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PROSPECTS FOR PARTICIPATORY WATER CONDENSATE HARVESTING FROM AIR-CONDITIONING HOME UNITS FOR USE IN PUBLIC GARDENS: A CASE STUDY IN TRIPOLI, LEBANON

by
TALA HANI EL MERHEBY

A thesis
submitted in partial fulfillment of the requirements
for the degree of Master of Environmental Sciences
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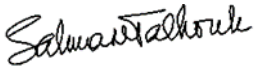

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ABSTRACT
OF THE THESIS OF

Tala Hani El Merheby for Master of Environmental Sciences
Major: Ecosystem Management

Title: Prospects for Participatory Water Condensate Harvesting from Air-conditioning Home Units for Use in Public Gardens: A Case Study in Tripoli, Lebanon

As water resources in Lebanon are becoming scarce and polluted, air-conditioner condensate (ACC) water could potentially be considered as an additional water source for the irrigation of public gardens in the city of Tripoli, North Lebanon. Retrofitting buildings with systems for the harvesting of this water is, however, ultimately a matter of social acceptance. Aside from calculating the amount of ACC water that could be generated, this study employed two qualitative research approaches, namely one-to-one interviews and focus group discussions, to investigate the perceptions and attitudes of both residents and municipality stakeholders regarding ACC water recovery and use for urban greenery irrigation.

Results confirmed that the quantity of ACC water generated from buildings in the immediate proximity of a case study green space would fulfill its manual irrigation demands, even exceeding its reported daily needs. Despite the presence of solid technical and social/economic foundations for initiating the proposed project, there was generally no social acceptance for retrofitting existing buildings with ACC water harvesting systems due to the lack of respondents' awareness on ACC water, lack of cooperation between building residents, lack of system financing, and complexity of system governance.

All weaknesses and threats identified in this study were addressed in light of both the available opportunities and the scenarios proposed by participants in order to guide the implementation of future initiatives. Further research needs to include the design of retrofitted ACC water harvesting systems and the development of policies related to regulations and financial schemes for ACC water collection.

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ABBREVIATIONS

AC	Air Conditioner
ACC	Air Conditioning Condensate
NGO	Non-governmental Organization
R	Respondent
FG	Focus Group
SWOT	Strength, Weaknesses, Opportunities, and Threats

CHAPTER I

INTRODUCTION

A. Background information

The demand for green spaces in cities increases with urban population growth because these spaces are essential for physical activity, entertainment, and social cohesion, and are vital to the mental health of urban residents (Rabbani KheirKhah & Kazemi, 2015; WHO, 2016; Nouri, Borujeni & Hoekstra, 2019). In Mediterranean cities, urban green spaces are water-intensive, and the limited water resources of the region do not allow for sustainable maintenance or growth of green spaces in cities (Nouri, Borujeni & Hoekstra, 2019; Dhakal et al., 2015). Located on the eastern shores of the Mediterranean, Lebanon is one of seventeen countries recently classified by the World Resources Institute (WRI) in the "Extremely high" water stress category (Hofste, Reig & Schleifer, 2019). The water footprint of green spaces in Lebanese cities is expected to be high, as in similar semi-arid cities, more than 50% of the total water resources are used for the maintenance of urban green spaces (Shi et al., 2017; Salvador et al., 2011; Mini et al., 2014; Navarro-Ortega, Sabater & Barceló, 2014).

In addition to the drastic water shortages in the Mediterranean area, the quality of the water sources used for irrigation in many countries is poor (Navarro-Ortega, Sabater & Barceló, 2014). The disposal of untreated municipal and industrial wastewater, the release of hazardous pesticides, fertilizers, and industrial effluents, are the main causes for the deterioration of the quality of surface and groundwater in this region (Shaban, 2012; Daou et al., 2018). Moreover, in several Mediterranean countries, including Lebanon, groundwater resources are mostly saline, especially in Beirut and

Tripoli, due to saltwater intrusion as a result of the excessive pumping (Saadeh & Wakim, 2017; Alameddine, Tarhini & El-Fadel, 2018; Kalaoun, Jazar & Al-Bitar, 2018). The seasonal inconsistency in precipitation patterns between winter and summer, as well as climate change and population growth, have all pushed for the excessive extraction of groundwater for domestic use and irrigation needs during the dry season, which in turn increases the brackishness of the water (Mahfouz, 2010; Saadeh & Wakim, 2017; Kalaoun, Jazar & Al-Bitar, 2018). Increases in water salinity ultimately degrade urban soils (Nouri et al., 2018), and suppress the growth of plants (Shrivastava & Kumar, 2015).

