institutions, mainly referring to both Majors of Cocody and Marcory, as well as to the district government. Another of the participants that partook in the interviews pointed out that Abidjan is not “prepared enough. They find solutions that are not long-term so it’s useless. The money of the government could be used for finding solutions, helping others but instead is used for authorities’ personal use.” The issue of financial mismanagement and the unequal distribution of aid among the boroughs seemed to have marked the people’s opinion of the local authorities, but that is not the only raised concern about the local response.

Corruption and lack of preparation and materials seem to be the most recurrent explanations or answers to the lack of institutional resilience towards the 2018 floods. About the local government, another of the participants, a student at the University of Cocody, pointed out that the local authorities “just donate a few victims under the cameras, but the great part received nothing. Some volunteers came to help the victims. In Abidjan we have Madame Yasmina Ouégnin (the major of Cocody),” but her leadership has not been effective. However, he points out that the government of Abidjan is “wealthy,” but this does not mean that its funds are properly distributed among the population. One of his main complaints was that the local government has not helped them either: “Abidjan’s economy is based on export products within the country or in border countries, so the market is doing well.” He continued saying that he manages a “real estate house, most of my clients come from Abidjan. But a lot of small businesses have been affected by the floods.” These small business owners are, according

to the secondary sources, the ones that ended up migrating and being displaced from their homes to other communes and cities.

On this note, a history professor at a local University who lives in the commune of Marcory said that “Abidjan is the capital of corruption in Africa.” Foreign governments donate and “the government takes a large part and sends a part to the city mayors who take their part as well before the donation reaches the disaster victims.” When he was asked to rate the role of city government’s role in trying to help with the effects of this action, he said that this was minimal and deserved a “very low grade because of a very bad performance.” This correlated with what it was said as well about the government/major of Cocody and they are run by the same political party of the center-left FPI (the Ivorian Popular Front). He said that his perception was that both institutional levels were aware that the core issues were not being addressed, and that is why this was quite problematic for the overall preparedness and resilience of the city and the country.

### *National Response*

In the area of the national institutional response to the flood problem, the role of the central government of Ivory Coast was also highly criticized by the participants in this study. For context, the politics of the Ivory Coast system relies on a framework of a presidential representative democratic republic, whereby the President of Ivory Coast is both head of state and head of government, and of a multi-party system (BBC, 2020). The executive power is exercised by the President and the Government, and the legislative power is vested in both the government and parliament. Before November 2016 and the future creation of the Senate, the

Parliament of Ivory Coast was only composed of the National Assembly. The National Assembly has 255 members, elected for a five-year term in single-seat constituencies. It passes on legislation typically introduced by the president although it also can introduce legislation (BBC, 2020).

When asking participants about the national government response, the overall responses were more positive than those of the responses about the local authorities. For example, one university student said that the national executive “helped everyone, but just a little bit.” When asking him about the possible financial assistance that they could access, he emphasized that there were no funds that one could apply for. He concluded that he had “several acquaintances who are victims, they are all lost and have not received financial help.” Most of these acquaintances, he pointed out, had to move as they close their small businesses and they closed down services around them, but he also pointed out that new members have arrived at Marcory even though there was a significant decrease in the population of this commune after the floods due to the socioeconomic impacts that they suffered. Likewise, again it was pointed out that the mismanagement and the corruption could come more from the local level: “The government (of Ivory Coast) donated to the town hall, but the mayors pocketed most of the donations. Lots of (international) organizations helped so many people, the Catholic church too.”

Likewise, when asking the participants ‘Do you think the government could have done better during the floods? If so in what areas?’ another participant said that there is room for improvement in the future: “So much better! Plan ahead! It’s not that hard, as a Third World country it’s hard to think about situations like this but in places that are geographically lower

inclined or in lower lands that are easily flooded are the most affected also the poor areas without any cement or proper foundation or easily underwater.” Then, when asking the question ‘could you rate the national government’s role in trying to help with the effects of this impact?’, she was saying how these national organizations “do as best as they can, but they still fail sometimes.” There is room for improvement, and perhaps a better monitoring and management system could be one of the approaches to ensure the liability of the local and the national government, but to that more community approaches need to be pursued asking for more sources from the national government to be able to help the human capital as, if one only relies on the economic well-being of the overall market (Horwich, 2000), the recovery process will be harder to accomplish as it addresses short-term economic solutions but not long-term socioeconomic problems (Du Pont et al., 2015).

Lastly, another problem that was brought when asking the citizens of Abidjan what other social or economic problems they would say that Abidjan suffers from, the response was unemployment, showing that these shocks mostly manifest in the economy of Ivory Coast. However, some optimists were found, in this case to the question of ‘Do you think the government could have done better during the floods? If so in what areas?’ One participant, a university professor of international economics at the University of Abidjan praised the government. He claimed that it also must be said that “the government is always doing its best to protect its population from these floods. Even still exists this problem. But it educates these populations to reduce the risk in the most affected areas.” Better education and training to know how to react to floods is the last point that was asked by the population of Abidjan to the national government. This is already an approach taken in studies about disaster-prone places

such as Japan and its disaster management system that they have exported abroad, as this training indeed does take place to an extent by the international organizations and institutions, which we will talk about in the next section.

### *International Response*

The international response to this type of disaster preparedness, response, and recovery is key when looking at the possible economic resources that can be provided to developing countries to help deal with floods and other shocks. In this aspect, the role of the UNDP or the World Bank has been crucial in countries like Ivory Coast, as they not only provide funds that can be used to build stronger and more efficient institutions, but they also finance and support training projects that attempt to adapt, mitigate, and transform to construct a more resilient country overall. For example, developed countries provide financing to developing ones so that they can reach certain climate mitigation and adaptation goals. States typically contribute directly to other states or through multilateral efforts like the United Nations Framework Convention on Climate Change (UNFCCC) framework or agencies such as the United Nations Development Program (UNDP) or United Nations Environment Programme (UNEP) (UN, 2020).

