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February 2022

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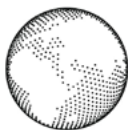Global Prosperity

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# ABSTRACT

On the 4th of August 2020, a large amount of ammonium nitrate stored at the port of the city of Beirut exploded, causing at least 200 deaths, over 7,000 injuries, US$3.8-4.6 billion in material damages, and the displacement of over 300,000 people. Lebanon was already suffering from a rapidly escalating financial crisis, further aggravated by the outbreak of COVID-19. This report explores the changing landscape of local vulnerabilities from pre-crisis to post-explosion focusing on the neighbourhood of Mar Mikhael, one of the areas that was heavily affected by the blast. It offers an integrated place-based analysis focusing on three of the most relevant indicators of vulnerability in Mar Mikhael: livelihoods and employment, housing security, and mental health and well-being. Vulnerabilities were investigated following the Prosperity Index work developed by the RELIEF Centre in Lebanon. We find that the current economic situation has impacted the financial wellbeing of households at every income level, albeit more so for lower-income households. NGOs have led in the assessment of building damage across all blast-affected neighbourhoods, while public bodies have been selective in their building-assessment. Housing in Mar Mikhael has on average become less affordable with fewer residents benefiting from old rent contracts. Overall, we found reduced feelings of happiness and safety, along with heightened stress levels. Residents also showed a preference for outdoor recreation activities in the neighbourhood to deal with stress, depression, or trauma post-blast, presenting opportunities for local CBOs and NGOs implementing local interventions

# ACKNOWLEDGEMENTS

# CORE TEAM

The research was carried out as a partnership between the Relief Centre and CatalyticAction (CA) charity, the Institute for Global Prosperity (IGP) and the Development Planning Unit (DPU) at University College London (UCL). The team was led by Dr. Elisabetta Pietrostefani (IGP) and Joana Dabaj (CA). The research team included Yara Sleiman (Relief Centre), Mayssa Jallad (Relief Centre), Sara Maassarani (CA), Dr. Efrosini Charalambous (IGP) and Professor Camillo Boano (DPU). The team worked together with 12 citizen scientists and involved Mar Mikhael residents in the activities.

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# INTRODUCTION

On the 4th of August 2020, a large amount of ammonium nitrate stored at the port of the city of Beirut exploded, causing over 200 deaths, 7,000 injuries, US$15 billion in property damages, and the displacement of almost 300,000 people (Human Rights Watch 2021). Lebanon was already suffering from a rapidly escalating financial crisis, further aggravated by the outbreak of COVID-19. The explosion devastated various neighbourhoods adjacent to the Beirut port area. Livelihoods were upended and people were forced to leave their homes or live in heavily damaged residences.

This report explores the changing landscape of local vulnerabilities from pre-crisis to post-explosion in the neighbourhood of Mar Mikhael, one of the areas that was heavily affected by the blast. The term 'pre-crisis' marks the period before the Lebanese liquidity crisis which started in August 2019. The term 'post-explosion' marks the period after the 4th of August 2020 port explosion. This research comes as a medium-term assessment, six months after the blast, enabling a clearer understanding of fluctuating local vulnerabilities following immediate efforts mobilised on the ground. It also locates the blast's impact within the wider context of the country's multiple crises and in terms of the city's precursory urban planning environment.

The 4th of August explosion attracted attention from political, humanitarian, and scientific groups all over the world. Urgent reconstruction efforts were underway immediately following the blast, whether by Lebanese residents, community-based organisations (CBOs), local non-governmental organisations

(NGOs), International Organisations, or the Lebanese Army. Great difficulties were faced nevertheless, in terms of communication and collaboration between different active entities to address the dire needs.

Lebanon is no stranger to post-disaster reconstruction. The Beirut city centre reconstruction after the Lebanese Civil War is a closely-tied example of the renovation of a historic core, though it displaced its local populations and dismantled entire neighbourhoods to make way for luxury developments (Verdeil 2002; Davie 2004). This not-so-distant episode created an underlining threat to the welfare and security of vulnerable residents in neighbourhoods adjacent to the Beirut port area, many of which were displaced following the blast and had not returned one year after the explosion[1]. Keeping this in mind, as well as the conspicuous alterations that many Beirut neighbourhoods have undergone over the past few decades (Gebara et al. 2016), this research evaluates some of the changes that the neighbourhood of Mar Mikhael and its residents experienced from 2018 to 2021.

Vulnerability can be defined as the diminished capacity of a group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard (IFRC 2020). To determine people's vulnerability, two questions need to be asked: To what threat or hazard are they vulnerable? What makes them vulnerable?

Beirut residents have been exposed to a triple crisis comprised of multiple economic and political threats: from a financial collapse, encapsulating a political and liquidity crisis, to the COVID-19 outbreak, and

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[1] Local stakeholders noted many residents had not returned to neighbourhoods heavily affected by the blast during a workshop discussion on June 30th 2021.

the 4th of August explosion (Bolin & Kurtz 2018). Building on previous research which operationalises vulnerability (Bernard 2020; Krellenberg et al. 2017), this study focuses on three of the most relevant indicators of vulnerability in our area of study (Hinkel 2011; Baumann & Kanafani 2020): livelihoods and employment, housing security, and mental health and well-being[2]. These three indicators were chosen in light of Lebanon's growing unemployment rates at the time of study, the physical damage undergone by countless dwellings post-blast, and the overwhelming issue of mental health in an already-strained population (Fouad et al. 2021; Banati et al. 2020). We assess changing vulnerabilities by observing measurable and comparative variables between 2018 and 2021 to help inform future interventions or public policies in the wider reconstruction process in our case-study area.

This research builds on the Prosperity Index work that the Institute for Global Prosperity (IGP) – RELIEF centre has been conducting in Lebanon over the past three years (RELIEF Centre & UN-Habitat Lebanon 2020; Mintchev et al. 2019). It also expands on the Participatory Spatial Intervention developed as part of the research project 'Public services and vulnerabilities in the Lebanese context of large-scale displacement' funded by the British Academy's cities and infrastructure programme (Dabaj et al. 2020). This research contributes to humanitarian agencies' tracking of vulnerabilities in the Lebanese context (UNHCR et al. 2020), and to the literature on citizen science and sustainable development goals (Fraisl et al. 2020). In addition, it provides support to the current local rhetoric about urban recovery not being mere reconstruction projects, but processes that restore social and economic networks and recover spaces of social significance to reconstitute both the built environment and the socio-cultural fabric (Al-Harithy et al. 2013).

**KEY OBJECTIVES**

1. Research local vulnerabilities and how they changed from pre-crisis to post-explosion.

2. Contribute to the discussion and inform inclusive post-disaster planning through community-based approaches in Beirut.

3. Better understand the ways in which residents of the Mar Mikhael neighbourhood can participate in the design and co-production of interventions that address their vulnerabilities towards equitable urban recovery and wellbeing.

4. Demonstrate how research and local community capacity-building through citizen science can contribute to the development of solutions to the challenges faced by local communities.

**MIXED METHODS APPROACH**

This research uses a mixed methods approach both in its research design and in the analysis of results. The research design phase included revisiting the RELIEF centre's Prosperity Index questionnaire with citizen scientists and consulting them on their experience on the key topics of the research. In this case, discussions occurred in the form of free-flowing conversations, probed by questions, contextualising and detailing interrogations around livelihoods, housing, and mental well-being. The discussions were consequently transcribed, and indicators revised to develop survey questions that were relevant to the specific neighbourhood of Mar Mikhael. Survey questions were also amended, where necessary, based on the input of project partners. This approach was based on RELIEF centre's Prosperity Index consultations where the concept of prosperity is explored as a lived experience, and consulting citizen scientists on the content of research is part of engaging them in the process (Jallad et al. 2021).

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[2]  Indicators constitute one approach to making theoretical concepts operational. An indicator is a function of an observable variable (Gallopin 1997).

Previously, the Prosperity Index was developed in Lebanon for the neighbourhood of Hamra in Beirut in 2019, and for multiple neighbourhoods in the city of El-Mina, Tripoli in 2020. The Prosperity Index work explores what prosperity means for people in Lebanon in a context of large-scale displacement and multiple crises. It intends to develop innovative tools and frameworks, which residents and local organisations can use to understand the quality of life of local communities. In both Hamra and El-Mina the Prosperity Index research resulted in the development of a household survey that explores all aspects of prosperity or lack thereof: from livelihoods and housing, to education, health, neighbourhood belonging and more. In Mar Mikhael, the research was adapted to a succinct vulnerabilities household survey including questions about the thematic foci, as well as questions assessing building damages, aid and relief received by residents post-blast.

During the research analysis phase, the household survey data was examined to identify socio-spatial patterns using descriptive statistics and comparing indicators between 2018 and 2021. Citizen scientist consultations following the data-collection and analysis helped further explain some of the identified trends. Citizen scientists also participated in consultations to discuss main issues in the neighbourhood and possible interventions using problem and solution trees, initiating a mechanism through which residents can participate in the design and co-production of the urban recovery effort. This participatory method was designed and deployed to ensure utmost sensitivity to this specific vulnerable context and reflect the realities of the lives people are living. The research focused on incorporating a diversity lens, to explore intra-community inequalities (Dabaj et al. 2020).

## DATA AND SAMPLING

This report is based on two survey datasets. The first was collected by Dr. Elisabetta Pietrostefani between March and June 2018 within the project *Geospatial analysis of housing insecurity and resident value of neighbourhood amenities in Beirut, Lebanon* supported by the Royal Geographical Society (with Institute of British Geographers). The second was collected between March and April 2021 for the project Assessing Vulnerabilities for urban recovery solutions in Beirut post-explosion supported by UKRI GCRF and the RELIEF Centre. The main limitation of the study lies in the lack of further temporal micro-data for the area of Mar Mikhael between the years of 2018 and 2021 which would have allowed us to identify how each of the multiple crises affected livelihoods, housing, and mental well-being variables.

The 2018 and 2021 household surveys were both conducted for representative samples of the comprehensive population count of Mar Mikhael proportionally stratified by nationality (Lebanese and non-Lebanese). As can be seen in Figure 1, the 2018 sample was conducted on a smaller geographic area (between the Charles Helou highway and Charles Malek Street) resulting in a smaller sample size. The sampling design consists of a two-stage random sample. Separate sampling frames are used for Lebanese and non-Lebanese. The sample size for non-Lebanese is calculated using the same formula, but by applying a finite population correction factor that accounts for the smaller population size of non-Lebanese within the area. The sample size was calculated using a 95 percent level of confidence (Z=1.96), and a 5 percent margin of error, and an estimated average household size of 3.4 for Lebanese (CAS & ILO 2020) and 4.7 for Syrians (UNHCR et al. 2020)[3]. The data presented and described in this report covers 360 and 415 households respectively

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[3] Cadastral population estimates were 16,412 Lebanese and 50 Non-Lebanese for Rmeil and 3,206 Lebanese and 150 non-Lebanese for Medawar in 2020 (UNHCR et al. 2020).

**Figure 1: Spatial sample 2018 and 2021**



**Note:** Households in 230 buildings were sampled in 2018 and in 275 buildings in 2021. Out of the buildings surveyed in 2018, 65 were not surveyed in 2021 because dwellings were either found vacant or destroyed, or households refused to participate or were absent. Households in an additional 110 buildings were surveyed in the 2021 making the spatial extent of the 2021 data larger as illustrated in Figure 1. While only one member per household was recorded in the 2018 survey, up to 10 members per household were recorded in 2021. Source of Badawi, Jeitaoui and Mar Mikhael zone limits: Beirut Urban Lab, 2020.

per survey periods 2018 and 2021. Given the predominance of Lebanese nationals in the area, representative samples were collected for Lebanese and non-Lebanese populations as a whole.

The neighbourhood of Mar Mikhael is located within the districts of Rmeil and Medawar in the Eastern part of Beirut. The neighbourhood borders the Port to the North, Bourj Hammoud to the East, Achrafieh and Jeitaoui to the South, with Gemmayzeh to the West. The neighbourhood boundaries were defined following two previous mappings of the neighbourhood by GAIA-Heritage (2015) and Beirut Urban Lab (2021) which follow different methodologies but arrive at similar conclusions. It is important to note that the six formal sector boundaries set by Inter Agencies as shown in Figure 1 (Mar Mikhael, Khodr, Hkmeh, Mustashfa el Roum,

Qobayat and Jeitaoui) are the ones used for survey purposes, but they should not be considered as hard lines that distinguish areas. In fact, residents most commonly refer to the areas of Mar Mikhael and Jeitaoui as shown in the coloured areas in Figure 1. This study incorporated both these areas because of the strong commercial and familial ties across these two neighbourhoods (Beirut Urban Lab 2021). Both these areas were also included because of their urban coherence in terms of building ages and historic development, which characterise both areas with sidewalks, stairs, and dead-end streets.

As illustrated in Figure 1, samples in our dataset are divided across the six administrative sectors which will be referred to in this report, with one respondent per household in 2018 and a maximum of ten respondents per household in 2021. These six sectors

cover the area commonly known as Mar Mikhael, as well as parts of Jeitaoui. Households in 230 buildings were sampled in 2018 and 275 buildings in 2021. The data capture programme was developed using KoBoToolbox and conducted using tablets and smart mobile phones. A total of 8 interviewers and 1 supervisor were recruited to administer the survey in 2018 and 11 interviewers and 3 supervisors in 2021.

# MAR MIKHAEL'S DEMOGRAPHIC PROFILE: 2018 TO 2021

We observe various demographic changes in the neighbourhood of Mar Mikhael between 2018 and 2021. The data suggests that the non-Lebanese population is progressively moving from the neighbourhood, and an aging and less active Lebanese population is predominant in the area. Findings suggest that families, mainly without children, are primarily the types of households that have stayed in the area because of their ties to the neighbourhood. Most surveyed residents cited high rent cost and damage caused by the blast as reasons for relocation.