Water supplies in semi-arid and arid regions are neither sufficient nor adequate for the irrigation of urban green spaces. Alternative water recovery strategies including desalination and treated wastewater reuse are costly, consume significant amounts of energy, require extensive treatment technologies, and harm the environment (Khan, Badr & Al- Zubaidy, 2014; Algarni, Saleel & Mujeebu, 2018). Additionally, these practices are unsustainable, as a state of water emergency could readily occur following any machinery damage or source water contamination (Bryant & Ahmed, 2008). In response to these challenges, researchers in many parts of the world, especially in the Mediterranean basin, are exploring the feasibility of AC water condensate harvesting, considering it an untapped, low-cost, additional water recovery strategy.

The vast majority of buildings in hot and humid regions are equipped with air conditioning (AC) units or central systems to maintain a cool indoor environment (Bryant & Ahmed, 2008). As the operating AC systems come in contact with warm, humid air, they generate substantial amounts of air-conditioning condensate (ACC) water (Siam et al., 2019). One AC unit installed in a hot and humid environment

generates around 11 to 38 liters of ACC water per 92.903 m^2 of air-conditioned space daily (Alliance for Water Efficiency (US), 2019). More importantly, ACC water is of high quality and requires minimal or no treatment (Siam et al., 2019). Hastbacka, Dieckmann and Brodrick (2012) and Loveless, Farooq and Ghaffour (2013) ascertained that the quality of ACC water is similar to distilled water and is therefore considered purer than incoming municipal water. As it is deficient in naturally occurring minerals and added sanitizers, such as chlorine and chloramine, this water is not intended for human consumption but is appropriate for many uses, especially the irrigation of plants (Hastbacka, Dieckmann and Brodrick, 2012). This water could become potable after undergoing minimal, low-cost treatments such as ion exchange and electrochemical processes (Loveless, Farooq & Ghaffour, 2013). Consequently, ACC water reuse presents a potential in alleviating water scarcity in cities and ameliorating the conditions of urban green spaces, particularly during the hot and humid months of the year (Ali, Saifur & Ali, 2018).

ACC water is relatively untapped as a resource because most AC users have a misconception that the water is unusable, or because of the absence of a water harvesting system (Guz, 2005; Siam et al., 2019). Some countries in the Mediterranean and the Middle East have considered using ACC water for landscape irrigation (Bryant & Ahmed, 2008; Ali, Saifur & Ali, 2018; Siam et al., 2019). In Dubai, for example, Burj Khalifa is equipped with an ACC water collection system designed to divert the water to the green spaces surrounding the tower (Hastbacka, Dieckmann and Brodrick, 2012). Interestingly, in this context, the Dubai Electricity and Water Authority (DEWA) has requested the recovery of ACC water generated from all AC units located in all new buildings with an overall cooling capacity of 350 kilowatt (kW) or more, and its reuse

for toilet flushing, irrigation, and other applications that do not involve human contact (DEWA, 2015).

The technology of ACC water recovery could be applied on new buildings, whether institutional or residential, but could also be retrofitted into existing buildings (Magrini et al., 2017; Che Husin, Mohd Zaki & Abu Husain, 2019). Aside from preserving the social and cultural value of the existing built environment, green retrofitting is less costly and time-consuming than demolishing and rebuilding, or even establishing new, eco-friendly buildings (Che Husin, Mohd Zaki & Abu Husain, 2019; Jagarajan et al., 2017). It is also an inherently sustainable practice, as it reduces resource consumption, pollution, and transport energy during the construction phase (Jagarajan et al., 2017). This concept has been successfully applied to improve energy consumption in many developing countries such as China, Singapore, Australia, Japan, Korea, New Zealand, Malaysia, Oman, among others (Brooke, 2011).