One can also highlight the work of the Green Climate Fund, another program within the UN umbrella that invests across four sectors: environment-building; energy and industry; human security, livelihoods, and wellbeing; and land-use, forests, and ecosystems. In terms of floods, for example, the fund's efforts in Laos promoted an alternative flood control solution, moving away from a traditional focus on grey infrastructures—such as dams and concrete drainage systems—and toward protecting wetlands, forests, and agroecological systems (Green Climate

Fund, 2020). Through this ecosystem-based effort, the initiative hopes to build climate resilience to better manage to fight against floods. Looking at these kinds of projects funded by development institutions and by climate finance mechanisms, one can look first at the information provided by secondary sources of the World Bank and other international organizations.

There are several current examples of these approaches such as: “Abidjan Urban Resilience” project; National Environment Action Plan (PNAE-CI); EU-ACP Region Disaster Reduction Partnership Trust Fund; Cote d’Ivoire - Urban Resilience and Solid Waste Management Project (The World Bank, 2020). Likewise, the World Bank approved \$US 300 million to boost urban mass transit in Abidjan. The World Bank Board of Executive Directors approved a \$US 300 million credit to Côte d’Ivoire for an Urban Mobility Project in Abidjan. “This project will transform urban mobility in Abidjan. Our funding aims to enable a large majority of the population of Abidjan to access, quickly and at low cost, employment opportunities and social services in neighborhoods with high concentrations of economic activities,” said Pierre Laporte, World Bank Director in Ivory Coast (GFDRR in The World Bank, 2020). The development objectives of the project are to reduce vulnerability to flooding in selected urban areas and improve solid waste management in targeted municipalities (The World Bank, 2020). However, according to the questionnaires, the citizens of Abidjan were not as familiar with this role taken by international organizations, as they do not promote these projects as much on the media or in other platforms as the local and national governments do.

The main criticism that came from the participants against international institutions is how the funds are distributed, as they feel that when these institutions provide these funds to help

communities to recover, especially small business owners, the money gets lost by corruption and economic mismanagement coming from the local and the national institutions. “A number of factors may affect survivors’ access to disaster aid, including demographic, socioeconomic, and damage conditions along with levels of social capital” (Alexander, 2006). In the case of Abidjan, participants responded that to avoid institutional corruption and to directly help the small business owners “direct donations are the solution.” A current student at CIFAD firmly states, arguing that the national institutions do not know where these funds should be placed as they do not understand the working and the social dynamics of the neighborhoods, something that already happened when the international organizations responded to other shocks such as the 2004 Indian Ocean Tsunami when not considering the internal social and cultural structures (Alexander, 2006). Many of the people interviewed for this study focused on the issue that most of the people forced to leave did so because they never received any help and, while the local and national economy was getting better, the standard of living of these parts of the population was worsening.

### **Quantitative Analysis: Voyant and Arc GIS**

For the quantitative analysis of this study two main tools are used. The first one is the word count and word mapping platform Voyant, to construct a word cloud with the answers to the question “what is the major challenge that Abidjan faces today?” (see Figure 5). Moreover, a series of maps were also created using Arc GIS to illustrate the climate vulnerability of Ivory Coast and the capital of Abidjan, particularly focusing on the communes of Macory and Cocody. Then, other maps were produced focusing on the socioeconomic distribution of the population of Abidjan based on available data of services and businesses such as supermarkets,

restaurants, or banks. All these datasets were directly obtained from the Esri datasets as well as from financial information coming from the World Bank.

*Voyant Word Cloud: What are the major problems of Abidjan?*

**Figure 5:** Voyant Word Cloud



When answering this question there was a wide diversity of topics that aligned with the ones found in the qualitative analysis of the secondary sources. Out of the 20 participants that partook in this research project and considering that there were two questions on the questionnaire that referred to this aspect, a total number of 40 words was collected helping to create Figure 5 (the Voyant Word Cloud). The results showed that even though this study was meant to study the 2018 Abidjan floods, for the population of this Western African city the floods are not the main problem, but the institutional issues that make the response slower and

less effective. The corruption and government mismanagement of the situation are the main worries expressed by the participants of this study. In Cocody and Marcory, the boroughs where the participants are from, the main challenge according to their testimonies was corruption. Both communes have their city councils under the same political party, but they also have a central-local government that was the authority in charge of distributing aid provided by the central state after the 2018 floods.

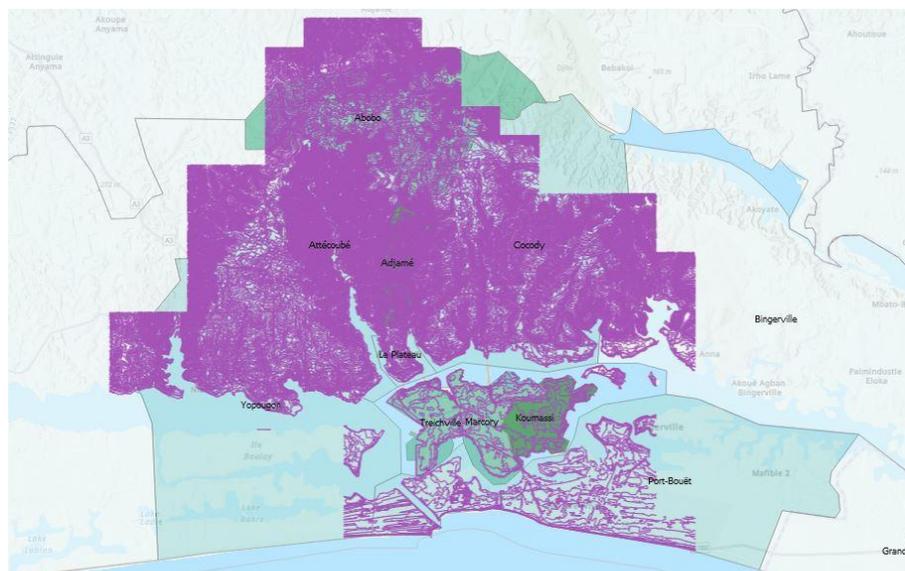
Furthermore, apart from corruption, the population from these two neighborhoods also points out five different variations of effects caused by climate. The mentioned in their answers 'floods,' which was the second most mentioned after 'corruption,' 'climate change,' 'sea-level rise,' 'pollution,' and 'irrigation.' All these climate-related issues have one thing in common, water. That is not surprising considering that Abidjan is a coastal city whose elevation is quite close to sea level, as we can see in the maps produced for the project. Other points that were brought up were 'migrations' and 'displacements.' These two can also be related to the effects that floods and other disasters have had on the population. In some of the transcripts from the interviews, one could see how many people had to move outside the capital due to the socioeconomic burden caused by these catastrophes, especially those from the vulnerable communities of small business owners that lost most of their property in the floods.