Survey results show that the majority of Mar Mikhael residents, in both 2018 and 2021 (83.3 and 90.6 percent respectively) were Lebanese, exceeding the national share of 79.8 percent and the Beirut share of 69.1 percent (CAS & ILO 2020). Syrians constituted the largest non-Lebanese group in the neighbourhood, comprising 6.7 percent of the total 2021 sample, and 9.7 percent of the total 2018 sample (Figure 2). The relocation of much of the non-Lebanese population from 2018 to 2021 to other areas of Lebanon (RELIEFWEB 2020) resulted in a smaller non-Lebanese sample size in 2021 (9.4 percent) than in 2018 (16.7 percent). The relocation of refugees and foreign workers amid the current economic climate could explain the drop in the proportion of non-Lebanese residents. At the time of the research, citizen scientists remarked that Syrian and migrant workers left the neighbourhood because of the economic situation, in larger numbers especially after the October 2019 revolution[4] and the August 4th, 2020, explosion. Syrian nationals who stayed

predominantly receive aid from UN organisations (Beirut Urban Lab 2021; Hariri & Bou Nader 2021). Other non-Lebanese residents include people from Europe and North America (4.4 and 1.2 percent), Africa (1.7 and 1.0 percent), and the Far East (0.3 and 0.5 percent) from 2018 and 2021 respectively. Overall 25.1 percent of respondents in 2021 acknowledged the relocation of neighbours, primarily outside the country (32.8 percent) and to Mount Lebanon (24.6 percent), namely Jdeideh and Jal el Dib.

**Figure 2. Samples by nationality**
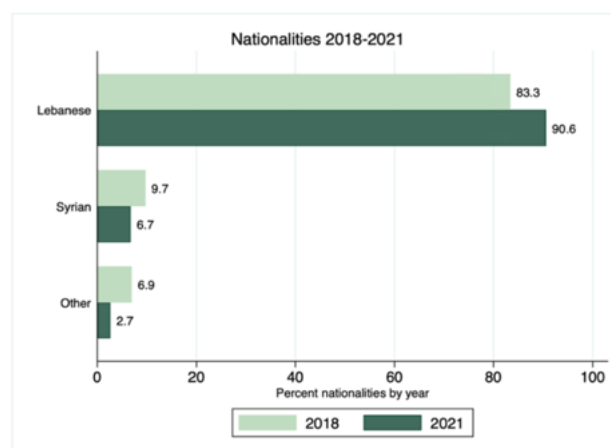


**Note:** The data presented and described in this report covers respectively 360 and 415 households per survey periods 2018 and 2021. While only one member per household was recorded in the 2018 survey, up to 10 members per household were recorded in 2021.

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[4] The 17 October Revolution is a series of civil protests taking place in Lebanon. These protests were triggered by tax increases on several key goods such as gasoline, tobacco and communication applications such as WhatsApp but rapidly expanded into a country-wide condemnation of sectarian rule and the national financial crises.

The largest share of residents across both years is represented by those in the 25-to-64-year age group, making up 62.5 percent of total sampled residents in 2018 and 53.3 percent in 2021. This is followed by the elderly (65 years and above) who comprise 30.0 percent of the total sample in 2018 and 27.2 percent in 2021. Younger residents (0 to 24 years) form the minority, accounting for only 7.5 percent of the 2018 sample and a relatively higher share of 19.5 percent in 2021.[5] As illustrated in Figure 3, the age structure of Mar Mikhael is noteworthy in that its combined share of adult (25 to 64) and elderly (65+) cohorts exceeds the corresponding national average by 22.0 percentage points.[6] Residents aged 40 or above make up more than 58 percent of the total population in both sampling period [7], and among those, approximately 45 percent are in the elderly age group. This confirms previous studies that have highlighted Mar Mikhael's aging population (Hariri & Bou Nader 2021).

A comparison of age and gender distribution across the two survey periods for Lebanese and non-Lebanese residents reveals the following demographic observations (Figure 3). There is a slight decline in the share of elderly Lebanese residents. The pyramid displays a majority population in the 55-70 age group, thus suggesting Mar Mikhael might be approaching a zero-population growth rate among Lebanese residents. The non-Lebanese pyramid, on the other hand, is distinctly more youthful with lower shares of older residents across both survey years (Figure 3). The Lebanese male-to-female ratio is slightly biased towards men in lower age groups (<25 years) in 2018, but is then, on average, biased towards women across both years. This may be a result of the emigration of Lebanese men for economic reasons. The non-Lebanese pyramid also presents asymmetries across years and age cohorts: the gender ratio favours men in the age group 25 to 54 in both survey periods.

**Figure 3. Age Pyramids**



**Note:** The data presented and described in this report covers respectively 360 and 415 households per survey periods 2018 and 2021. While only one member per household was recorded in the 2018 survey, up to 10 members per household were recorded in 2021.
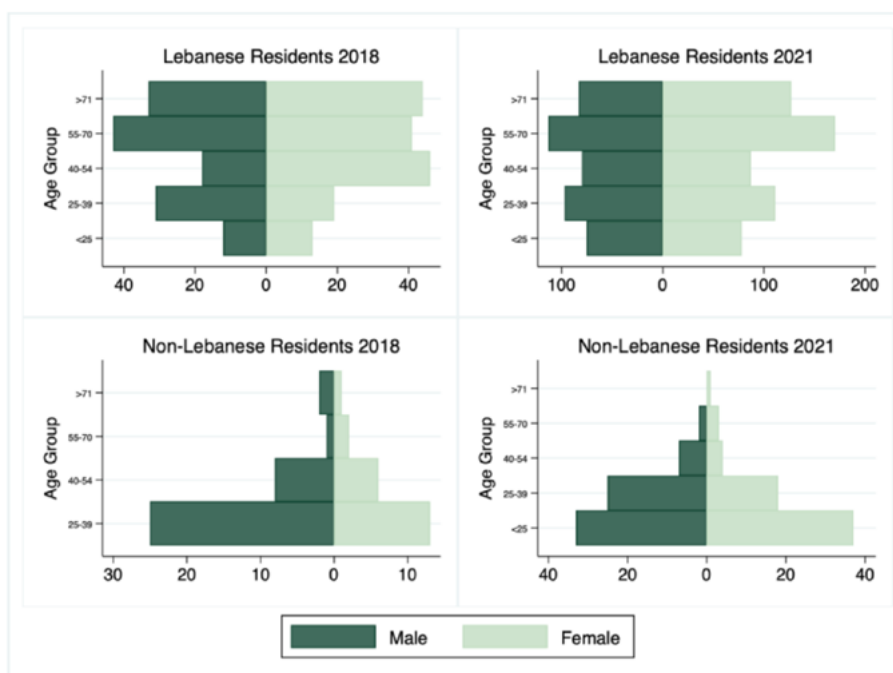
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[5] This two-fold increase in children and youth is most likely a limitation of the 2018 sample which only recorded 1 member per household instead of 10 members.

[6] Mar Mikhael residents aged between 25 and 64 represent 53.3 percent of our 2021 sample, more than the national share at 47.5 percent. Residents aged 65 and above represent 27.2 percent of our sample, more than 10 percentage point more than the national share at 10.9 percent (CAS & ILO 2020).

[7] Residents aged 40 or above represent 68.1 percent of the sample in 2018 and 58.7 in 2021.

The Lebanese household size in Mar Mikhael is on average comprised of 2.8 persons, which is less than both Beirut (3.2) and Lebanon averages (3.4) (CAS & ILO 2020). As for Non-Lebanese in Mar Mikhael, the average 3.4 people per household is higher than Lebanese households in the area but lower than Beirut (4.3) and National averages (4.7) (UNHCR et al. 2020). As for household types in 2021, 74.4 percent of households in Mar Mikhael are families, 23.4 percent are living alone, 1.7 percent are families with domestic workers, and 0.5 are professionals or workers living together. In comparison to 2018, there are more families (68.8 percent of households in 2018), more people living alone (13.3 percent in 2018), less families with domestic workers (9.2 percent in 2018) and less professionals or workers living together (8.7 percent in 2018). The data thus suggests that families are primarily the types of households that have stayed in the area considering their ties to the neighbourhood.

Findings also indicate that groups of non-Lebanese male living together as workers have moved out of the area, possibly to neighbourhoods with lower-priced housing or increased working opportunities (Hariri & Bou Nader 2021). The high costs of living and the Lebanese pound (LBP) devaluation also explain the decrease of households with in-house domestic workers, resulting in this already vulnerable population being heavily affected by the blast as many migrant domestic workers were abandoned by their employers (Randhawa 2020). In 2021, there is an average of 0.2 children per Lebanese household, and 1.9 children per Syrian household, which are both considerably lower than the Beirut averages at 1.7 and 3.1 children respectively for Lebanese and non-Lebanese (CAS & ILO 2020). Indeed, citizen scientists observed during the research design phase that newlyweds and the offspring of long-term inhabitants (who are paying old rent), tend to move outside of the area because they cannot afford expensive new rent in the gentrifying neighbourhood (Krijnen 2018).

There is a majority Christian population in Mar Mikhael (83 to 86.3 in our samples), with minority Muslim and Druze populations at 11 and 1.7 percent respectively. The data suggests a drop in declared atheists between 2018 and 2021 from 4.1 to 1 percent, which could be due to the departure of certain socio-economic groups and European and North American residents post blast. Both possibilities were suggested in citizen scientist consultations.

The data suggests inequalities in educational attainment among Mar Mikhael residents. Approximately one third of the population educated only at primary school level and more than one third educated at university level with smaller percentages (16.4 and 13.3 for 2018 and 2021 respectively) educated at secondary school level. A small share of the population in Mar Mikhael have no formal education, 7.3 percent of men and 9.9 percent of women, which is however slightly higher than for men and women at the national level (4.4 percent and 8.7 percent respectively) (CAS & ILO 2020). As shown in Figure 4, university attainment in Mar Mikhael is slightly higher among women (37.3 percent) than among men (33.9 percent). These shares are also higher than the corresponding national rates (31 percent and 28.1 percent respectively) (CAS & ILO 2020).

**Figure 4.** Educational Attainment of residents (aged 3+) by subsample



Educational Attainment by Subsample
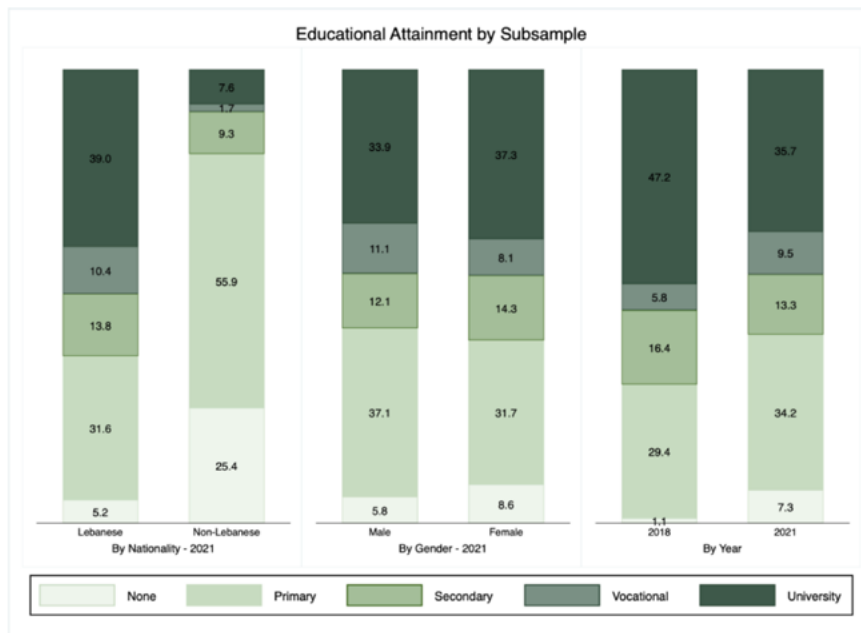
In terms of nationality, Lebanese are considerably more likely than non-Lebanese to have attained a university-level education (39.0 percent and 7.6 percent respectively), while non-Lebanese are much more likely to have attained primary-level education only (Figure 4). Non-Lebanese are also more likely than Lebanese to have not completed any formal schooling (25.4 percent and 5.2 percent respectively). A comparison between the 2018 and 2021 data shows a decrease in university level educational attainment in the area (47.2 percent and 35.7 percent respectively). This might be due to the brain-drain the country has witnessed more evidently since the LBP devaluation and the blast, as well as the destruction of newer high-rise buildings in Mar Mikhael which might house more affluent and educated people (Vohra 2021). The percentage of the population that has had no formal education at all has also increased from 1.1 percent in 2018 to 7.3 in 2021.

Of households living in Mar Mikhael, 24.4 percent had relocated at least once: 22.4 percent among Lebanese and 43.6 percent among non-Lebanese[8]. Of those that had relocated at least once, only 4.0 percent had done so from other countries, namely Syria (50.0 percent), France (25.0 percent), and the Philippines (25.0 percent). The rest had relocated within Lebanon suggesting predominant patters of internal migration to and from the area – 36.6 percent within Beirut and 59.4 percent from another district. One-third (33.3 percent) of those moving from another district relocated from El Metn, 13.9 percent moved from Baabda, and an equal share moved from Aley (11.1 percent) and Chouf (11.1 percent). Intra-district movement (i.e. relocation within Beirut) was largely from Ashrafieh (43.1 percent) and Mar Mikhael (29.3 percent). Among various options provided in the questionnaire, most respondents (10.0 percent) cited high rent cost as a reason for relocation. This is followed by security threats (9.0 percent) and

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[8] Surveyed residents were asked if their your household had ever changed accommodation or relocated

damage caused by the blast (8.0 percent). The highest reported reasons for relocation within Mar Mikhael are damage caused by the blast (17.7 percent) and high rent cost (17.7 percent).

Overall, the demographic findings reported suggest a shift in populations residing in the neighbourhood between 2018 and 2021. From the 2000s, with the rise of a creative class followed by trendy cafes, boutiques and restaurants, Mar Mikhael had experienced a major change in its socio-economic profile characterised by the increased presence of expats, tourists, and consumer visitors (GAIA-heritage 2015). This had contributed to the general diversity of Mar Mikhael (Zukin 1998; Mintchev & Moore 2016), although it was paired with waves of financial investments in the neighbourhood, forcing out many long-term residents through eviction and demolition (Fawaz & Mneimneh 2020). Since the financial crises and the blast, our data suggests that many of the newer residents of Mar Mikhael have now left, while many long-term residents who were born and raised in the neighbourhood have stayed.

# LIVELIHOODS: SECURING BASIC NEEDS AND DEVELOPING COPING STRATEGIES POST-BLAST

Economic conditions in Lebanon have quickly deteriorated amid the COVID-19 outbreak, the financial collapse, and the political crisis. The August 4th blast, which comprises the third consecutive economic shock since October 2019, has further exacerbated living conditions. As such, ongoing financial instability compounded by the devastations of the blast has prompted further reductions in purchasing power and the loss of essential livelihoods and income.

