

Vulnerability and Resilience: A Framework of Development for Poor Urban Communities

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Abstract

Due to the rapid urbanisation in the last century and the lack of provision of housing by the State, informal construction spread all over the city of Beirut creating low-income neighbourhoods. Today, informal settlements became a part of the city, however, distinguished by their old buildings, weak provision of services and facilities, and poverty. The explosion of Lebanon's capital destroyed more than 6,000 buildings in the city, displacing around 300,000 people. With its buildings dating from the 1930s and 1940s, the neighbourhood of Karantina was highly affected by the blast that damaged most of the houses, displacing the majority of the residents. This paper focuses on the inclusion of professionals and architects in the upgrade of buildings in the most vulnerable urban neighbourhoods to become resilient to disasters and emergencies. The situation of the buildings and apartments poses many questions in terms of architectural quality, safety, health, and privacy, among others. This study proposes a strategy for the development of the neighbourhood's resiliency to external factors. Action tools are given based on the needs of the users, while the priority follows the criticality of the problems that are found in the neighbourhood following a survey on the urban and building levels. Finally, the resilience of poor and vulnerable urban communities to emergencies and disasters takes another form in Beirut with the presence of old buildings together with a long history of negligence from the State. Up to date, those densely populated and poor residential neighbourhoods are not recognised as informal.

Keywords: *Informal settlements, Resilience, Urban Informality, Technology of architecture, Beirut explosion.*

Introduction

The milestone for the development of urban areas was reached in 2009 when the urban population exceeded the rural population. Today, out of the 7.7 billion people living on earth, more than 4 billion people live in cities. The growth of urban areas is exponential and in the next 30 years 2.5 to 3 billion more people will be living in cities (United Nations Department of Economic and Social Affairs, 2018). In the cities of the Global South where the percentage of people living in slums is the highest, the growth of cities and the arrival of rural migrants is distinguished by its informal character. This will increase the challenges for governments towards informal areas that lack good services, structures, and institutions, causing persistent environment

and socioeconomic degradation (Soliman, 2021). Indeed, urban informality is continuing to spread on the periphery of cities in developing countries exacerbating already existing problematics pertaining to poverty, exclusion and inequality, unemployment, informal urban sprawl, environmental degradation, and climate change (Roy, 2005; Soliman, 2021). There is a need for urban sustainability transitions (Kabisch *et al.*, 2016) where nonlinear and complex processes of change are needed and persistent societal challenges - in which fundamental and structural changes in urban systems, are addressed (Frantzeskaki *et al.*, 2017). Improving the resilience of peripheries to exogenous factors and pressures is hence crucial for stabilising the cities and increasing their readiness to accommodate new dwellers. Urban resilience is regarded as a critical component of achieving city-level and urban informality transitions to sustainability to contribute to the sustainable development process.

1. Background

88% of the Lebanese population currently lives in urban areas with the majority (estimated at 64%) residing in large agglomerations, mostly in the metropolitan areas of Beirut and Tripoli (Figure 1).