### *Arc GIS Maps*

When assessing the vulnerability of these two communes and Abidjan when facing floods, one aspect that was considered as the overall average altitude of the city. On the next page (Figure 7), one can see that the purple areas are those whose level is above the sea, leaving

some areas of Marcory below sea level, making them more vulnerable to flooding and requiring not only a better institutional response but also infrastructural preparedness on the ground (UNISDIR, 2011). Cocody, although it was vastly affected by the floods as well, is on average 100 feet above sea level, making it less vulnerable geographically speaking. The participants translated this displacement by explaining that most citizens that had to leave Abidjan after 2018 were coming from Southern Abidjan. This could be explained by geography; however, one also needs to consider the financial aspects and the services that are provided in each of the communes. For that, refer to Figures 7 and 8.

**Figure 6:** Average Altitude of Abidjan (The areas in purple are communes that lie at the sea-level or even a few feet under being exposed to sea-level rise and flooding) (Source: Arc GIS) (See also Figure A5 in Appendix A)



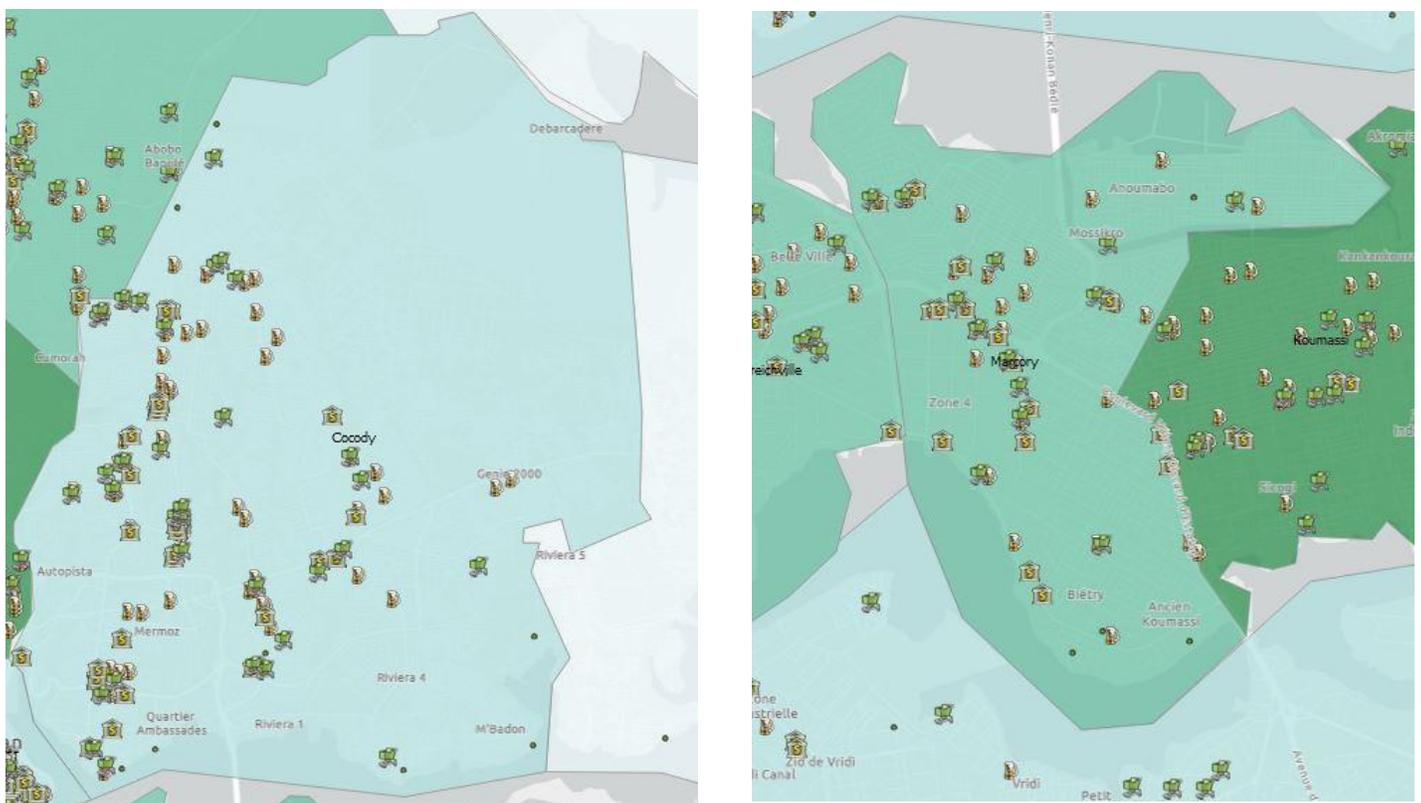
In the following figures, one can see the presence of small businesses (for example, supermarkets) and financial institutions (banking institutions) in the boroughs of Marcory (in

Southern Abidjan, Figure 7) and Cocody (in Northern Abidjan, Figure 8). It was difficult when just observing the data, to find the significance of these institutions and their effect on building social ties with the locals from these communes. However, the presence of these institutions and the possibility that money was saved in the bank and not in the households that kept them in them could play a role. “Pledges to ensure that each individual has a bank account might be the first step toward an inclusive financial services sector. Promoting bank account outreach—even if it didn’t help the poor to borrow, would surely enhance their access to a safe place to save and a simpler and cheaper way to move money around” (Collins, 2009). The presence of financial institutions where the citizens could keep their money ends up being crucial, as the floods did not destroy the physical capital and, also, showed that there was a structured financial system prepared to help with the reconstruction of this potential shock.

The recurrent presence of these financial institutions in these two boroughs supports that they were the least disrupted, as they did not lose their funds to rebuild their houses. “I took a loan from a bank here, in Cocody, to rebuild our home,” says one of the participants then a professor at the University of Cocody. The presence of these could explain the quick recovery of the larger economy of the commune and how their social ties might not see themselves as affected. In Appendix B, one can see that most areas of Southern Abidjan suffered more infrastructural damage than Northern Abidjan. Nevertheless, the overall economy did well and recovered fast due to the presence of businesses that received help from governmental authorities. This did not help certain parts of the population, causing displacements and losing up to 15% of their population to other cities due to floods as they were not adequately addressed by local and national institutions (Comoe et al., 2017; Adomon et al., 2018).