This section explores the critical components of livelihoods in Mar Mikhael and how households secure their basic needs. We present the distribution of income and principal sources of income across survey periods and subgroups. This is followed by an overview of main labour force indicators, highlighting diverging trends and disproportionate impacts of labour market shocks. The section concludes with an assessment of current financial vulnerabilities and coping methods deployed by households.

### INCOME REDUCTION AND INEQUALITIES

Overall, our findings confirm increasing income inequalities among Mar Mikhael's households. The data shows considerable reductions in real wages across all income groups in area, with the exception of those in the top income bracket. The data also illustrates increasing numbers of households being pushed below the minimum wage.

The estimated average monthly income for the Mar Mikhael population stands at 3,936,350 LBP in 2021 – 28.5 percent lower than mean income in 2018 (t(591)=8.1, p<0.001). Significant discrepancies in approximated income reductions are observed between Lebanese (26.3 percent) and non-Lebanese households (44.3 percent) across the two survey periods (t(591)=2.2, p<0.05). One reason is that Lebanese households are more likely to be at the top of the income distribution with secure contract jobs, or earnings in foreign currencies, and are therefore more sheltered from income and price shocks. To clarify, Lebanese households account for over 86.0 percent of the highest two income brackets in 2018 and 94.7 percent in 2021. The data also shows that Lebanese households constitute the majority of fresh-dollar earners (86.7 percent)[9] and are significantly more likely to have written employment arrangements (55.6 *percent* vs. 16.7 *percent*; $X^2(1)$ = 12.5, p < 0.001).

Figure 5 shows that household income is skewed towards lower income brackets across both survey periods. The lowest two brackets constitute 27.4 percent of Lebanese and 36.2 percent of non-Lebanese household income in 2018. In 2021, the income distribution shifts further to the left, so that earners of up to 2,400,000 LBP account for 61.0 percent of total Lebanese household income and 87.1 percent of non-Lebanese income. This reflects reductions in real wages following the 80.0 percent devaluation of the LBP at the time this report was published (Lira Rate 2021). As a result, earnings accruing to middle-income earners decline and an additional 7.7 percent of household income is pushed below the minimum wage of 675,000 LBP with

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[9] Among 415 sampled households in 2021, 257 (61.9 percent) reported the currency of earnings. Out of those, 93.4 percent were paid in LBP, 4.7 percent were paid in fresh dollars exchanged at the black-market rate, 0.4 percent were paid in local dollars exchanged at the 3,900 LBP/USD rate. The rest were paid in one or more currencies as follows: 0.8 percent were paid in both LBP and fresh dollars, 0.4 percent were paid in LBP and local dollars, and 0.4 percent were paid in all three denominations.

**Figure 5.** Income Distribution by Nationality 2018 – 2021
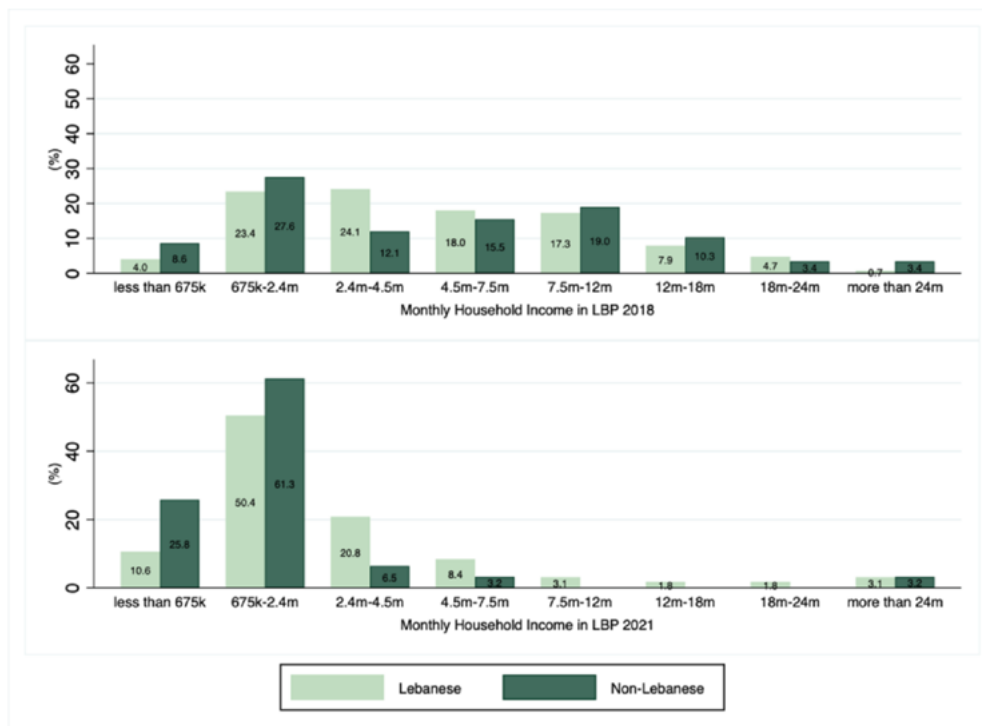


**Note:** Income was standardised based on the different LBP-to-dollar values. Survey data was collected for a representative sample of the population estimates for the neighbourhood of Mar Mikhael across the cadastres of Rmeil and Medawar.

significant discrepancies between Lebanese and non-Lebanese households (10.6 percent vs. 25.8 percent respectively; t(255)=-2.4, p<0.01)[10]. At the other end of the distribution, households earning more than 18,000,000 LBP in 2018 make up 5.4 percent of Lebanese and 6.8 percent of non-Lebanese income, consisting wholly of earnings from European and North American residents. This image changes in 2021 as the proportion of non-Lebanese at the top two brackets becomes half of its 2018 share. However, the corresponding share among Lebanese declined only slightly to 4.9 percent, further widening the income gap between Lebanese and non-Lebanese residents. In terms of spatial concentration, the Hkmeh and Mar Mikhael sectors presented the areas with most household earning above 15 million LBP at 14.8 and 3.7 percent respectively in 2021. Hkmeh

was also the area with the lowest number of sampled households with earnings below 4.5 million LBP at 66.7 percent, while in all other sectors households predominately declared earnings in the three lowest income brackets.

This gap is manifested in divergent living standards as measured by access to or ownership of basic household assets. To acquire a full understanding of current living standards, we assess material wellbeing in 2021 using an index of wealth constructed through principal component analysis (UNICEF 2015). The index measures a household's socio-economic position by looking at durable possessions and dwelling features. This includes the possession of a telephone, television, refrigerator, motorcycle bicycle, car, mobile phone, computer, internet

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[10] Article 44 of the Labour Code stipulates that salaries must not be lower than the minimum wage set by a decree issued from the Lebanese Council of Ministers. As per the last amendment in February 1, 2012, the minimum official wage was fixed at 675,000 LBP (Geagea & Wanssa 2017).

**Figure 6.** Wealth Index Quintiles by Cohort 2021



**Note:** Household wealth was assessed through an index constructed by principal component analysis using data on dwelling characteristics and personal assets. Survey data was collected for a representative sample of the population estimates for the neighbourhood of Mar Mikhael across the cadastres of Rmeil and Medawar.
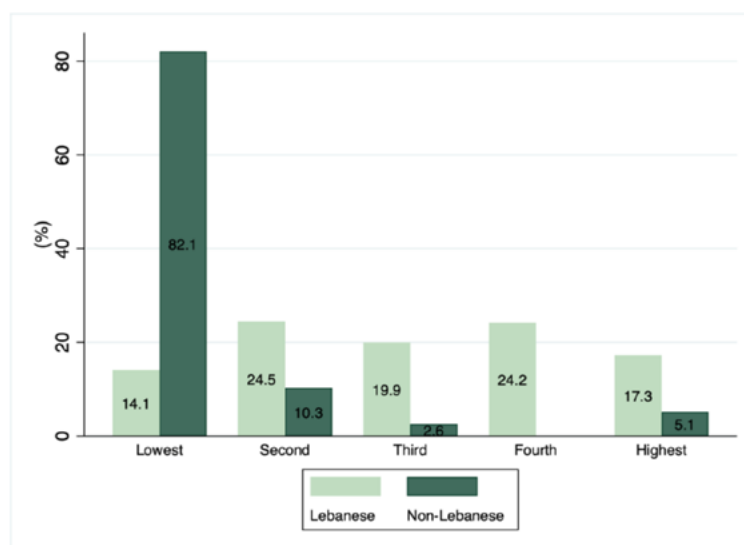
connection, building elevator, and a private parking spot. Figure 6 shows that Lebanese households are normally distributed along the five constructed wealth index quintiles. In contrast, for the wealth distribution of non-Lebanese we observe much higher density on the lower sides of the index. For Lebanese households, 17.3 percent are found in the highest quintile, compared to 14.1 percent being in the lowest quintile. For non-Lebanese households, 82.1 percent are categorised in the lowest quintile and 5.1 percent in the highest, thus complementing results from the income data.

Such income and wealth differentials in Lebanon are well-documented for both pre-crisis (Edwin et al. 2017; CAS & ILO 2020) and post-crisis levels (ESCWA 2020; Kebede et al. 2020; WFP 2020). However, an extensive assessment of income changes is required to capture the disproportionate effects of the triple crisis. In this respect, respondents were asked to indicate changes in income since October 2019 on a Likert scale ranging from 1 (decreased a lot) to 5 (increased a lot). Table 1 displays reported income changes by household head nationality, gender, age group, contract type, and monthly income with options re-coded to a 3-point scale.

The results show how the majority of respondents (87.7 percent) report reductions in household income compared to the period prior to October 2019. This was unanimously reported by both Lebanese and non-Lebanese households, and male and female-headed households. Respondents were slightly better off in households headed by younger residents. Similarly, those with written employment agreements (75.9 percent reported decrease) fared better than those with no agreements (88.9 percent reported decrease) and those with oral agreements (90.4 percent reported decrease). However, there were no significant differences in reported income changes across examined subgroups, as reported in column 6, with the exception of household monthly income. Most respondents across the income distribution report relative reductions in income level with the exception of those in the top income bracket. Households earning more than 24,000,000 LBP are more likely to have fresh-dollar denominated earnings (62.5 *percent* vs. 3.6 *percent*; $X^2(1) = 53.7$, p < 0.001) making them relatively more sheltered from negative economic shocks.

**Table 1.** Reported Changes in Income after October 2019 by Subgroup

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Decreased | No Change | Increased | Total | N | Chi2 p-value |
| **Total** | **87.7%** | **11.5%** | **0.8%** | **100.0%** | **392** | |
| Nationality | | | | | | 0.249 |
| Lebanese | 88.4% | 11.0% | 0.6% | 100.0% | 354 | |
| Non-Lebanese | 81.5% | 15.8% | 2.6% | 100.0% | 38 | |
| Household Head Gender | | | | | | 0.709 |
| Male | 89.2% | 10.0% | 0.8% | 100.0% | 241 | |
| Female | 86.6% | 12.7% | 0.7% | 100.0% | 142 | |
| Household Head Age Group | | | | | | 0.423 |
| 25-35 | 83.4% | 13.3% | 3.3% | 100.0% | 30 | |
| 35-44 | 80.9% | 17.0% | 2.1% | 100.0% | 47 | |
| 45-54 | 93.9% | 6.1% | 0.0% | 100.0% | 49 | |
| 54-64 | 89.3% | 10.7% | 0.0% | 100.0% | 84 | |
| 64+ | 89.0% | 10.4% | 0.6% | 100.0% | 173 | |
| Household Head Contract Type | | | | | | 0.160 |
| Written Agreement | 75.9% | 22.9% | 1.2% | 100.0% | 83 | |
| Oral Agreement | 90.4% | 8.2% | 1.4% | 100.0% | 73 | |
| None | 88.9% | 11.1% | 0.0% | 100.0% | 9 | |
| Household Monthly Income (LBP) | | | | | | 0.000 |
| Less than 675k | 96.7% | 3.3% | 0.0% | 100.0% | 30 | |
| 675k-4.5m | 85.9% | 13.0% | 1.1% | 100.0% | 177 | |
| 4.5m-12m | 88.9% | 11.1% | 0.0% | 100.0% | 27 | |
| 12m-24m | 62.5% | 37.5% | 0.0% | 100.0% | 8 | |
| More than 24m | 25.0% | 62.5% | 12.5% | 100.0% | 8 | |

**Note:** Respondents were asked to indicate changes in income since October 2019 on a Likert scale ranging from 1 (decreased a lot) to 5 (increased a lot). Question options were recorded to a 3-point scale as reported in the table.

When exploring income changes in the context of labour market shocks, it is also instructive to examine the distribution of income sources across the different income brackets. Figure 7 presents the composition of income by household income group in 2021. On average, labour income accounts for most household earnings in Mar Mikhael (49.2 percent). This is followed by income from savings (35.8 percent), self-employment (14.1 percent), gifts from family (13.4 percent), remittances (12.3 percent), and assistance or aid from a humanitarian organisation/charity (5.8 percent).

The data suggests that non-labour income is highest among minimum-wage households. As observed in other contexts, as these households cannot access more labour income, they are the most likely to have diversified sources of income (Davis et al. 2014). In this respect, income diversification may be used as a risk-reduction strategy to relax consumption and cope with livelihood vulnerabilities. This is especially true in times of crises or income shocks where households turn to alternative and/or supplementary sources of income to make ends meet (WFP 2020). At the other end of the distribution, it is noteworthy that income from remittances is highest among the top income groups, supporting further the above-mentioned figures delinking high-income households from current macro-financial shocks. This is because remittances function as a hedge, enabling households to smooth consumption during episodes of fiscal/exchange rate instability (Beaton et al. 2018). Similarly, we observe a relatively higher share of self-employment earnings among high-income groups. Compared to other sources of income, particularly labour income, self-employment acts as a good economic shock absorber as it provides for more flexibility in adjusting to price changes (Berry & Rodriguez 2001; Narjoko & Hill 2007).