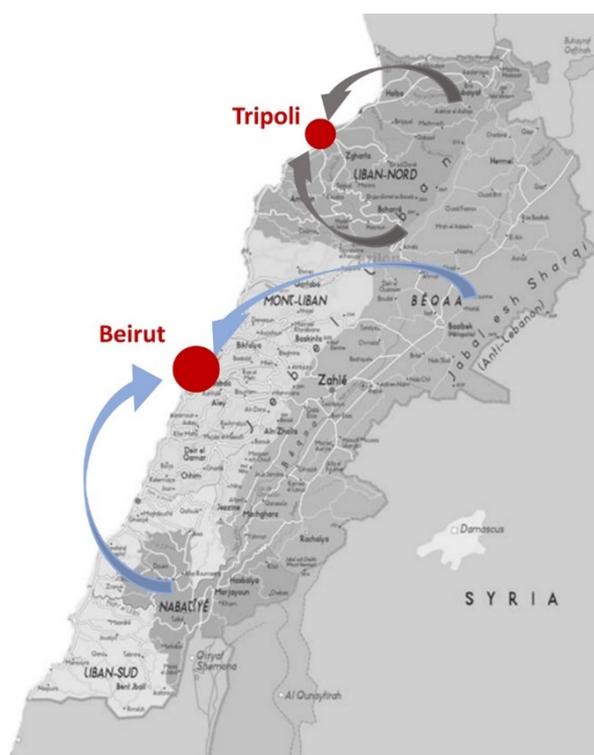


Figure 1 Rural migration in Lebanon. Developed by the Author.

The modern urban history of Lebanon was marked by high population density in informal areas, totalling 1'880'000 people in 2005 (about 53% of the urban population). Rapid urbanization, poor managing and unequal development of urban areas has contributed to the development of informal settlements and the creation of poor urban neighbourhoods around and inside the city of Beirut. Living in these settlements often poses significant health risks problems including poor sanitation, indoor pollution, and overcrowding that

contributes to stress, violence, drug abuse, and other social problems. The first informal settlements that appeared in Beirut were the camps of Armenian and Assyrian refugees who arrived in the country following the Armenian Genocide, these camps were built between 1920 and 1930 in Karantina and Bourj Hammoud in the east of Beirut (Bourgey and Pharès, 1973; Fawaz and Peillen, 2003; Hediger and Lukic, 2009).

The massive rural-to-urban migration to the Lebanese capital Beirut, that began by the 1940s, left the city with a vast poor and under-serviced periphery. The industrialization process experienced by the country attracted massive flows of immigrants to the capital in search of better opportunities. Beirut was unable to accommodate this new population that settled in peripheries that were characterized by unstable physical and sanitary conditions. The situation of these areas has not been improved since then and eventually has become a problem for the urban population (Bourgey and Pharès, 1973).

2. Methodology

Firstly, the paper discusses and analyses the low-income semi-industrial neighbourhood of Karantina, Beirut. The analysis focuses on the urban level and the building level. It evokes the history and evolution of Karantina until the explosion that took place on the 4th of August 2020, then it analyses the urban fabric, the construction history and process, the used materials, safety of buildings, open public space availability and accessibility, streets, road network, provision of basic urban services and facilities and finally the health and education systems. In addition, this paper examines the interventions on the neighbourhood and the role of NGOs in the reconstruction of Beirut after the blast. Secondly, actions for the development and upgrade of Karantina are elaborated emphasising the strengths of the neighbourhood and the willingness of residents to develop their living conditions/space. They are elaborated in response to the critical issues found in the district while insisting on the role of Architectural design and the inclusion of residents. Finally, the article investigates the resilience of informal settlements to disasters. It focuses on improving living conditions of inhabitants and increasing the sense of belonging to the community through the rehabilitation of buildings to be safe and structurally stable, the improvement of space use and design of apartments, the connection of the neighbourhood to the city, the revival of open public spaces, and the enhancement of the economy.

3. Karantina prior to the Port explosions

3.1. Location

Karantina is a small neighbourhood of 610,000 m² and around 3,000 inhabitants. It is located to the east of the municipal city of Beirut in the district of Medawar, right next to the Port of Beirut. It is bordered by the River of Beirut to the east, the Charles Helou highway to the south and the port to the west and north (Figure 2). The presence of the river, the highway and the port marginalised the neighbourhood and created a sort of barrier all around. Also, the industrial character of the area which contains several factories, a garbage

processing plant, a slaughterhouse, oil and gas tanks and a massive landfill, led to the deterioration of the living conditions in the neighbourhood and to environmental degradation.