However, these displacements could have been mitigated because of the presence of the appropriate banking institutions to sustain their livelihoods (Scoones, 2009), and to provide financial means to the Abidjan local population in other poorer communes.

**Figures 7 & 8:** Comparison of the Tertiary Service Places/Institutions (small-businesses, banking institutions, supermarkets, and stores represented with symbols of banks, shopping carts, and the dollar symbol in green and yellow) in the communes of Cocody (left) and Marcory (right)<sup>3</sup>



In sum, when looking at these two communes, the economic recovery process directly correlates with social capital recovery. When looking at other shocks such as the Kobe

<sup>3</sup> In future research studies on resilience in Abidjan, it could be interesting to look deeper into this data and analyze how the presence of banking and financial institutions in these two communes of the city affected the overall recovery. For that, one could look at concepts such as the social capital, the population change before and after the shock, or even at how the dynamics between the neighbors were different in comparison to other communes of the city.

earthquake of 1995 and at different wards (neighborhoods), those with “higher levels of social capital— measured in the time-series cross-sectional data as the number of new neighborhood-level NPOs created per capita— proved more successful at rebuilding population levels” (Aldrich, 2012). As earlier mentioned, the boroughs of Cocody and Marcory are the wealthiest of Abidjan. That, together with these two communes being the place where most of the financial institutions were placed, helped with the economic preparedness and the overall post-recovery, therefore why the social capital here relies more on the economy than on the social ties of their neighbors, but at the same time more stable and less affected than in other communes. Therefore, since most people that lived in these two boroughs stayed, the overall social capital of the two communes remained in the area. “I still live with most of the neighbors that I had before 2018,” says Idris when talking about his experience at the University of Abidjan and how most of his classmates returned to the university and the apartments surrounding it once the streets were cleared out and classes resumed.

### **Resilience Measures/Indicators**

To assess the overall resilience to floods of this city, one can also look at the existing Flood Resilience Index (FRI) and apply its principles to measure the overall resilience in Abidjan. This measure evaluates urban resilience by analyzing certain flood characteristics. It was created as “the number of people affected by flooding processes increases up to the point where the organizational structure of urban communities threatens to experience the significant direct and indirect damages” (Gouberville & Batica, 2014). In the case of Abidjan, the index points out that the main area to be improved is the infrastructure to combat the effects of this shock and to provide economic assistance after the disaster. However, there is a lack of information when

looking at what the different institutional responses are. The index assesses five main indicators that can evaluate the flood resilience of a city, region, or country (see Figure A4 in Appendix A):

- Relief: The use of existing structures and urban functions for the collection of flood water is dominant. Measures implemented before a flood.
- Resist: Prevention of flood risk if possible, threshold capacity; measures implemented before a flood.
- Response: Actions that focus on crisis management. Flood impact is reduced by the implementation of physical, technical, non-structural, and procedural measures relates to the concept of “living with floods.”
- Recovery: Providing support to recovery processes and engaging and building capacity in communities enable to cope with the impacts after flooding events.
- Reflect: Actions focus on increasing awareness and adaptive capacity, learning from a past event, and/or preparation for an uncertain future. Enhancing the awareness and engagement of flood risk and the means of managing it at the policy level (politicians/decision-makers), professionals, and at the public participation (people, companies, insurance companies).

In terms of these five indicators, one can say that ‘relief’ and ‘resist’ are based on the existing infrastructure, which now Abidjan is lacking, and it should be made a priority for development. ‘Response’ and ‘recover’ focus more on the topic of this study of institutional resilience and, according to the testimonies collected by the participants, the qualitative, and the quantitative analysis, do require improvement at the local and national institutional level. Lastly, for ‘reflect,’ the awareness is not there yet at the considered levels, but with studies such

as this one, awareness is raised and, by investing in information, monitoring, and training, much of the casualties, displacement, and socioeconomic despair can be mitigated. For that, however, stronger institutions are needed, and future studies could dive deeper with this index using different methods to assess how the city can become more resilient.

## **Conclusions**

Overall, one can say that Abidjan is a city under current urbanization, economic growth, and development. However, it is not an institutionally resilient city when facing floods, especially at the local and national levels. Abidjan's institutional resilience can improve, particularly in disaster preparedness, aid distribution, and political/governmental accountability. Several factors have been pointed out by the participants interviewed for this project but, among some of the most recurrent ones of proper infrastructure and funds, corruption seems to be the major challenge. Corruption, at the national and local level, has made the population of Abidjan, especially small business owners and members of the poorest administrative communes, move to other areas of the country and even abroad. These disruptions cause a decrease in the local population, which disrupts the overall social capital of the 10 communes of this Western African capital had in place.

The main vulnerabilities found were poverty, corruption, and climate change, but the focus of the study was on how the institutions tackled flooding. On a brighter note, there are international organizations that provide aid and funds but, the problem is that they do so indirectly through local and national governmental authorities. These international organizations could serve as a monitoring system to make other authorities accountable for the

managing of the post-disaster economic recovery. For now, their main problem is that these international organizations cannot hold the local and national government accountable for their actions and, likewise, their work is not well known by the average Abidjan citizen. The response and flood resilience of the communes of Marcory and Cocody is better than the overall response of the city of Abidjan and that is since they have the presence of economic institutions, their overall social capital is less disrupted and, even though corruption may occur, funds made it their way helping reconstruct their communes.

### **Looking Forward**

Improving Abidjan's institutional resilience is crucial to successfully counteract the negative effects that flooding has on this coastal city. The current institutional corruption and economic mismanagement translate into casualties, displacements, and the disruption of this city's social capital. A better institutional response could save lives and would avoid tragic stories such as Idris'. For that, accountable institutional monitoring systems must be set in place to avoid major institutional flaws that impede the overall response and recovery of the citizens of Abidjan.