**Figure 7.** Main income sources by income bracket 2021
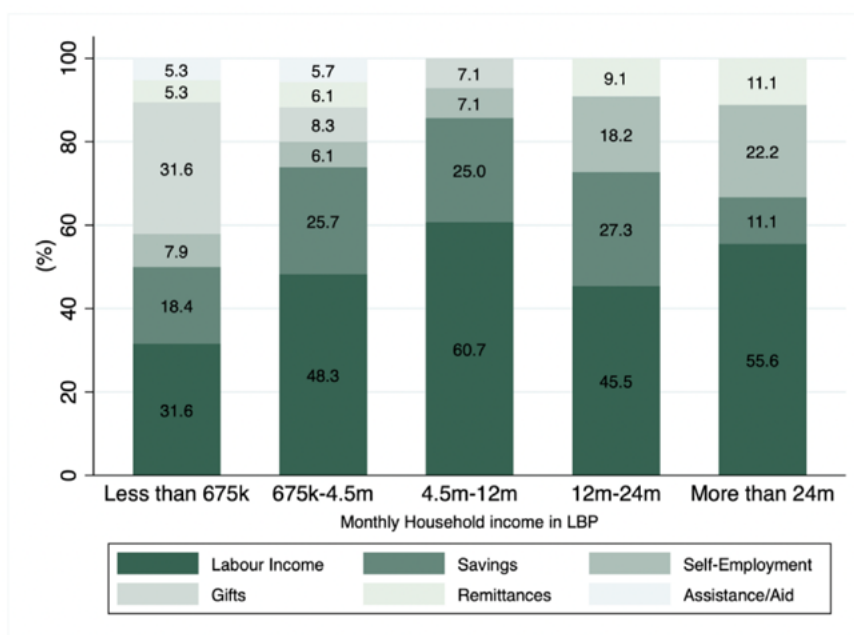


## MAIN LABOUR FORCE INDICATORS

In addition to changes in income and wealth, an assessment of labour market activity across subgroups of our sample provides further insights into the impacts of the blast and the economic downturn. The main labour force indicators for the Mar Mikhael labour market, derived from the 2018 and 2021 data, are displayed in Table 2. An equal share of residents (73.3 percent) is active in the labour force in both sampled years[11]. The inactive population consists mostly of housewives (49.3 percent and 50.9 percent), students or trainees (34.3 percent and 34.3 percent), and retirees (10.5 percent and 15.1 percent) in 2018 and 2021 respectively. The analysis refers to changes from 2019 given both the Lebanese liquidity crisis (August 2019) and the October revolution started in this year.

Out of the total labour force, 8.2 percent report being unemployed in 2018, and a significantly higher proportion of 27.3 percent is unemployed in 2021 ($X^2(1) = 123.5$, $p < 0.001$). The higher rate of unemployment in 2021 exceeds the Beirut 2019 rate by 15.7 percentage points and might be attributed to a deteriorating economic climate instigating employment loss (CAS & ILO 2020; WFP 2020; UNDP 2020). In fact, survey results show that 50.6 percent of unemployed or inactive household heads were let go in or after 2019. Most household heads pushed out of employment worked in Ashrafieh (22.0 percent), outside Beirut (22.0 percent), Mar Mikhael (9.8 percent), and at home (9.8 percent). In terms of sectoral distribution, we observe the highest reported layoffs among Lebanese household heads in the administrative and support services sector (18.2 percent). A relatively high proportion also worked in the financial and insurance sector (12.1 percent) and the transport sector (12.1 percent). Non-Lebanese household heads laid-off in or after 2019 worked mostly in

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[11] Our working-age group sampled (15-64 years) consist of 251 residents in 2018 and 589 residents in 2021. The limitation in the comparison of the data being that while only one member per household was recorded in the 2018 survey, up to 10 members per household were recorded in 2021.

**Table 2.** Main Labour Force Indicators 2018 – 2021

|  | Employment Rate | Unemployment Rate | Inactivity Rate |
|---|---|---|---|
| **Beirut 2018-2019** | 88.4% | 11.6% | 47.4% |
| **Mar Mikhael 2018** | 91.8% | 8.2% | 26.7% |
| Nationality |  |  |  |
|     Lebanese | 92.0% | 8.0% | 29.7% |
|     Non-Lebanese | 91.5% | 8.5% | 16.1% |
| Gender |  |  |  |
|     Male | 98.2% | 1.8% | 10.6% |
|     Female | 82.4% | 17.6% | 42.2% |
| **Mar Mikhael 2021** | 72.7% | 27.3% | 26.7% |
| Nationality |  |  |  |
|     Lebanese | 72.8% | 27.2% | 26.8% |
|     Non-Lebanese | 72.0% | 28.0% | 25.4% |
| Gender |  |  |  |
|     Male | 75.5% | 24.5% | 14.6% |
|     Female | 69.5% | 30.5% | 36.8% |

**Note:** Beirut 2018-2019 data sourced from CAS & ILO (2019)

construction (37.5 percent) and domestic work (37.5 percent). This may be attributed to the irregular and casual nature of work in these sectors (ILO 2020).

Lebanese and non-Lebanese residents display no radical differences in unemployment, but non-Lebanese are more likely to be active in the labour market across both survey periods. This finding is consistent with national figures and may be because most out-migration occurs primarily for economic reasons (CAS & ILO 2020; Arab Barometer 2019). On the other hand, significant gender differences are observed with men suffering greater job losses compared to women. The male unemployment rate records a 22.7 percentage point increase in 2021 whereas the female rate has increased by 12.9 percentage points. This may be attributed to the gender composition of different sectors within the 2018 labour market. For instance, a larger proportion of men (10.3 percent) compared to women (1.7 percent) in 2018 are employed in manufacturing, transportation, and construction. These are regarded as highly cyclical sectors which are largely affected by economic downturns (Alon et al. 2020). Women, on the other hand, are highly represented in relatively non-cyclical sectors such as education, health, and professional services where the proportion of female employment exceeds that of men by 18.4 percentage points.

Sectoral distribution analysis shows that across both years, the services sector employs most workers (87.4 percent and 81.2 percent in 2018 and 2021 respectively). This resembles Beirut-wide distribution of 87.2 percent services and 12.7 percent industrial activity (CAS & ILO 2020). Many Lebanese residents surveyed in 2018 worked in wholesale and retail trade (24.2 percent), followed by professional, scientific and technical activities (15.3 percent). At present, the largest share of Lebanese work in administrative and support service activities (9.3 percent) and human health and social work (9.3 percent). Non-Lebanese are mostly concentrated in activities of households across both survey periods 2018 (11.9 percent) and 2021 (37.5 percent). This is followed by accommodation and food services in 2018 (11.9 percent) and construction in 2021 (33.3 percent).

**FINANCIAL DISTRESS AND COPING STRATEGIES POST-BLAST**

The current economic situation has impacted the financial wellbeing of households at every income level as previously displayed, albeit more so for lower-income households. With tightened restrictions on banking withdrawals, an increase in prices of goods and services, and an abrupt need for reconstruction, residents are increasingly struggling to cover expenses. Figure 8 displays the percentage of households in 2021 reporting difficulties covering

**Figure 8. Difficulty Covering Expenses by Income Group (LBP) 2021**
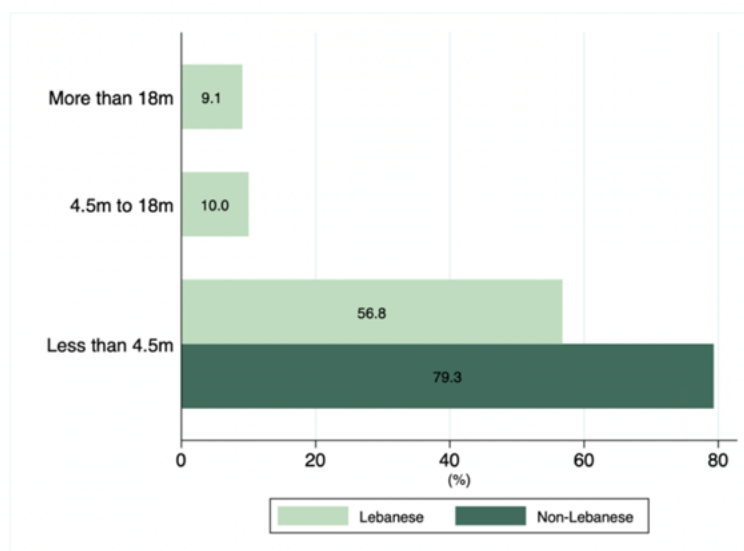


expenses by income level. Overall, 47.3 percent of households, representing all levels of income, report such difficulties. These problems are more highly concentrated among lower-income households earning up to 4,500,000 LBP monthly (59.8 *percent* vs. 9.3 *percent*; $X^2(1) = 36.6$, p < 0.001). The data shows that even lower-income households whose income has reportedly remained stable after October 2019 are struggling as one-third (33.3 percent) of those face difficulties covering costs. Such struggles are significantly more widespread among non-Lebanese residents, reflecting the higher prevalence of low-income households among these communities. An overwhelming 79.3 percent of non-Lebanese in lower-income brackets report problems paying their bills, compared to 56.8 percent of Lebanese households in this group ($X^2(1) = 5.3$, < 0.05). The overall majority (93.5 percent) of those falling short on covering costs have no access to local or fresh-dollar denominated earnings ($X^2(1) = 15.7$, p < 0.001).

To cope with financial difficulties, households across the entire income spectrum have resorted to borrowing money. In total, 27.3 percent of respondents in 2021 borrowed money in the past year. A significantly higher proportion of non-Lebanese (61.5 percent) than Lebanese (23.7 percent) reported borrowing ($X^2(1)=25.4$, p < 0.001).

Although the share of Lebanese taking on debt is relatively low compared to the national rate (46.0 percent), the percentage among non-Lebanese, precisely Syrian households, is found to be more severe at 78.6 percent compared to the national rate (72.0 percent) (WFP 2020). Demonstrating the secondary effects of the blast, most households resort to borrowing to cover food (41.2 and 87.5 percent), and household expenses (32.9 and 54.2 percent) as illustrated in Figure 9 by nationality. This is followed by health care expenses (27.1 percent and 37.5 percent), and housing and rent expenses (17.6 percent and 50 percent) for Lebanese and non-Lebanese respectively. The highest discrepancies among Lebanese and non-Lebanese households are observed for food expenses as non-Lebanese were more than twice as likely to borrow to cover these costs ($X^2(1) = 16.1$, p < 0.001) and housing expenses with non-Lebanese almost three times as likely to borrow than Lebanese ($X^2(1) = 10.5$, p < 0.001).

**Figure 9.** Reasons for Borrowing by Nationality 2021



To capture financial coping strategies deployed post-blast, respondents were asked a set of questions on potential methods of shifting expenditures and reallocating resources to cope with food insecurities and financial burdens. The aim was to capture the extent to which households resort to negative coping mechanisms to meet their essential needs. The set of questions asked is constructed as a modified version of the Livelihood Coping Strategies questions which include three main types of coping mechanisms: (1) stress strategies of moderate intensity (2) crisis strategies of high intensity and (3) emergency strategies of severe intensity (Maxwell & Caldwell 2008).[12] The latter has a greater impact on a household's future coping capacity. For instance, a household whose members are pushed into begging or accepting exploitative work (emergency coping strategies) will have a reduced coping capacity to future disturbances when compared to a household that had to borrow money to buy food (stress coping strategies) (Ruel et al. 1998).

Our results suggest that Mar Mikhael households are more likely to adopt stress coping mechanisms than other strategies to fulfil food needs. Sampled households in Mar Mikhael have increasingly adopted high levels of stress strategies (31.8 percent pre-blast and 42.4 percent post-blast) but have roughly maintained the same low level of crisis (18.3 percent pre-blast and 21.2 percent post-blast) and emergency strategies (9.6 percent pre-blast and 10.4 percent post-blast). Among all mechanisms, respondents were most likely to dip into their household savings, reduce health expenses, and buy food on credit to deal with current and previous financial burdens. They are also more likely to spend household savings after the blast (37.8 percent) than before the blast (26.5 percent). This compliments findings from a web-based survey conducted by WFP (2020) where Lebanese respondents in Beirut are found to rely heavily on savings and selling domestic assets post-blast. Despite limitations on bank withdrawals, many

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[12] In the 2021 Mar Mikhael survey, stress strategies include buying food on credit, spending household savings, and moving to a cheaper rental place, crisis strategies include reduction of health expenses, marriage of children under 18, moving children from a private school to a public school, and withdrawing children from school, and emergency strategies include selling household goods, involving children in income-generation, and accepting high-risk, dangerous, or exploitative work.

residents had already withdrawn portions of their savings at the onset of the October 2019 protests to safeguard them at home (Francis 2020).

Besides these strategies, there are no radical differences in coping patterns pre- and post-blast. For instance, the percentage of respondents reporting reductions in health expenses (18.1 percent and 20.2 percent post-blast), buying food on credit (10.4 percent and 13.5 percent post-blast), and selling household goods (8.9 percent and 9.4 percent post-blast) is roughly equivalent across both periods. Similarly, almost no respondents report accepting risky or exploitative work, withdrawing children from school, moving children to a public school, or involving children in income-generation both pre- and post-blast. This is in stark contrast to results from a recent national assessment by UNICEF (2021) revealing a large deployment of negative coping mechanisms impacting children (15 percent withdrew children from schools and 9 percent involved them in income-generating activities.)

# HOUSING: EXTENSIVE NGO ASSESSMENT WHILE RENTS KEEP RISING

Tensions around housing security are multiple in Mar Mikhael. Throughout its evolution, housing in Lebanon has been hijacked by real-estate profit discourses, growing neo-liberal urbanism and free market tendencies, as well as rising competition for living space. Triggers for evictions and displacement stem from this context. The financialization of housing in the Mar Mikhael dates from the 2000s with the arrival of creative industries, followed by the influx of the nightlife industry which rapidly led to the role of land as a financial asset (Krijnen 2010; Beirut Urban Lab 2021).[13] In addition, the new law regulating old rents (approved in 2014 and amended in 2017) has led to countless evictions and deprived many old tenants of their rights to stay in their residency (Saksouk & Bekdache 2020). Finally, the deterioration of the built fabric and housing interiors following the 4th of August blast led to the flight of many residents and increased housing insecurity for many others. Fawaz and Mneimneh (2020) argue the blast should be seen as a disruption that will intensify the effects of the already-in-place mechanisms, pushing away a larger number of those who have worked or lived in the neighbourhoods surrounding the port.