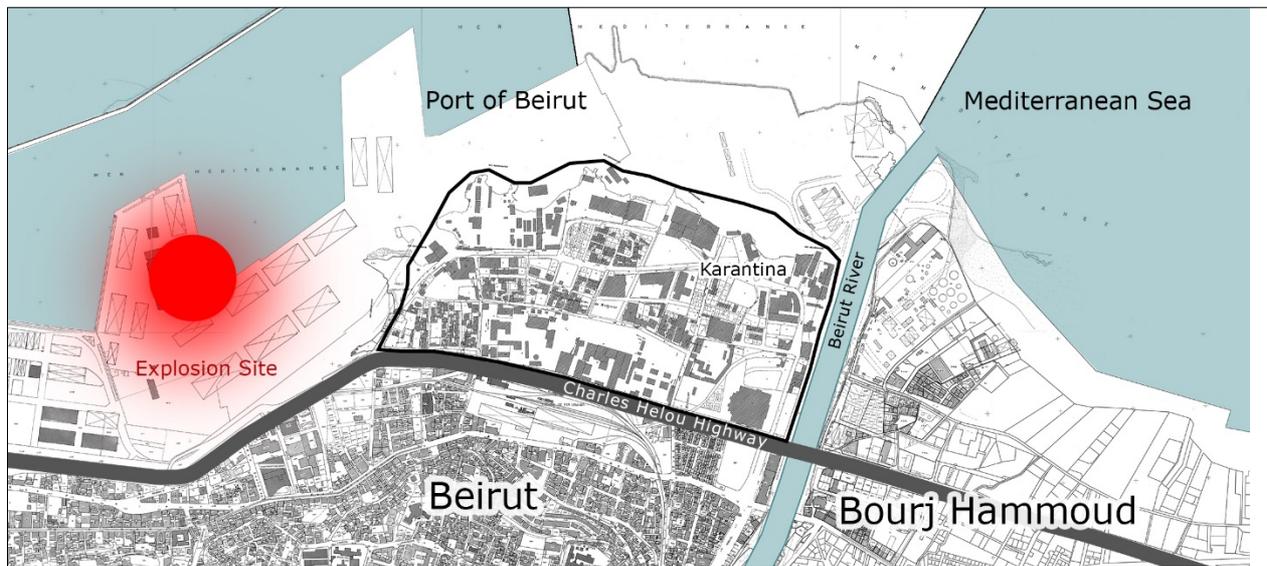


Figure 2 The location of Karantina with respect to the City of Beirut, the port, and the explosion site. Developed by the Author based on the cadastral map of Beirut, field surveying, and the BFER platform.

3.2. Evolution

The name of the neighbourhood historically refers to the Quarantine station that was built in the 1830s as a public health isolation spot for sailors arriving to Beirut. It started in 1923 as a refugee camp for Armenians escaping from the genocide in Turkey. The camp was slowly made more permanent with the replacement of tents with wooden and metal structures. In the following years, Armenians were offered other permanent solutions and were gradually relocated to other cities, especially after the fire of 1933 that destroyed 600 housing units (UN-Habitat Lebanon, 2021). The lands that were left were sold to some other Lebanese migrants who arrived in Beirut searching for better job opportunities in the port and other industrial sectors. In 1975, Karantina was regarded as one of the most deprived areas around Beirut. It had no running water and electricity, with the majority of inhabitants living in tin huts that accommodated 8 to 14 people each (Kazziha, 2015). During the Lebanese civil war (1975-1990), Karantina passed through intense political conflicts, and until now some militia heads still have power over their quarters, which induced a division in the neighbourhood between Muslim and Christians. In addition to Lebanese residents, Syrians arrived and settled in the neighbourhood since the 1990s, due to its proximity to the industrial areas and construction sites in the centre of Beirut that was undergoing a big reconstruction plan after the civil war. Some of the Syrian migrants started bringing their family members after the beginning of the Syrian crisis (2011).

3.3. Process of construction, urban fabric, and architectural design

The construction of Karantina started in the 1920s with the tents of Armenian refugees that were changed soon after into more permanent houses with wooden structures. In the following years, Lebanese rural migrants, Palestinians and Kurds settled in the neighbourhood and started constructing their houses. Most

of the residential buildings present nowadays date from the pre-civil war period (1940s-1975), in addition to some old houses built in the 1930s and new industrial buildings built after 1975. Residential buildings are concentrated in the western side while the eastern side has an industrial character.