One of the major problems that Ivory Coast suffers are its numerous internal displacements (see Figure 9). These were aggravated in 2018 due to the lack of economic assistance and the poor distribution of funds by the local government when the floods occurred. For future studies, it is worth exploring these displacements and how they not only affected the different boroughs' economy, society, and demographics, but also the places where the displaced people live. Today, Ivory Coast has over 300,000 internally displaced people but is unclear how many of

those were produced by flooding and what have been the effects on their social capital and resilience.

**Figure 9: Ivory Coast Displacements (Source: International Migration Organization)**



## Works Cited

- Adomon, A. A., Beba, E. A. É. K., & Gogbé, T. (2018). Communities Decentralized in Front of Urban Disorders in Abidjan. The Case of Riviera-Bonoumin in the Municipality of Cocody (Côte d'Ivoire). *Current Urban Studies*, 6(01), 121-137.
- African Development Bank Group (2020). « Côte d'Ivoire. »
- Aldrich, Daniel P. (2012). *Building Resilience: Social Capital in Post-Disaster Recovery*. Chicago: University of Chicago Press
- Alexander, R. (2006). *Tsunami - Build Back Better: Mantra Aside, An Aid Gone Wrong Story?* (Bangalore: Development Consultancy Group)

<http://reliefweb.int/sites/reliefweb.int/files/resources/E2364F40FE0020E0C12571BD00>

3

African Development Bank Group (2020). « Côte d'Ivoire. »

<https://www.afdb.org/en/countries/west-africa/cote-divoire>

Amouin, J., Kouadio, K. Y., Kacou, M., Djakouré, S., & Ta, S. (2020). Diagnosis of the Causes of the Rain Flooding in June in the West Africa Coastal Area. *Atmospheric and Climate Sciences*, 11(1), 11-31.

BBC. (2020). Ivory Coast country profile. *BBC News/Ivory Coast*.

<https://www.bbc.com/news/world-africa-13287216>.

Collins et al. (2009). *Portfolios of the Poor: How the World's Poor Live on \$2 a Day*. Chapter 1 "Portfolios of the Poor" (pages 1-27).

Comoe, B. R., & Ozer, P. (2017). Risk management in Ivory Coast: case study of population evictions in Port-Bouët, Abidjan.

Danumah, J. H., Odai, S. N., Saley, B. M., Szarzynski, J., Thiel, M., Kwaku, A., & Akpa, L.Y. (2016). Flood risk assessment and mapping in Abidjan district using multi-criteria analysis (AHP) model and geoinformation techniques, (Cote d'Ivoire). *Geoenvironmental Disasters*, 3(1), 1-13.

Desmet, K. (2020). Escaping the Rising Tide by Moving.

Dongo, K., Kablan, A. K. M., & Kouamé, F. K. (2018). Mapping urban residents' vulnerability to heat in Abidjan, Côte d'Ivoire. *Climate and Development*, 10(7), 600-613.

DuPont, Noy, Okuyama, and Yasuyuki. (2015). The Long-Run Socio-Economic Consequences of a Large Disaster: The 1995 earthquake in Kobe

<http://www.rieti.go.jp/jp/publications/dp/15e035.pdf>

Environmental Protection Agency. (2020, October 27). Flooding. EPA.

<https://www.epa.gov/natural-disasters/flooding>.

Figueiredo, L., T. Honiden and A. Schumann (2018). "Indicators for Resilient Cities", *OECD Regional Development Working Papers*, <https://doi.org/10.1787/6f1f6065-en>.

Floods hit Abidjan, Ivory Coast. (2018). *National Catholic Reporter*, 54(20), 4-4.

GFDRR. (2020). "Abidjan - PDNA, recovery framework and technical studies for Urban resilience to flood risk." *GFDDR*.

<https://www.gfdr.org/en/abidjan-pdna-recovery-framework-and-technical-studies-urban-resilience-flood-risk>

GFDRR (2020). "Côte D'Ivoire: Post-Disaster needs Assessment, recovery framework and technical studies for urban resilience to flood risk in Abidjan." *GFDDR*.

<https://www.gfdr.org/en/cote-divoire-post-disaster-needs-assessment-recovery-frame-work-and-technical-studies-urban>

Gourbesville, P. & Batica, J. (2014). Flood Resilience Index - Methodology and Application.

[https://www.researchgate.net/publication/273805886\\_Flood\\_Resilience\\_Index\\_-\\_Methodology\\_And\\_Application](https://www.researchgate.net/publication/273805886_Flood_Resilience_Index_-_Methodology_And_Application)

Grasham, C.F. (2019). "On considering climate resilience in urban water security: A review of the vulnerability of the urban poor in sub-Saharan Africa." *Wiley*

Horwich, G. (2000). Economic lessons of the Kobe earthquake. *Economic Development and Cultural Change* 48(3) : pp. 521–542

<http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1128&context=ciberwp>

Jha, A. K., Miner, T. W., & Stanton-Geddes, Z. (Eds.). (2013). Building urban resilience: principles, tools, and practice. World Bank Publications.

Kablan, M. et al, (2017). "Assessment of Social Vulnerability to Flood in Urban Côte d'Ivoire Using the MOVE Framework." *MDPI*

Kouassi, K. D., Kouadio, B. H., Saley, B. M., Dedjo, Y. S., & Saraka, K. S. Realization of an Early Flood Warning System in the Abobo Commune (Abidjan, Côte d'Ivoire): Contributions of HEC-GEORAS and HEC-RAS.

Marcel, B. K., Athanase, A. A., Joël, K. K., & Della André, A. (2021). Accidents Related to the 2014 Rains and Their Socio-Economic Consequences in the City of Abidjan: The Case of the Municipalities of Abobo and Attécoubé (Côte D'Ivoire). *Journal of Geoscience and Environment Protection*, 9(3), 195-208.

National Geographic Society. (2012). *Flood*. National Geographic Society.

<https://www.nationalgeographic.org/encyclopedia/flood/>.

Nka, B. N., Oudin, L., Karambiri, H., Paturel, J. E., & Ribstein, P. (2015). "Trends in floods in West Africa: Analysis based on 11 catchments in the region." *Hydrology and Earth System Sciences*, 19(11), 4707-4719.

Oluwaseyi Ogunkalu, H. & Eniayejuni, A. (2019). Democracy and Electoral Outcomes: Comparative Analysis of Nigeria and Ivory Coast Elections. *Challenges of the Knowledge Society*, 1247–1254.