As well as being subject to economic shocks, Mar Mikhael residents have therefore also been facing various housing threats. As such, although often considered a middle-income area, Mar Mikhael presents increasing housing vulnerabilities for many of its inhabitants through rising housing prices, threats of eviction, damage from the blast and lack of access to adequate housing conditions (Saksouk & Bekdache 2020). This section explores the critical components of housing security in the area. It gives an overview of the extent sampled buildings were affected by the blast and explores the reasons why residents chose Mar Mikhael as a living location. This section also examines the evolution in housing tenure trends from 2018 to 2021 and explores different forms of housing unaffordability found in the area.

## PREVAILING NGO ASSESSMENT IN BUILDING DAMANGE

We first review the extent to which buildings in our sample were affected by the 4th of August blast. Among the households surveyed in 2021, over half (52.0 percent) reported their building was structurally affected by the blast. Out of the 275 buildings surveyed in 2021, 29.8 percent were partially affected, and 31.6 percent were no longer structurally sound. About a quarter (23.3 percent) of building owners of structurally affected buildings agreed to repairs after the blast, most of them agreeing immediately without receiving pressure from NGOs or INGOs.

NGOs were the most prevalent body to assess the physical damages of buildings or offer repairs (70.4 percent of respondents), while only 31.3 percent of respondents declared public bodies provided assessment.[14] This confirms the wide response of grassroots organisations following the blast and their continued efforts to date in the ongoing reconstruction effort (Chehayeb & Sewell 2020). Both citizen scientists and local stakeholders highlighted, however, the pronounced coordination problems between different NGOs, with some buildings involving up to eight different organisations (Frem et al. 2021). Our data suggests some spatial

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[13] Krijnen's (2018) research reveals that between 1999 and 2011, at least a dozen laws were issued to incentivise the flow of capital into the built environment.

[14] Other respondents declared philanthropists (7.2 percent), civil groups or individuals (4.8 percent), international aid relief (3.1 percent), private institutions (3.1 percent), and political parties (0.5 percent) also contributed to assessing physical damages of their building or offer repairs but to lesser degrees.

**Figure 10. Damage assessment or offer of repairs**



**Note:** Households in 275 buildings were sampled in 2021 The numbers within each sector mark the percentage of sampled buildings assessed by a public body.

concentration in the number of buildings assessed for damages by public bodies, showing a focus of efforts in the areas closest to the blast with Hkmeh at 55.1 percent of surveyed buildings and Mar Mikhael at 47.6 percent of surveyed buildings (Figure 10). NGOs on the other hand assessed buildings across our whole case-study area. We do not, however, find significant differences in assessment of damages of dwellings inhabited by Lebanese or non-Lebanese by either NGOs (70.7 and 66.7 percent respectively) or public bodies (31.9 and 25.7 percent respectively).

More than half of surveyed households have always lived in Mar Mikhael (54.0 percent), while almost a third of households live in the neighbourhood to be near family and friends (28.0 percent). Both these reasons are highest among Lebanese residents as illustrated in Figure 11. While Syrian households predominantly live in the neighbourhood for work (64.3 percent) and for standards of accommodation (21.4 percent). Other residents, predominantly from

Europe and North America chose the area for work (36.4 percent) and for the lifestyle (27.3) notably the close access to restaurants and cafes even after the financial crisis. Residents were also asked the main reasons for choosing their current accommodation. Lebanese households mostly chose their accommodation to be close to family and relatives (26.9 percent) or because they inherited the dwelling (29.8 percent).

**Figure 11.** Main reason for moving to Mar Mikhael
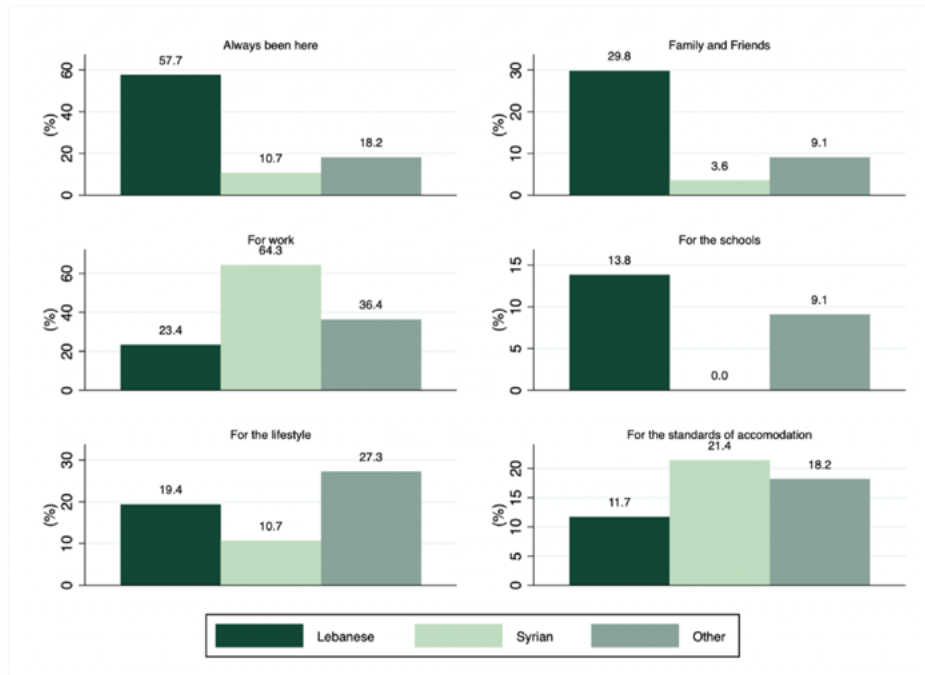


**Note:** This figure differentiates between Syrians and other non-Lebanese residents as tendencies differ more widely than for other analysis, however our 2021 sample only includes 11 households of other non-Lebanese nationalities and percentages should therefore only be considered indicative.

Only 9.4 percent of surveyed households stated their intent to move in the next 6 months, confirming other research findings that those who were born and raised in Mar Mikhael are not planning to leave (Beirut Urban Lab 2021). As illustrated in Figure 12, most households reported social life (57.6 percent) as being the main reason they chose to stay with small differences between Lebanese and non-Lebanese. Other reasons included the absence of an alternative place to live (45.5 percent) and the strategic location (40.0 percent). Lebanese and non-Lebanese residents differ in reasons for staying in the area, non-Lebanese stated work as a main reason for staying (12.1 percent vs. 42.3 percent respectively), while Lebanese stated memories linked to the place as primary reasons for wanting to remain (38.2 percent vs. 11.5 percent respectively).

Citizen scientists commented that Syrian and migrant workers have left because of the economic situation, and low-income non-Lebanese nationals that have stayed in the area are receiving aid. On the other hand,

46.2 percent of sampled non-Lebanese residents mentioned the affordability of the neighbourhood as one of their reasons to stay, and 28.2 percent stated that affordability of accommodation was one of their reasons for moving to the area. When looking more closely at the data, however, we observe that the residents who reported the affordability of the area are paying very low rents, ranging from 550 to 750 thousand LBP per month. We also observe that these households are predominantly at the higher end of the income bracket.

**Figure 12.** Reasons for staying in Mar Mikhael



**Figure 12.** Reasons for staying in Mar Mikhael
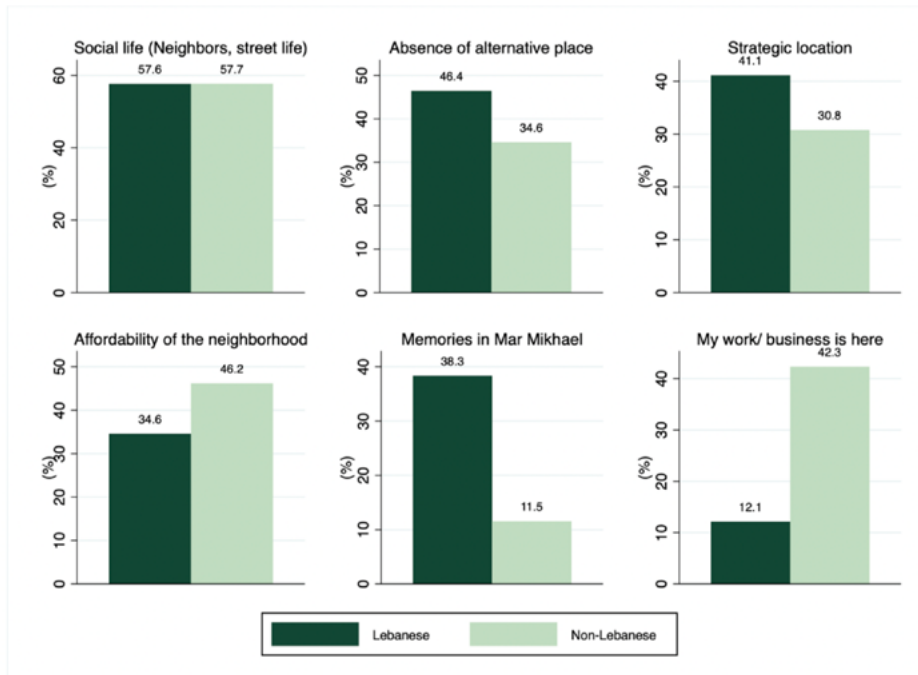
## LESS LIVING SPACE AND REDUCTIONS IN OLD LEASES

In evaluating the changes of housing conditions in the neighbourhood, we first look at the evolution in living space. On average both Lebanese and non-Lebanese residents of Mar Mikhael are now living in smaller spaces with less bedrooms ($X^2(6)$ = 191.0, $p$ < 0.001). Non-Lebanese residents living in apartments with two bedrooms or less have increased from 75 percent in 2018 to 85 percent in 2021, while Lebanese residents living in apartments with two bedrooms or less have increased from 48 to 65 percent. There is also a significant difference between Lebanese and non-Lebanese housing ($X^2(6)$ = 45.2, $p$ < 0.001): Lebanese residents live more spacious accommodation. We find no difference in satisfaction of conditions of living space between 2018 and 2021, however, nor by nationality.

As observed in Figure 13 we see a stable number of

owners among Lebanese residents in Mar Mikhael at approximately 41 percent. This confirms other literature observing 48.2 percent of owners in Mar Mikhael in 2014 and 44.0 percent in 2020 (GAIA-heritage 2015; Beirut Urban Lab 2021).[15] These results contrast with the national distributions where owner shares were last recorded at 71.0 percent (Yaacoub & Badre 2012). Only 10.6 percent of surveyed owners were approached to sell following the 4th of August blast. These included proposals from one political party, three real estate offices, one building owner and one private institution. Seven respondents were not aware of the entity attempting to purchase their dwelling or chose not to disclose it.

We observe a significant evolution in tenure type for Lebanese residents between 2018 and 2021 (t(688)=2.7, p<0.01). More specifically, a significant reduction in old rent contracts from 39 to 25 percent for Lebanese and from 8.6 to 2.5 percent

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[15] These numbers are based on the following data. In 2014, on a household survey of 286 observation collected as part of the MEDNETA project aims at improving the economic and social returns of the Arts, Crafts and Design in Mar Mikhael. In 2020, on 512 observations on mode of occupancy collected within the Technical Assessment led by UNHCR's implementing partners between September and December of that year.

**Figure 13.** Housing Tenure by year and nationality
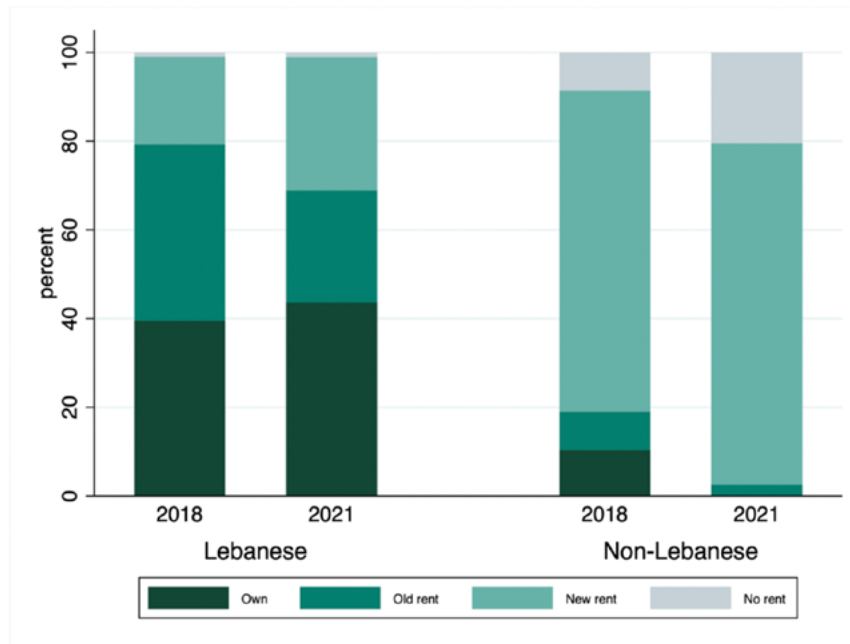


for non-Lebanese for all forms of tenure. This is a considerable reduction especially if we compare it to the overwhelming majority in old leases recorded in 2014 in Mar Mikhael: almost 80 percent of renters and 41 percent of all forms of tenure (GAIA-heritage 2015). Despite the protections offered by the old rent law, our data thus confirms that evictions and demolitions in the neighbourhood have led to the displacement of many original residents. The ageing population has also most likely contributed to this reduction in old leases which have not been passed on to descendants.

Citizen scientists observed that the population was already leaving before the blast, renting out their places to newcomers for higher prices or selling, thus furthering the process of gentrification being left with no other choice to sustain their livelihoods. Recent research also suggests that some old tenants may be forced to leave their apartments if they are unable to cover the post-blast repair costs, especially if their landlords refuse to offer help (Beirut Urban Lab 2021). Citizen scientists also remarked that other tenants may no longer afford to pay high rent as a result of the economic crisis, often leaving apartments to impoverished landlords who are unable to cover the costs of repair. New rents, which

made up the smallest part of housing tenure in 2018 for Lebanese residents at 19.7 percent have, on the other hand, greatly increased to a third (30.5 percent) of total Lebanese housing in Mar Mikhael (Figure 13). New rents have also slightly increased among non-Lebanese from 72.4 to 76.9 percent between survey periods.