Reinforced concrete structural systems were introduced to Lebanese cities in the 1940s making a shift in the buildings' shape and number of floors. The majority of buildings in Karantina are built with frame structure made of reinforced concrete while the walls are in prefabricated concrete blocks. Buildings are high up to four floors with the presence of some new constructions up to ten floors and more, while apartments are relatively small (mostly two-room apartments). Until today, some buildings present fibre-reinforced cement roofs on the last floor which are made of steel structure and Eternit sheets. In addition, we can find some heritage buildings (two-floor traditional Lebanese houses). Those houses are built with traditional load-bearing structural system with stone, while the roof is made of wood and other materials. The construction of industrial buildings is relatively new (starting from 1990) and uses frame structures made of reinforced concrete with concrete blocks or steel structures, along with metal corrugated sheets for the external envelope. Ground floors are mostly inhabited while on main roads they are used for commercial activities and workshops (carpentry, aluminium doors and windows fabrication, and car repair workshops among others).

3.4. Structural condition and safety of buildings

The neighbourhood was built between the 1920s and 1970s, and the average age of buildings is 70 years. Most of the residential buildings were built with primary construction methods with no interventions of architects and/or civil engineers. In the north-western part, buildings are in deteriorated conditions and show signs of visible cracking and many of them present water penetration that is decreasing the strength of the structural system. In addition, some residents are living in shacks that are built with no structural systems, which presents a real danger since they are not protected against external factors and emergencies.

3.5. Basic urban services and facilities

Karantina suffers from neglect on the part of the Municipality of Beirut, and the access to municipal services is insufficient and always disputed by the residents. The wastewater network is basic with a total absence of a storm water network in the majority of the streets. As for the street lighting system, it is in a critical situation with a lack of light on most of the streets which renders some parts of the neighbourhood unsafe, especially the industrial zones which are deserted at night. The provision of potable water and electricity is limited by a schedule similar to that of the rest of the country. The issue of walkability and access to open spaces in Karantina is a major one due to the absence of sidewalks and open spaces, and the industrial character that overwhelms the area and makes for a frequent passage for trucks and camions in the residential streets making them unsafe for kids. Moreover, access to public spaces outside of the neighbourhood is difficult with the presence of the physical borders all around (the port, the river, and the highway). Exceptionally, in 2017,

an abandoned plot owned by the municipality was renovated and transformed into a public garden through a project funded by the Université Saint Joseph.

3.6. Health and education

Access to private hospitals is rendered difficult by the high fees and the absence of health insurance for the majority of residents of Karantina. Residents rely, to a lower extent, on the Karantina Governmental Hospital located in the neighbourhood. Thus, for more serious cases, the Rafic Hariri Public University Hospital located in the east of Beirut, at more than five kilometres away from the neighbourhood, offers many other services at lower costs. Access to education remains a big issue in Karantina, especially among females. In the northern part of Karantina, more than half of the children and youth population is not attending school and the highest reached level among youth between 15 and 24 is intermediate school (UN-Habitat, 2018).