Oura, R. (2012). « Extension urbaine et protection naturelle : La difficile expérience d'Abidjan. »

*Natures et Métropoles*. <https://journals.openedition.org/vertigo/12966?lang=pt>

Roberto, R. (2018), "Ivory Coast Profile," *United Nations Office for Disaster Risk Reduction –*

*Regional Office for Africa and Centro Internazionale in Monitoraggio Ambientale*

<https://www.undrr.org/publication/disaster-risk-profile-ivory-coast>

Scoones. 1998. Sustainable Rural Livelihoods: A Framework for Analysis. IDS Working Paper

72: pages 1-22

Tano, R. A., Aman, A., Toualy, E., Kouadio, Y. K., François-Xavier, B. B. D., & Addo, K. A.

(2018). Development of an integrated coastal vulnerability index for the Ivorian Coast in West Africa. *Journal of Environmental Protection*, 9(11), 1171-1184.

Transparency International. (2020). "Corruption Index : Côte d'Ivoire." Retrieved from:

<https://www.transparency.org/en/countries/c%C3%B4te-divoire>

The World Bank. (2020). "Cote d'Ivoire - urban resilience and solid waste management project."

<https://www.worldbank.org/en/news/loans-credits/2020/06/12/cote-divoire-urban-resilience-and-solid-waste-management-project>

The World Bank. (2019). "Côte D'Ivoire: World bank approves \$300 million to Boost urban mass transit in Abidjan."

<https://www.worldbank.org/en/news/pressrelease/2019/06/27/cote-divoire-world-bank-approves-300-million-to-boost-urban-mass-transit-in-abidjan>

The World Bank. (2021). *Ivory Coast Overview*. World Bank.

<https://www.worldbank.org/en/country/cotedivoire/overview>.

The World Bank (2013). Which coastal cities are at highest risk of damaging floods? New study crunches the numbers.

<https://www.worldbank.org/en/news/feature/2013/08/19/coastal->

cities-at-highest-risk-floods.

Ulrich, E. A. K. (2019). Flood Inundation Modeling in the Gourou Watershed of Côte d'Ivoire, West Africa (Master's thesis, PAUWES).

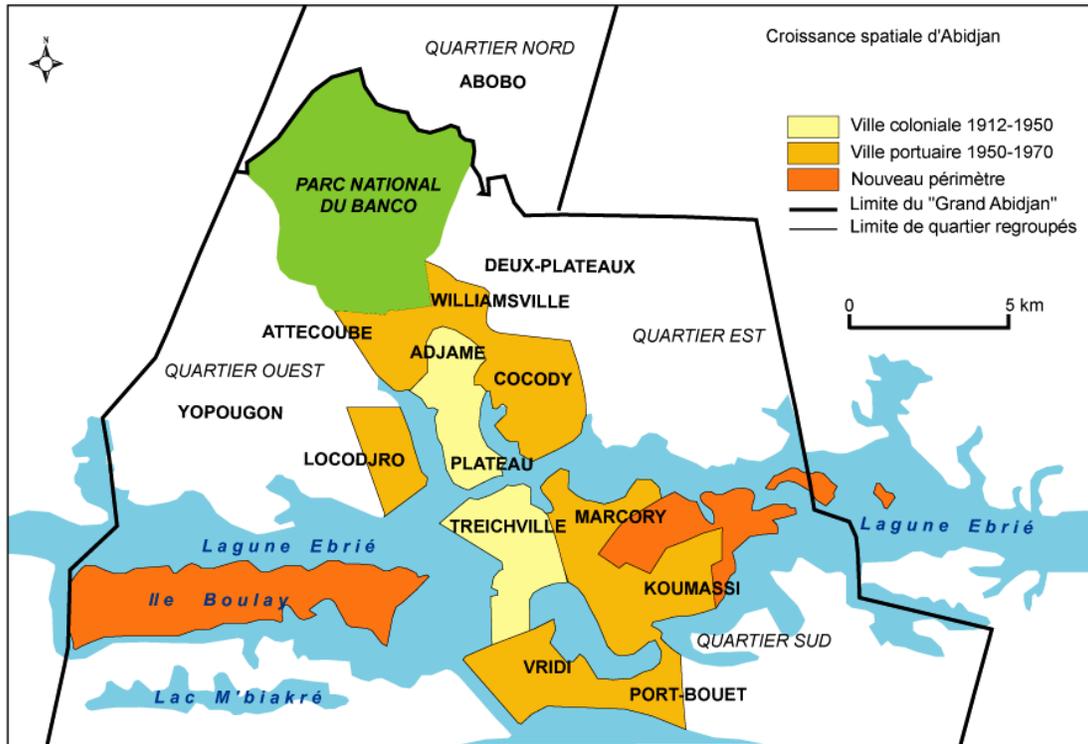
Vale, Lawrence J., and Thomas J. Campanella. (2005). The Resilient City: How Modern Cities Recover from Disaster. New York: Oxford University Press

Winsemius, H. C., Jongman, B., Veldkamp, T. I., Hallegatte, S., Bangalore, M., & Ward, P. J. (2015). Disaster risk, climate change, and poverty: assessing the global exposure of poor people to floods and droughts.

Zolberg, A. R. (2015). One-party government in the Ivory Coast. Princeton University Press.