If we consider all types of tenancies in 2021, the proportion of tenants is high compared to the nationwide percentage (29.0 percent) for both Lebanese residents at 55.3 percent and non-Lebanese residents at 79.5 percent. The association between tenure type and nationality is statistically significant. The data thus suggests both a clear evolution toward new rental contracts in the housing market affecting all residents, and a clear disadvantage for non-owners. When asked if they were satisfied with the value for money for the rent they paid, 69.1 percent of respondents said they were either satisfied or very satisfied. Moreover, no significant differences between satisfaction were observed between nationalities despite observed deterioration in building quality (Beirut Urban Lab 2021).

We must note, that this analysis presents some important limitations and does not allow us to paint a complete picture of the changes in housing. Housing tenure and its related costs is a major driver of population movement, and our 2021 data only accounts for households who were living in Mar Mikhael at the time of the survey. It does not account for households who have either returned to the area at a later date following the blast, or who have no intention of returning.

**INCRERASING UNAFFORDABILITY[16]**

In terms of evolution of rent prices between 2018 and 2021, the data suggests an increase in average rents for all types of observable housing tenure. Average price per square metre has increased from 6,659 LBP in 2018, to 11,789 LBP in 2021 for old rents, however the difference between the two sampled years is not significant (t(181)= -1.9, p>0.05). The concentration in old rents remains at the lower ends of the rent spectrum with almost identical percentages (36.0-36.2) found in the lowest rent quintile as shown in Figure 14.[17] We can assume that the higher average price is probably driven by the displacement of residents who were previously paying the cheapest old rents in the neighbourhood.

In terms of new rents, the average price per square metre has significantly increased from 12,840 LBP in 2018, to 20,659 LBP in 2021 (t(166)= -3.0, p<0.01). As observed in Figure 14, the concentration in new rents is in the three highest rent quintiles, with 62.7 percent of rents in the two highest quintiles in 2018, increasing to 75 percent of rents in the two highest quintiles in 2021, with a considerable 49.3 percent of rents at over 13,334 LBP per square metre. This suggests that as other locations in Beirut, mean prices in the city have slowed down but continued increasing despite the crises and Mar Mikhael remains a location amenity area despite the financial crises and the blast (Hammoud 2020). In fact, most owners (82.9 percent) did not change rent prices post explosion, with 13.7 percent increasing rent and only 3.4 percent decreasing it. Only 3 respondents mentioned no longer paying since the explosion and these were all located in Qobayat. This suggests that the increase in average new rents observed in our data is a result of the continued effect of the financialization of housing in the neighbourhood, which had not altered six months after the Beirut blast.

**Figure 14.** **Distribution of rent quintiles by year and rent type**
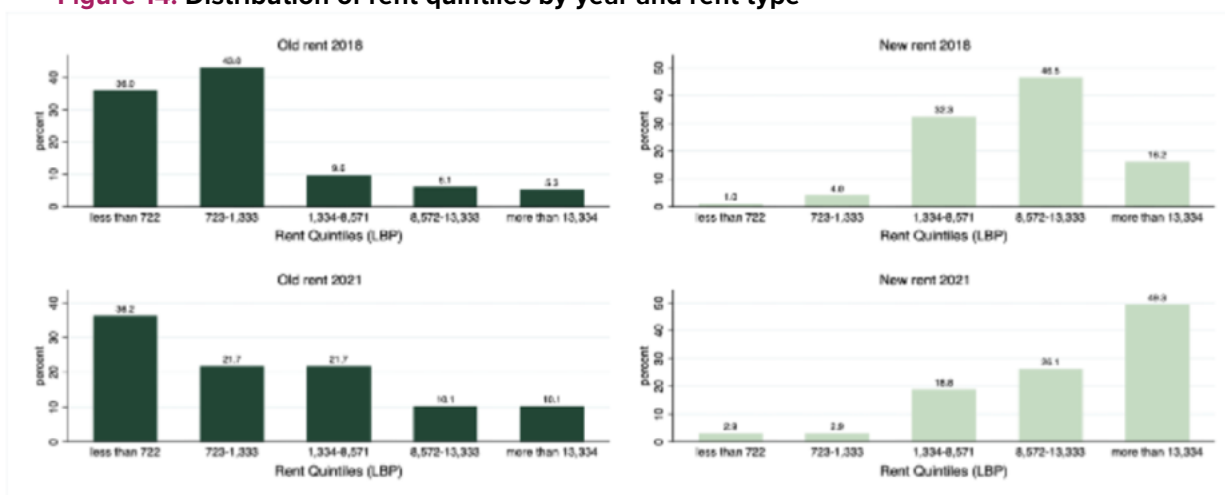


**Note:** There is no significant difference in old rent prices between our two sampled years (t(181)= -1.9, p=0.058), there is however a significant difference in new rent prices between our two sampled years (t(166)= -3.0, p<0.01)

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[16] Our sample presents a limitation. While we have only 3 percent of missing values for rent payments in 2018, we have 42 percent of missing values for rent payments in 2021.
[17] Other differences are most likely due to the limitations in samples in this case.

**Figure 15.** Increasing Unaffordability
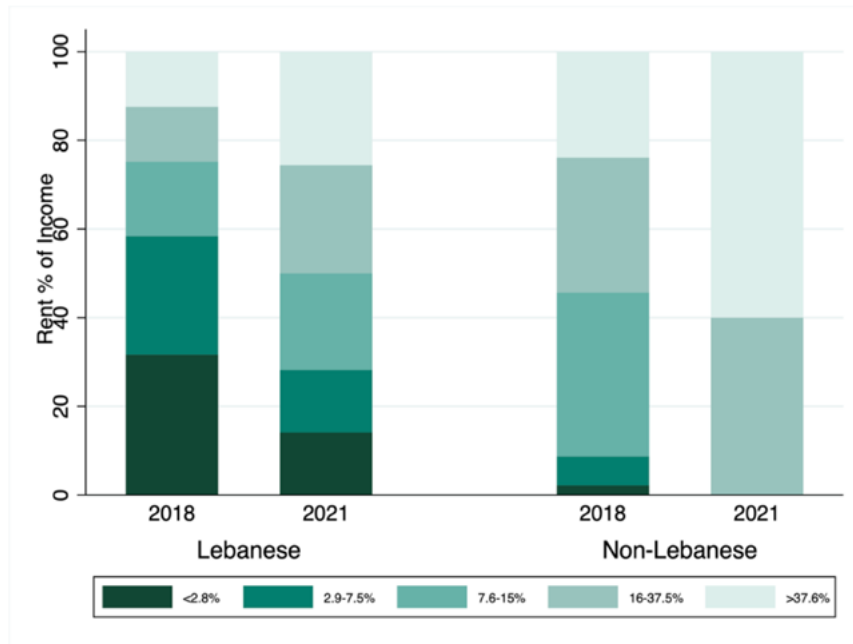


We observe a weak positive relationship between income and rent payment in 2018 (r = 0.18 p<0.01) suggesting households with additional income were not more likely to pay higher rents pre-crisis. This evolves to a moderate positive relationship in 2021 (r = 0.55 p<0.001), suggesting that households with higher incomes are more likely to pay more post-blast. This evolution may be for several reasons. Higher-income households may be more concerned with higher quality of housing post-blast in light of housing deterioration. They may also be willing to pay more for infrastructural services such as better generator access following the electricity and fuel shortages which have worsened with the financial crises (Baumann & Kanafani 2020).

We do not observe any predominance of type of tenure by sub-neighbourhoods in our area of study, however, we do find some spatial correlation in terms of higher and lower rents according to sector. There is some spatial clustering of higher rents in certain

sub-neighbourhoods in 2021. This spatial disparity is driven by new rents.[18] Hkmeh presents the area with the highest average rent per square metre at 22,900 LBP, followed by Qobayat follows an average rent per square metre at 18,067 LBP. Jeitaoui on the other hand is the most affordable area with an average rent per square metre of 9,801 LBP.[19]

We measure affordability by creating a quintile ratio between rent and income, this results into five brackets stipulating whether a household pays less than 2.8 percent of their income on rent, between 2.9 and 7.5 percent, between 7.6 and 15 percent, between 16 and 37.5 percent or more than 37.6 percent of their income on rent. Not only do we observe a significant difference between rents paid and nationality for both survey years with non-Lebanese paying higher rents on average ($X^2$(4)=63.5, $p < 0.001$), but we also observe a significant difference between affordability and nationality ($X^2$(4) = 34.7, $p < 0.001$) as illustrated in Figure 15. Indeed, only 13.7 percent of Lebanese

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[18] We do not find a significant relationship between old rents and location (216 = 21.7, p > 0.05)

[19] These reported averages are all for new rents. Mustashfa El-Roum, Khodr and Mar Mikhael present with an average rent per square metre 13,187 LBP, 16,584 LBP and 12,891 LBP respectively.

residents living in Mar Mikhael paid more than 30 percent of their income on rent in 2018; this increases to 32.5 percent in 2021. This escalation is even more significant among non-Lebanese residents, from 26.1 to 75.0 percent paying more that 30 percent of their income on rent in 2018 and 2021 respectively. However, this drastic increase is most likely driven by the changes in the socio-economic characteristics of non-Lebanese populations in the neighbourhood. As previously specified, our analysis presents limitations considering the type of households present in the area at the time of the survey.

# MENTAL HEALTH AND WELL-BEING: FINDING COPING MECHANISMS IN THE NEIGHBOURHOOD

The triple-fold crisis in Lebanon has taken a significant toll on the mental health and psychosocial well-being of individuals from all factions of society (Fouad et al. 2021). This section explores some key indicators of mental health and well-being from pre-crisis to post-explosion in Mar Mikhael. It considers both the changes in residents' sense of neighbourhood belonging and various indicators of self-reported well-being and life satisfaction. This segment also explores the different coping mechanisms residents have adopted in light of the multiple crises in order to identify possible areas of opportunity for future interventions.

## A WEARKER SENSE OF NEIGHBOURHOOD BELONING DESPITE A VALUED SOCIAL STREET LIFE

Neighbourhood relationships are a significant aspect of everyday life, and they represent how connected one feels to their immediate surroundings and their local community. The degree to which one feels a sense of belonging to their neighbourhood often reflects the strength of the local social networks and the emotional bond to the place (Young et al. 2004). These are important components of everyday life associated with a sense of community identity and wellbeing (Finney & Jivraj 2013).

Mar Mikhael is often characterised as a neighbourhood valued for its social street life. Indeed, as reported in the previous chapter, most households reported social life (57.6 percent) as being the main reason they chose to stay. In both

2018 and 2021 surveys, respondents were asked a set of questions regarding different forms of ties and interactions they have within their local neighbourhood. For example, they were asked to indicate their level of agreement with sentences such as 'I feel like I belong to this neighbourhood', which reflects how strongly connected people feel with their immediate environment. The neighbourhood belonging variables captured different forms of social connections within the local neighbourhood such as friendships and associations, seeking advice, borrowing things, planning to remain a resident, regularly stopping and talking to people, willingness to help neighbours and trust in neighbours.[20] To examine Mar Mikhael inhabitants' sense of neighbourhood belonging, we have focused on the average scores of these variables, hereafter referred to as the 'neighbourhood belonging score'. We then compared the scores between the 2018 and 2021 datasets to explore the post-crisis changes in the sense of belonging to the local area.

Overall, the data reveals a significantly lower neighbourhood belonging score in 2021 compared to 2018 (3.5 vs. 3.3 respectively; t(773)=2.7, p< 0.01)). This finding is consistent across all sampled areas, with the exception of the Mar Mikhael sector as displayed in Figure 16. Of course, we cannot pin-point which crisis may have affected this reduction the most. Various factors may influence the strength of attachment people form to their neighbourhoods such as the number of years they have lived in the same house, their age, or their nationality. The 2018

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[20] Respondents were presented with a total of 8 statements where they were asked to respond to what extent they agreed or disagreed on a 5-point Likert scale. The statements were the following: I feel like I belong to this neighbourhood; The friendships and associations I have with other people in my neighbourhood mean a lot to me; If I needed advice about something I could go to someone in my neighbourhood; I borrow things and exchange favours with my neighbours; I plan to remain a resident of this neighbourhood for a

Figure 16. Neighbourhood belonging score by sector and survey year



Figure 16. Neighbourhood belonging score by sector and survey year
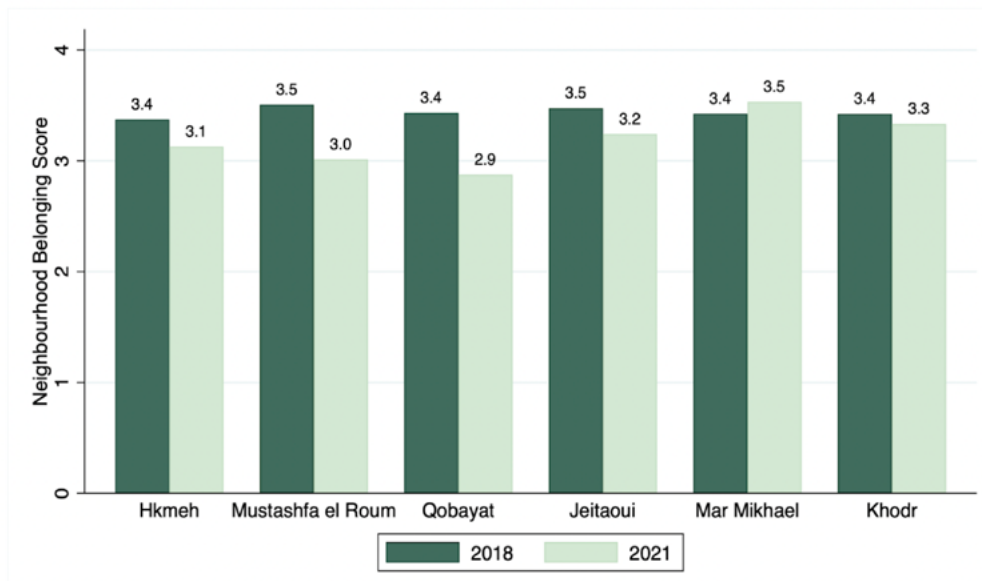
survey data showed that neighbourhood belonging correlates positively with age (r=0.3, p<0.001) as well as with years lived in the same house (r=0.3, p<0.001).  These correlations, however, appear to be weaker in 2021 (age: r=0.2, p<0.001, years in the same house: r=0.2, p<0.01). Additionally, while the 2018 data shows significant differences in the sense of neighbourhood belonging (t(358)=2.7, p<0.01) between Lebanese (mean=3.5 , SEM= 0.05) and non-Lebanese (mean=3.2 , SEM= 0.1) the 2021 dataset does not show any significant differences between these groups (t(413)=1.12, p>0.05).