4. Actions on Karantina

The strategy for the improvement of living conditions of the dwellers of Karantina works on three levels, 1) the individual, 2) the shelter, and 3) the community. First, on the level of individuals, actions focus on making the living space resilient to withstand internal and external risk factors. Architectural design plays a major role in providing healthier environment inside residential units through increasing the access to natural resources including light and ventilation. In addition, the management of liveable space can be organised to be more functional, provide more privacy, and respond to the needs of all household members. Second, as for shelter, the provision of adequate shelters resilient to external factors is crucial. It starts with the rehabilitation of buildings to be able to protect people from atmospheric factors and environmental risks since the neighbourhood is located right next to the sea. Apartments on the street level are subject to flooding at first heavy storm, thus, the storm water network must be implemented in the neighbourhood since it can avoid a lot of problems. Eternit roofs and light roofs made of corrugated metal sheets should be changed to more permanent structures. Not to mention that for the buildings in critical structural situations, there needs to be a technical assessment in order to take adequate actions or evacuate the residents. Finally, on the level of community, informal settlements in Lebanon are witnessing severe degradation in terms of services and facilities along with a long neglect from the government and local municipalities. In Karantina, the use of public space must be deliberately thought out; the streets should be improved and equipped with functioning sewage and stormwater networks and sidewalks to make them safer and suitable for use. Some streets inside residential areas should be prohibited for tracks and camions. Streetlights have to be added to the streets of Karantina together with a plan for the improvement of pedestrian connection between the different parts of the neighbourhood and the city of Beirut. Such a connection could improve the local economy and the access of outsiders, thus reviving the popular Souk of Karantina. Furthermore, access to waterfront should be granted to the inhabitants since the neighbourhood was bordering the Mediterranean before the addition of the fourth basin to the port.

Conclusions

Resilient Karantina

The city of Beirut is subject to flooding and earthquakes and specifically the neighbourhood of Karantina which is located close to the sea in an unsafe area. Thus, the State should start developing a resilience programme for informal settlements of Beirut built more than 50 years ago.

To make Karantina more resilient, professionals should also focus on the safety of buildings since the neighbourhood was constructed more than 70 years ago without the involvement of professionals. The interventions on the buildings' design and streets would increase the sense of belonging to the neighbourhood that was marginalised by the State for decades. The internal design of apartments should also be improved to efficiently use the space and provide more privacy for the residents. The resilience of Karantina also means the resilience of the population living in it. Improving the living conditions of the inhabitants fosters inclusivity and leads to a more compact community resilient to internal and external risk factors. In any improvement project, residents must be put at the centre and involved in the rehabilitation of their houses, buildings, and districts through a participatory design approach. Therefore, the solutions should come "from below".

What happens in case of disasters?

The blast event of the 4th of August 2020, which devastated large parts of Beirut, was one of the biggest non-nuclear explosions in history. The aftermath of the explosion reveals more than 200 deaths and over 6,000 injured people, while the 15 billion \$ in property damage is leaving an estimate of 300,000 people homeless. Located at 600 meters from the explosion site (Figure 2), Karantina was hit the most as for the number of victims and the degree of destruction (Figure 3).



Figure 3 Left: destroyed building in Karantina. Courtesy of the Author. Right: View over some damaged buildings. Courtesy of Toronto Star.

Interventions after the explosion

The aftermath of the blast was marked by the start of a big emergency response plan in collaboration with different NGOs operating in Lebanon. The plan focused on the repair of physical damages that occurred to

the neighbourhoods that were affected by the explosion, without setting a clear strategy of improvement of poor districts where the most vulnerable people are living, namely Karantina. The policy of many organisations didn't enable any changes to the design of buildings and has not even allowed the owners to do the renovation and then get reimbursed at a later stage. In some cases, interventions have not followed some health standards while in other cases apartments were renovated despite the weak structure of the buildings themselves. Another concern about the emergency interventions on informal settlements is that they lacked a thorough involvement of the residents in the conception of the renovation plan which slows down the recovery process and weakens the inclusivity within the city.

In the case of Beirut, Resilient recovery can be guaranteed through involving, on one hand, professionals, and university labs in the process, and on the other hand, the residents. The recovery after the blast should be accompanied by a multi-layered upgrade process where individuals are involved in the upgrade of their houses and communities. In the cases of Karantina, the strategy could be elaborated before the start of the reconstruction since the buildings were emptied and "cash for rent" programmes were started by many NGOs. In first line, buildings that are old and have started to show dangerous signs of deterioration shall be upgraded to save the inhabitants from another disaster. Floors can be added in some parts of the neighbourhood where buildings are in good conditions, in order to allow the relocation of people who are living in unsafe buildings and in small houses with metal roofs.

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