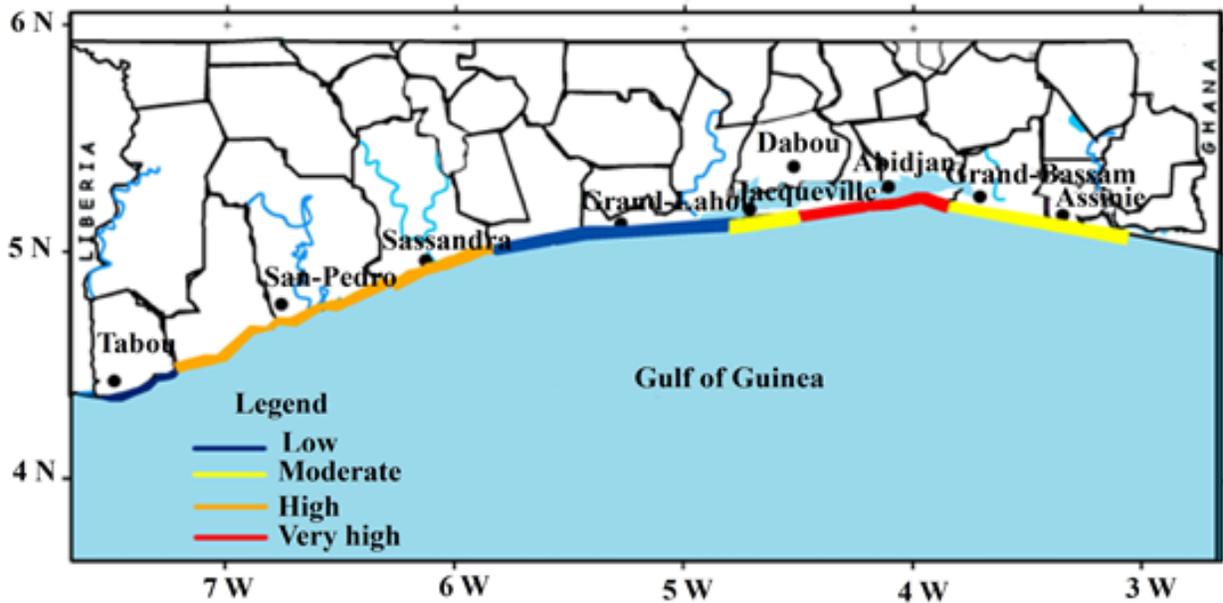
## **Appendix A: Figures**

**Figure A1: Boroughs of Abidjan (Source: Antoine & Herry, 1983)**



Source : Antoine P. & Herry C., 1983 La population d'Abidjan dans ses murs : dynamique urbaine et évolution des structures démographiques entre 1955-1978

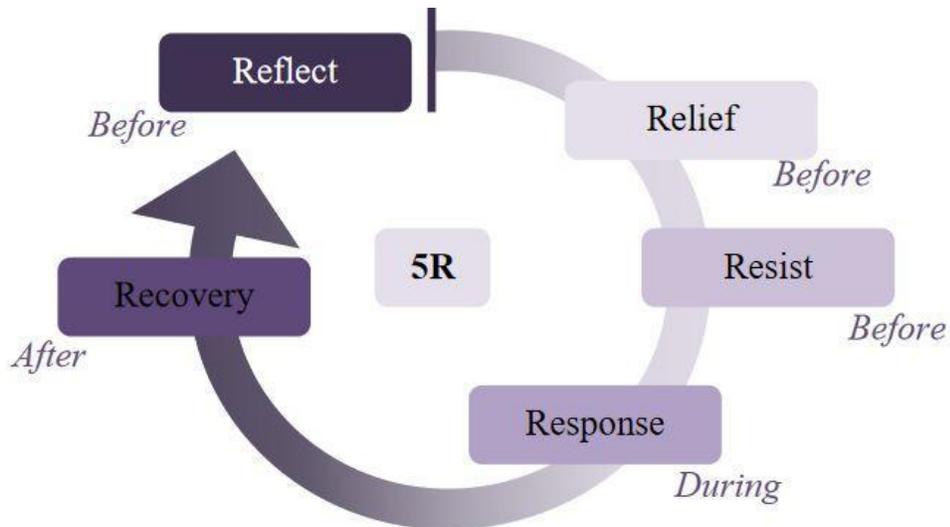
**Figure A2: Spatial variability of socio-economic index along the Ivorian coastline (Source SVI)**



**Figure A3:** Socio-economic or human pressure vulnerability matrix (Source: Tano, 2018)

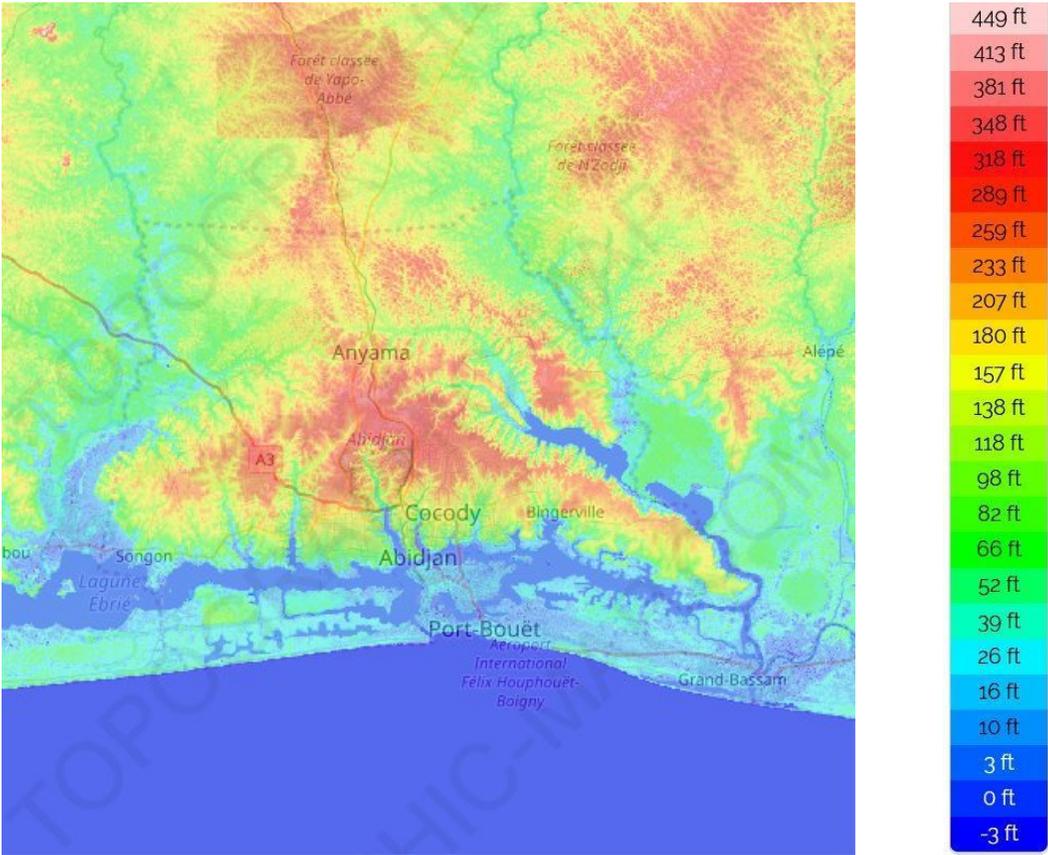
Coastal city	Population density (hbts/km <sup>2</sup> )	Airport	Road	Harbor	Land use	Protected area
Tabou	1	2	1	1	1	1
San-Pedro	1	3	3	5	5	1
Sassandra	1	2	3	1	4	5
Grand-Lahou	1	1	3	1	1	1
Jacqueville	2	1	1	1	2	5
Dabou	2	2	3	1	4	5
Abidjan	5	5	5	5	5	1
Grand-Bassam	3	1	5	1	5	1