It is thus reasonable to assume that the decrease in the neighbourhood belonging score is associated with additional factors that go beyond age, nationality or years spent in the same house.  For example, reporting lower levels of attachment to the neighbourhood might reflect weaker local social networks and heightened insecurity about the future of these relationships amid the post-explosion recovery of the local community as a whole.

## DRIVERS OF SUBJECTIVE WELL-BEING

To assess the mental health and wellbeing of Mar Mikhael residents in 2021, respondents were asked to rate how happy, stressed and depressed they felt on a five-point scale. From a policy perspective, such questions are valuable in that they enable an empirical examination of the different elements that drive subjective well-being (Fleche et al. 2012; OECD 2013). Over half (59.3 percent) of Mar Mikhael residents reported feeling not at all happy or not very happy, with a higher share among non-Lebanese (69.23 percent) than Lebanese (58.4 percent). The majority reported feeling stressed (73.7 percent) and depressed (67.1 percent) most of the time or often. Subjective stress was reported more frequently among Lebanese residents (74.0 percent and 69.2 percent for non-Lebanese), whereas feelings of depression were more prevalent among non-Lebanese (66.3 percent and 74.4 percent for non-Lebanese).[21]

To explore respondents' well-being, we first examine mental health indicators – i.e., measures of happiness, stress, and depression – against variables denoting the extent to which residents'

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[21] Efforts were made to obtain maximum data comparability between the two sampled years but general state happiness, stress and depression was only recorded in 2021.

**Figure 17. Mental health and exposure to the blast**
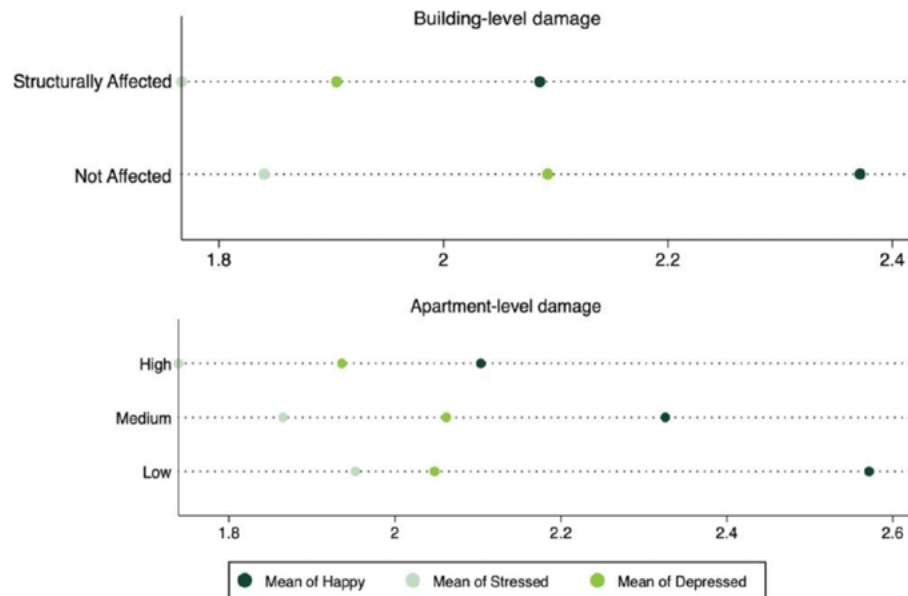


**Note:** Building-level damage: Numbers have been recoded so that high numbers are normatively positive (more happy, less stressed, less depressed) and low numbers are normatively negative (less happy, more stressed, more depressed). Apartment-level damage: The measure of apartment-level damage was constructed by aggregating residents' assessment of the level of damage to the windows, walls, and furniture on a four-point scale (1=Completely Damaged; 4=No Damage)

homes were affected by the blast. We utilise two measures of blast exposure: building-level damage, a binary variable which takes on the value of one if the building is structurally affected and zero otherwise, and apartment-level damage, constructed by aggregating residents' assessment of damage to the windows, walls, and furniture on a four-point scale (1=Completely Damaged; 4=No Damage). The aggregate measure is then recoded to a 3-point scale measuring damage level, as displayed in Figure 17. Building and apartment damage are used as proxies of blast exposure within the limitations of the survey questions. They are not intended as direct measures of blast exposure which would include countless determinants such as injury, loss of loved one, damage to one's surrounding are, loss of jobs because of the blast among others. Significant differences were observed for levels of happiness (r=-0.2; p<0.001) and depression (r=0.01; p<0.05) between residents of structurally affected buildings and structurally unaffected buildings. Respondents living in heavily damaged apartments were also significantly less happy (r=-0.2; p<0.001) and more

depressed. Stress levels correlated positively with both structural damage and apartment-level damage, with no significant differences.

To further investigate the relationship between neighbourhood and well-being, respondents were asked to rate how happy, stressed, and safe they felt towards their neighbourhood, and we compared participants' responses between the years 2018 and 2021. Responses to these questions indicate how the inhabitants of the area perceive their neighbourhood and the effect that it has on aspects related to their wellbeing in their daily lives.

Respondents' level of happiness in their neighbourhood showed higher scores in 2018 compared to 2021. As shown in Figure 18, 73.1 percent reported a high level of happiness in 2018 compared to 54.4 percent in 2021 ($\chi^2(1)$ = 26.1, $p <$ 0.001). Resident responses to the question 'how safe do you find your local neighbourhood' also show a significant difference ($\chi^2(1)$ = 22.5, $p <$ 0.001) between samples, suggesting a decrease in inhabitants' sense

**Figure 18. Feelings of stress, safety, and happiness between 2018 and 2021**



of safety in their neighbourhood between 2018 and 2021. As shown in Figure 18, 80 percent responded feeling safe or very safe in their neighbourhood in 2018 compared to 63.9 percent of participants in 2021. This difference is confirmed by Mar Mikhael inhabitants' responses regarding the perceived changes in sense of safety in the neighbourhood in 2021. About half of the respondents thought that their neighbourhood was safer before the blast both during the day (48.4 percent) and during the night (51.6 percent). Similarly, surveyed residents in 2018 revealed higher stress levels compared to those in 2021. As shown in Figure 18, 78.6 percent reported a low level of stress in 2018 compared to 71.3 percent of the respondents in 2021 ($\chi2(1)$ =4.6, p<0.05). Our findings thus suggest that respondents' daily life, sense of wellbeing and the degree to which they feel connected to their local area has been significantly affected by the blast.

Reductions in feelings of happiness and safety, along with heightened stress levels, correlate positively with a lower perceived life satisfaction (Lombardo et al. 2018; Michalos & Zumbo 2002). In this regard, the mean life satisfaction score[22] in Mar Mikhael stood at 4.7 in 2021, falling behind the national satisfaction score of 6.7 (Haerpfer et al. 2020). As shown in the density plot in Figure 19, we observe that the distribution of scores in Mar Mikhael is skewed towards the lower scores with 69.5 percent of responses below the median value of 5, compared to the national distribution which is skewed towards the higher scores 89.1 percent of responses surpassing the median value. Life satisfaction in Mar Mikhael has thus clearly lower that the national average recorded in 2018.

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[22] The life satisfaction question was asked as follows: "Using a scale of 1 to 10, where 1 means "Very dissatisfied" and 10 means "Very satisfied," how do you feel about your life as a whole right now?". The question was asked in the same manner both in the World Values Survey (Wave 7) in Lebanon in 2018 and in the vulnerabilities survey in Mar Mikhael in 2021.

**Figure 19.** Kernel density estimates of Mar Mikhael and national life satisfaction
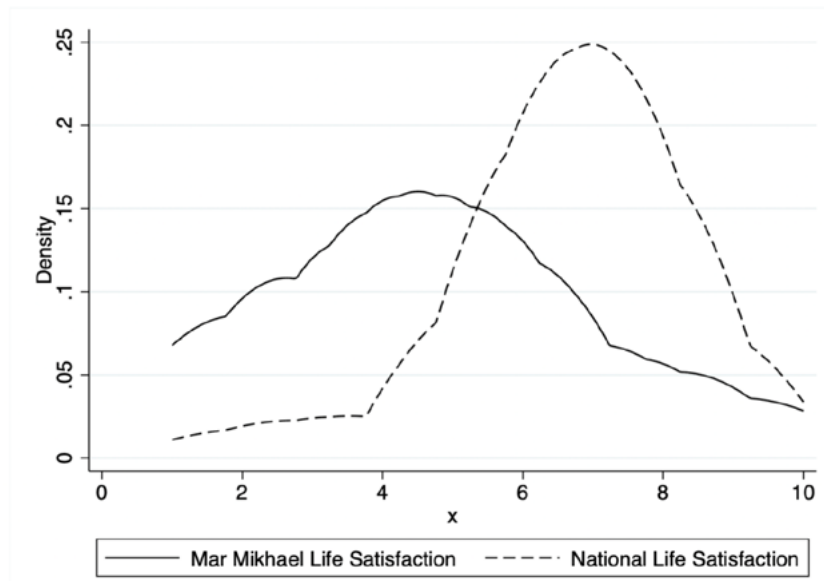


**Note:** National life satisfaction data sourced from the World Values Survey (Wave 7) 2018 (Haerpfer et al., 2020)

## DEALING WITH STRESS, DEPRESSION, OR TRAUMA POST-BLAST

The comparison of Mar Mikhael inhabitants' responses across the two survey periods suggests that resident attachment to their local area and their sense of belonging to their neighbourhood has weakened. Additionally, the 2021 survey data suggests that residents perceive their neighbourhood as having a more negative impact on their wellbeing than in 2018. To identify the kind of socio-spatial recovery solutions that are meaningful to the residents of the area, it is important to better understand how people tend to deal with issues that affect their wellbeing and what kind of coping mechanism they are adopting or are more likely to use.

A set of survey questions in 2021 attempted to capture how residents have been dealing with the effects of the blast. People were asked to indicate to what extent they use or have used certain coping mechanisms to deal with stress, depression, or trauma they faced post-blast. In general, the data suggests that people tend to cope with these issues mostly through self-support, support from family and friends and by engaging in outdoor recreation

or sport activities. More specifically, more than 2 out of 3 respondents (68.4 percent) appear to rely on self-support often or most of the time (Figure 20). Also, 1 in two (50.2 percent) reported finding support from family and/or friends often or most of the time. The data also suggests that the third most frequent coping mechanism appears to be different recreation/sports outdoor activities. We therefore observe clear predominance of family, friends, self-support and outdoor activities as the main ways residents have been dealing with the effects of the blast. There is no evidence these tendencies differ according to income, education levels or other socio-economic variables.

**Figure 20.** Coping mechanism to deal with the effects of the blast
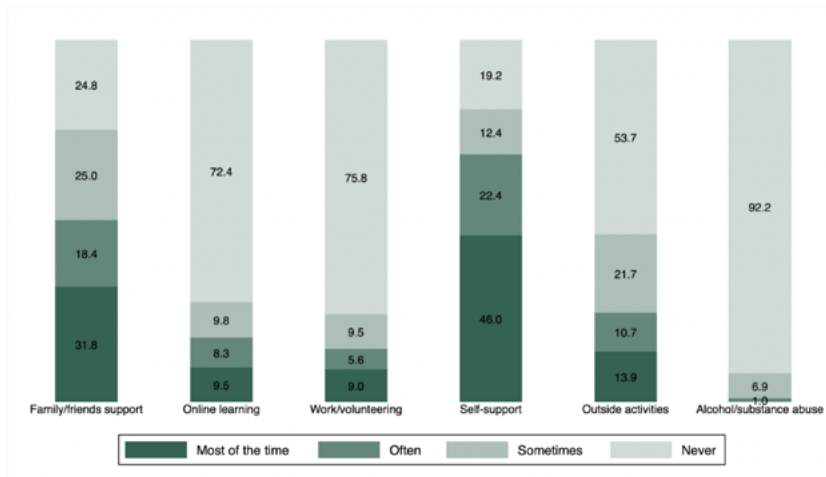


**Table 3.** Tendencies in self-support location

|  | Online | In the neighbourhood | In Beirut (not neighbourhood) | Outside Beirut | Other |
|---|---|---|---|---|---|
| Support from family and friends | 10.6% | 54.2% | 15.5% | 17.0% | 20.3% |
| Outside activities are mostly | 9.4% | 51.6% | 17.9% | 16.8% | 13.2% |

**Note:** Percentages do not equal to 100 percent as some respondent chose more than one medium through which

Follow up questions aimed to clarify where people tend to find this support from family and friends, as well as where they tend to go for outside recreation of sports activities. Table 3 shows the percentages of participants' positive responses to several relevant choices. The data show that 54.2 percent of respondents find support from family and friends who are living in the immediate local neighbourhood. Furthermore, approximately half of surveyed residents (51.6 precent) who choose to engage in outdoor recreation or sports activities tend to do partake in such activities in their local neighbourhood. The responses to these follow-up questions highlight the role of the support that one can find in their immediate environment as well as the importance of the local social and infrastructural networks for coping with post-blast effect and for community recovery.

# CONSULTATIONS

Throughout the research process, consultations were organised with citizen scientists to validate both research questions in the first instance and findings once the data was analysed. Indeed, citizen scientist observations have been an integral part of the analysis process. Once the survey data collection was completed, further consultations were also organised with citizen scientists, local key stakeholders, and community representatives to address local vulnerabilities and to contribute to the larger urban recovery process in response to the Beirut blast. Sessions with citizen scientists were designed to initiate ideas and reflections towards possible interventions to address vulnerabilities. These consisted in brainstorming and mapping exercises and were divided into two separate but interconnected activities. First, a consultation focusing on the mapping of spaces of exchange, and second a consultation where initial findings were presented and discussed with the citizen scientists to formulate problem and solution trees. A third consultation took place with neighbourhood stakeholders including researchers from diverse backgrounds, NGOs, data scientists, community activists and the project citizen scientists. During this session stakeholders presented findings and discussed the difficulties of going from data-collection to action in the Beirut post-blast context.

## CONSULTATION 1:
## MAPPING 'SPACES OF EXCHANGE'

The consultation workshop on 'mapping spaces of exchange' took place on the 20th of April 2021 with the aim to start reflecting with citizen scientists on the subjective representations of the neighbourhood and how residents and other users experience it.