**Figure A4:** Elements for flood risk management cycle (Source: CORFU Project)



Elements for flood risk management cycle – CORFU project

Figure A5: Elevation Map of Abidjan (Source: Ivory Coast National Government)



**Appendix B: 2018 Floods photos provided by the participants.**

**Image 1:** 2018 Floods in Yopougon Zone Industrielle



**Image 2:** 2018 Floods in Northern Abidjan



**Image 3:** 2018 Floods in GD Bassam



**Image 4:** 2018 Floods in Northern Abidjan



**Image 5:** 2018 Floods in Cocody



**Image 6: 2018 Floods in Cocody**



**Image 7: 2018 Floods in Cocody**



**Image 8: 2018 Floods in Yopougon Zone Industrielle**



**Image 9:** 2018 Floods in Marcory (Southern Abidjan)



**Image 10:** 2018 Floods in Northern Abidjan



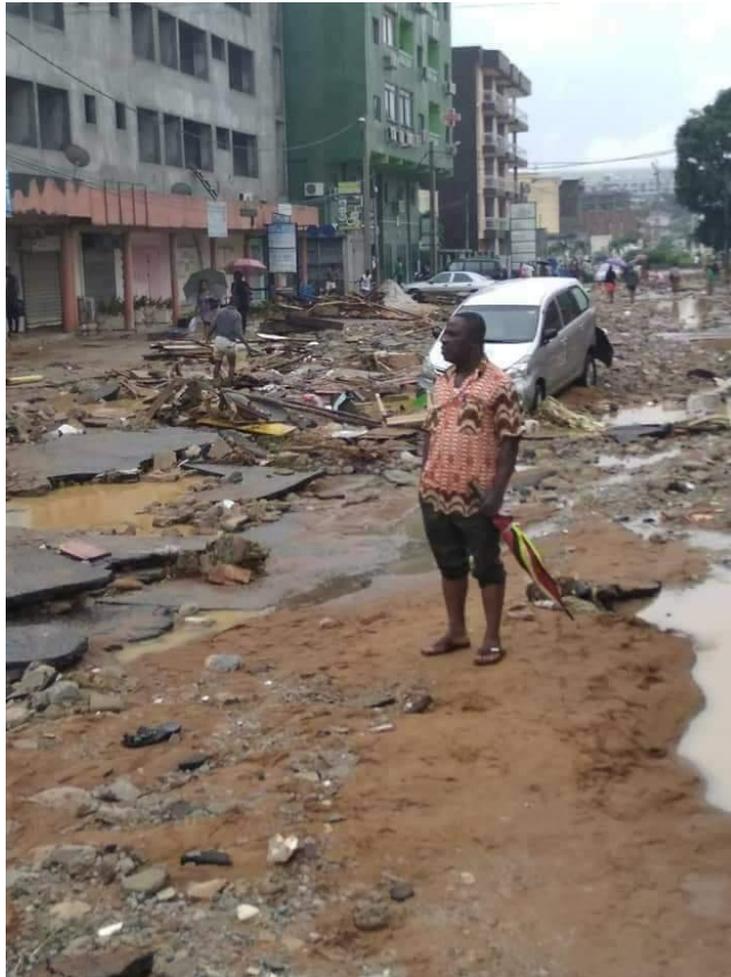
**Image 11:** 2018 Floods in Abidjan



**Image 12: 2018 Floods in Abidjan**



**Image 13:** 2018 Floods in Cocody (Northern Abidjan)



**Image 14:** 2018 Floods in Cocody (Northern Abidjan)



## Appendix C: Questionnaire

- 1) With what word would you define Abidjan?
- 2) What are the main problems that Abidjan faces?
- 3) What is Abidjan major climate impact for you?
- 4) How prepared is Abidjan to this climate impact and other impacts?
- 5) Could you range it Abidjan disaster/impact preparation from 1 to 5?
- 6) Could you rate the national government's role on trying to help with the effects of this impact?
- 7) Could you rate the city government's role on trying to help with the effects of this impact?
- 8) Are citizens of Abidjan aware of this issue?
- 9) Are the Ivory Coast government authorities aware of this issue?
- 10) Are the local authorities of Abidjan aware of this issue?
- 11) What other social or economic problems would you say that Abidjan suffers from?
- 12) How did you live the 2018 floods? Do you know any relatives/friends that have been affected by floods? Have you personally been affected by the floods?
- 13) Do you think the government could have done better during the floods? If so in what areas?
- 14) Could you range from 1 to 5 the government's reaction to the floods?
- 15) Could you range from 1 to 5 the city's reaction to the floods?
- 16) Could you range from 1 to 5 the population's reaction to floods?
- 17) Would you consider moving from Abidjan or have you considered it already?

**\*Total Word Count including the appendixes: 9,253 words.**

Adger *et al.* (2005) write, “Resilience can be eroded or bolstered accidentally or deliberately through human action” (p. 1037). They assert that multilevel social networks are crucial for developing social capital and enhancing resilience, concluding with the warning, “There is no time to waste” (Adger, *et al.*, 2005, p. 1037).

Adger, W. N. (2003). Social Capital, Collective Action, and Adaptation to Climate Change. *Economic Geography*, 79(4), 387–404. <https://doi.org/10.1111/j.1944-8287.2003.tb00220.x>

Adger, W. Neil, *et al.* (2005, August 12). Social-ecological resilience to coastal disasters. *Science* 309(5737), 1036. <https://doi.org/10.1126/science.1112122>

Aldrich, Daniel P. (2012). *Building Resilience: Social Capital in Post-disaster Recovery*. University of Chicago Press.