As an initial consultation workshop after the survey data collection, we started with a discussion on the citizen scientists' experiences of collecting data in Mar Mikhael through the household survey. Each researcher had experienced the fieldwork differently. One Lebanese citizen scientist (female, 30 years old) said she felt residents are still traumatised 9 months after the explosion and many houses still require rehabilitation. Another Lebanese citizen scientist (female, 40 years old) was happily surprised by how people welcomed her and shared their stories and struggles despite the trauma. A Syrian citizen scientist (male, 23 years old) also felt that people wanted to speak and engage in a conversation with him.

The citizen scientists then discussed mapping, and their previous mapping experiences. The group discussed the differences between geographic and psychological maps, and the ways in which this mapping exercise would attempt to focus on subjective representations of the city that enable residents to feel at home and to feel they belong to their neighbourhood. Following this discussion, we moved to consider the concept of a 'spaces of exchange', defining them as the threshold between private and public space, where social activities happen or where people give and receive care. 'Spaces of exchange' were also identified as general spaces where people experience the city, cope with their issues, develop their skills or simply exist. Researchers and citizen scientists noted that these 'spaces of exchange' were noticeable during the household survey. Citizen scientists shared their observations of places where they saw people drinking coffee, where residents met their neighbours on the building staircase or on the balconies. They also noticed how some public spaces lost their

original purposes, such as the Jesuit Garden that was no longer used by its residents because of NGO staff presence after the port explosion.

These spaces were grouped into 4 main categories:
1.  Spaces of dialogue: spaces in the city where we find chairs, people sitting, a table, a narghile, a bottle of water, a teapot, or pumpkin seeds shells on the floor.
2.  Spaces of informal economic transaction: spaces in the city that have small trolleys selling coffee, flowers, or water.
3.  Spaces of care: places where people water the flowers in front of their homes, feed stray animals, or keep an empty welcoming chair in a street gathering.
4.  Spaces of expression: places where people have expressed their feeling and ideas on a mural, spaces where children have placed their drawings or where they are simply playing.

Citizen scientists were then divided into three groups and asked to chose a path they would take to map 'spaces of exchange' they considered relevant, explaining the reasons why they chose the path and drawing it on a map. To represent these spaces,

**Figure 21.** Mapping spaces of exchange

the citizen scientists located them on the map and took pictures as illustrated in Figure 21. They also explained what was happening in each space. They were encouraged to document different categories of spaces. As a follow up consultation (8th of May 2021), the citizen scientists shared their findings and observed that this exercise made them notice spaces and social encounters they would have otherwise missed. It encouraged them to observe details that made the neighbourhood especially recognizable to them, resulting in their improved knowledge of the area.

The analysis of themes that emerged from this consultation contributed to our understanding of local spaces used for outside activities, which as noted in Table 3, were an important part of overcoming trauma for local populations. Proximity and familiarity were recurring themes. Children playing under their house so their parents could watch them from the balcony. People drying their laundry on the Vendome stairs in front of their homes. Elderly women watering their flowers on the balconies and using this moment to initiate conversations with passers-by. These were all considered outside activities that contributed to people's local well-being. Care was also a recurring theme. Citizen scientists observed residents cleaning the front of their houses as an act of care towards the neighbourhood or caring for stray cats as part of their routine. A mutual support mechanism between residents was clearly noticed throughout the observations.

With rehabilitation works still underway, new spaces of dialogue have also appeared in the neighbourhood. Spaces where workers meet for breaks to eat and chat and where residents thank them for their hard work. Streets have also become places to wait and discuss the progress of rehabilitation work. The public stairs were mentioned as clear landmark spaces in Mar Mikhael, reflecting the history of the neighbourhood. Citizen scientists noted that although the activities on the stairs may have changed over time, they would always remain a landmark of the social infrastructure of the neighbourhood.

*"Planned and unplanned paths, many places attracted us and made us stop, discuss and choose the spot to take notes, pin the place and take photos. Jeitaoui was our first area where we started our adventure. My colleague and I are discovering and checking buildings, knocking on unknown people's doors, asking strangers on the street, etc. This neighbourhood became known to us some weeks later, very familiar, special, and close to our hearts by the stories we listened to, people we had a special relation with, who treated us and welcomed us as if they knew us from a long time ago. This neighbourhood became different to us. It is not a strange place anymore but an area that represents all the stories and all the lovely people we met. All these points were the reasons why we have chosen this path. The souvenirs, the specific people who take care of cats, the new places we discovered during this exercise."*

**- Two citizen scientists**

**CONSULTATION 2:**
**PROBLEM AND SOLUTION TREES**
The second consultation took place on the 31st of May 2021 and included a presentation of preliminary survey findings and a discussion of the main identified vulnerabilities and how they can be addressed. Citizen scientists discussed the problem trees they had mapped before the data-collection which identified the causes and effects of the problems. They then developed solution trees which would bring forward ideas towards resolving these problems.

While presenting the findings to the citizen scientists, we asked them questions when results were unclear or warranted consultation or further explanations. Some of these observations have been included in the livelihoods, housing and mental health analysis. For example, citizen scientists were asked to comment on the reduction in the number of Mar Mikhael residents who have attained university degrees or to provide examples of self-employment they had observed during their fieldwork. These anecdotal observations helped the research team supplement the analysis and further apprehend certain findings.

The problem tree exercise began with a session brainstorming main vulnerabilities in the neighbourhood, their causes and their effects. The research team created the problem trees based on activities with the citizen scientists, by condensing and summarising conversations into three problem trees on livelihoods, housing and mental health. In discussing livelihoods, citizen scientists spoke of the lack of job opportunities, the exploitation of workers by companies abroad by paying very little in dollars, the difficulty of online work, and the dependence of locals on NGO aid (please see Livelihoods Tree). In analysing housing, the citizen scientists spoke of the isolation of people within their houses and micro-communities, the lack of safety felt after the blast, and the unaffordability of housing and rent (please see Housing Tree). In considering mental health, citizen scientists spoke generally about poor mental health issues, trauma and PTSD after the blast (please see Mental Health Tree). They also mentioned the negative effect of competition over jobs and the lack of basic needs on mental health.

Based on the problem trees, the citizen scientists were then divided into 3 groups to develop solution trees. Each group brainstormed the goals, solutions, and effects in response to the livelihoods, housing and mental health problem trees. For livelihoods, the citizen scientists proposed a mapping of businesses and skills in the area, a council to protect workers'

rights, the establishment of centres with computers and stable internet, and encouraging NGOs to hire residents and encourage local businesses. For housing, citizen scientists suggested a campaign to encourage people to interact together, the creation and rehabilitations of meeting spaces, as well as the provision of COVID-19 vaccines for all residents. Housing solutions also included improving street lighting and municipal police, repairing building gates, starting a solidarity fund to support those with difficulties paying rent, monitoring apartment prices, and making use of empty apartments. For mental health, citizen scientists proposed the creation of new gardens and public spaces for residents to gather, the provision of more sport and creative activities including art therapy, the facilitation of therapy sessions with localised specialised centres. They also suggested the creation of technical schools to provide opportunities for local youth. Citizen scientists also spoke generally about supporting activism to hold the government accountable, and working towards a more trusted justice system, as well as political and economic stability.

**CONSULTATION 3: FROM DATA TO ACTION**

The final consultation took place on the 30th of June 2021. The project team invited stakeholders to a presentation of some of the research's key findings, as well as an overview of some of the solutions for urban recovery developed by the team of citizen scientists. The aim of the workshop was to bring together researchers from diverse backgrounds, as well as NGOs, data scientists and community activists to discuss different assessments of vulnerabilities in the area. Although the session was focused on Mar Mikhael, actors from diverse areas affected by the blast were invited to join to bring insights from different neighbourhoods and to continue the conversation involving actors from the wider urban recovery effort.

Presentations were also given by Beirut Shifting Grounds, Public Works Studio and Nusaned, who

also shared key findings that had emerged from their work in Mar Mikhael neighbourhood post-blast.

- Beirut Shifting Grounds is a research project led by Sandra Frem and Boulos Douaihy in collaboration with ArD/ AUB faculty Carla Aramouny, Rana Haddad, Nicolas Fayad and Joanne Hayek (https://beirutshiftinggrounds.com/Synopsis).
- Nusaned is a humanitarian, community-based and volunteer organisation who believe that the power to create change comes from working collaboratively (https://nusaned.org/en).
- Public Works is a multidisciplinary research and design studio that engages critically and creatively with a number of urban and public issues in Lebanon (https://publicworksstudio.com/en/about).

The session was held in person for a limited number of attendees and online. Overall, it included around 50 participants. Following the presentations, discussions took place between attendees. Many highlighted the disjunction between data collection and action in the Beirut post-blast context.

A lack of transparency of information was highlighted. Local stakeholders voiced how residents who were the most affected by the blast were often not provided with information either about the laws issued to protect the damaged areas they live in, or about the data collected about them immediately post explosion. A representative of the *Victims Association* stated the importance of bringing data back to the community and the need to involve the residents in translating data to local interventions and actions. Researchers responded by mentioning their efforts in bringing the data back to local communities through multiple methods such as involving local citizens in research processes, distributing findings via Whatsapp, holding Town Halls, and using co-design and participatory processes both for research and developing interventions. Subsequently,

stakeholders expressed that despite these efforts a disjunction between data and action is still very present, and efforts need to be increased to continue bridging the gap between data collection, analysis, local distribution of findings and integration of results into CBO and NGO efforts. One stakeholder highlighted the significance of bringing findings to local leaders who then discuss them with residents who are faced with too-many daily challenges to want to listen to researchers.

An overwhelming frustration with the lack of governance was voiced, as well as the impossibility to keep working in crisis mode. NGOs remarked on the unfeasibility of continuing to fulfil most roles in the reconstruction effort and the necessity for public institutions to lead in coordinating. A lack of centralised data-management was expressed as a main issue in a context where data-sharing is critical for appropriate action. A representative from Open Map Lebanon (https://openmaplebanon.org/) questioned issues around consent, and whether residents really understand what the data collected is being used for - A visualisation? An intervention? The need for transparent data aggregation methods were also voiced, and the endeavour to make more data freely available and avoid the duplication of research with an already exhausted population. Beirut Urban Lab announced the creation of The Beirut Urban Observatory (https://beirut-urban-observatory-aub.hub.arcgis.com/) which they hoped would help coordination efforts by creating a platform of geo-localised urban data informing ongoing post-blast recovery efforts.

Participants from this final consultation collectively concluded on the importance to keep collaborating and coordinating efforts. Moreover, despite the absence of funding within this project to further co-design and develop interventions based on the vulnerabilities uncovered in the data, project partners endeavour to further the uses of our data both by seeking further funding and establishing

data sharing agreements and partnerships with organisations active on the ground.

# CONCLUSIONS

This report has explored the changing landscape of local vulnerabilities from pre-crisis to post-explosion in Mar Mikhael, one of the neighbourhoods heavily affected by the August 4th blast. This document has offered an integrated place-based analysis focusing on three of the most relevant indicators of vulnerability in Mar Mikhael: livelihoods and employment, housing security, and mental health and well-being. These three topics were selected because of their urgency in Lebanon's multiple crises, where securing income, adequate housing and taking care of one's mental health have been the core concerns of many. This report has attempted to analyse these topics while also considering the blast's impact within the wider context of the country's multiple crises and in terms of the city's precursory urban planning environment.

This research provides three key contributions. First, we assess changing vulnerabilities by observing measurable and comparative variables between 2018 and 2021 to help inform future interventions or public policies in the wider reconstruction process in our case-study area. This is a key added value as data-based urban research was conducted over two time-periods. It was important for us to map changes in a data-poor context, where data over time is scarce. Second, we use a mixed methods approach, combining quantitative descriptive statistics, citizen science consultations and a co-design approach. Indeed, one of the major contribution of our analysis is to triangulate quantitative changes in indicators with citizen scientist observations and field observations. We believe that cities are made by the people who inhabit them, and the combination of quantitative surveys and qualitative consultations strengthens our analysis by exploring both the wider conditions of residents and the underlining stories behind them. Third, this research contributes to a broader understanding of how people are coping in a context of multiple crises.

Overall, the demographic findings suggest a shift in non-Lebanese populations residing in the neighbourhood between 2018 and 2021, many of them returning to their country of origin as the crisis progressed. Many long-term residents who were born and raised in the neighbourhood have stayed, on the other hand, even in the post-blast setting. Our findings show that the current economic situation has impacted the financial wellbeing of households at every income level, albeit more so for lower-income households. To cope with financial difficulties, households across the entire income spectrum have resorted to borrowing money.

Our data shows that NGOs have led in the assessment of building damage across all blast-affected neighbourhoods, while public bodies have been selective in their building-assessment. Housing in Mar Mikhael has on average become less affordable and residents are living in less space with fewer residents benefiting from old rent contracts in 2021 than they were in 2018. There is an increase in average rents, and households with higher incomes are more likely to pay higher rents post-blast, most likely to obtain better infrastructural services such as generator access following the worsening electricity shortages.

With regards to wellbeing, most households reported social life as being the main reason they chose to stay in Mar Mikhael. Despite this finding, there is a significantly lower sense of neighbourhood belonging in 2021 compared to 2018. Overall, feelings of happiness and safety are reduced, along with heightened stress levels. Findings show a preference for outdoor recreation activities in the neighbourhood to deal with stress, depression, or trauma post-blast, presenting opportunities for local CBOs and NGOs implementing interventions in the neighbourhood.

Following data analysis, consultation sessions with the citizen scientists were designed to initiate ideas and reflections towards possible interventions to address vulnerabilities. Although project limitations did not allow us to reach actual pathways to address local needs, the first step in a co-design approach was initiated to be continued beyond the scope of this project. Co-design and participatory design processes refer to a family of practices where future users and related stakeholders are fully involved in the design process (Rigon et al. 2021). Our co-design approach was aimed at fostering the research and entrepreneurial skills of citizen scientists and giving agency to the community in the long term. In a city like Beirut hit by multiple crises, a co-design process becomes crucial to ensure residents' agency towards sustainable urban recovery that addresses residents' specific needs concerning both their built and socio-cultural fabric (Hussain et al. 2012). This project thus seeks to inspire a collaborative process of institutions with the community to concretely benefit affected residents long term. The evidence presented is especially relevant in the post-disaster urban context of Mar Mikhael where the reconstruction and regeneration of the area threatens the displacement of the most vulnerable populations.

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