Although retrofitting old buildings is environmentally and economically sustainable, it remains relatively unpopular in most countries. Moreover, the majority of retrofit projects undertaken to date focused primarily on energy (Bertone et al., 2018). Further exacerbating this matter is that retrofitting has traditionally been implemented using a top-down approach, through which governmental institutions plan, design, and implement projects without considering residents' preferences (Liu et al., 2015). Nevertheless, unlike commercial buildings, retrofitting residential buildings with green technology, including ACC water harvesting systems, should be based on both technical and socio-technical factors, and depend predominantly on the degree of participation, cooperation, and mobilization of the concerned residents to attain a common goal through coordinated action (He et al., 2019; Lomas 2010; Liu et al., 2015). In both

Slovenia and the USA, for instance, the ability of residents to cooperate with each other and work collectively, as well as their positive attitudes towards eco-friendly fixtures, led to successful and efficient building renovations (Cirman, Mandic & Zoric, 2011; McEwen, 2012).

As residents' participation in retrofitting projects is fundamental, understanding the dynamics, as well as the barriers, drivers, and challenges is crucial to generate more successful interventions (Kermanshahi et al., 2020; Ferrante, 2014). Indeed, studies have shown that the "circle of blame", which posits that all individuals, including residents, municipal stakeholders, and governmental officials, claim that they are willing to adopt sustainable practices only if others cooperate with them is one of the major obstacles that impede retrofitting ecofriendly technologies in buildings (Jagarajan et al., 2017). Moreover, and aside from socio-demographics, the initial capital cost of green buildings, the lack of monetary incentives and trust in governmental institutions, as well as the limited, if not absent, willingness of governmental entities, especially municipalities, and/or private parties to invest in green buildings' development and to provide support mechanisms have all been found to demotivate residents to engage in such practices (Achtnicht & Madlener, 2012; Jagarajan et al., 2017; Bertone, 2018; Tsantopoulos et al., 2018; He, Xu, Li & Zhao, 2018; Oguntona et al., 2019; Makki & Mosly, 2020). The ability of the government to tailor and enforce adequate policies and regulations was also deemed to be an important determinant of the public's willingness to retrofit (Makki &Mosly, 2020). Another fundamental factor is green awareness and education (Bertone, 2018). Studies have shown that in many cases, owners, residents, and investors are not knowledgeable about the benefits of green buildings (Liu et al., 2015; Jansson-Boyd et al., 2016; Baharoon, Rahman & Fadl, 2016; Jagarajan et al.,

2017; Tsantopoulos et al., 2018). This is further exacerbated by the lack of communication between the concerned stakeholders across various levels of decision-making, design, and implementation stages (Jagarajan et al., 2017).

Studies from which the above factors were retrieved indicate that residents of different cities have varying perspectives related to the adoption of building green retrofits. This emphasizes the significance of studying these factors on a case-by-case bases (Makki & Mosly, 2020). The literature suggests that most countries face resistance to implementation and reluctance to investment from the part of the public, which is deemed as a critical barrier to the flourishing of the green retrofitting sector. For this reason, scholars proposed many solutions to make retrofitting more appealing to the public, including structuring financial incentives, rebound effects, and visual impacts, as well as garnering political support, using local resources, ensuring access to reliable financial income and mechanisms, establishing networks among community members, strengthening trust between residents and government/municipalities, raising awareness and undertaking platforms for information exchange (Makki & Mosly, 2020; Silva, 2018; Jagarajan et al. 2017). Studies have also stressed on the significance of drawing in all stakeholders during all stages of the process, especially the planning, technology selection, and design phases, to install systems that are adequately tailored to the residents' preferences, needs, motives, knowledge, and dwelling practices (Jagarajan et al., 2017; Liu et al., 2015).

B. Objective

This study will be the first case study in Lebanon that explores the social acceptance of retrofitting buildings with systems for ACC water harvesting for its

subsequent use in the irrigation of public gardens in the city of Tripoli, North Lebanon. As the literature suggests that similar initiatives should be studied independently, the study investigates whether residents and municipality stakeholders in Tripoli are aware about the quality of ACC water for irrigation and whether they are willing to contribute to the proposed participatory strategy, through which the ACC water harvested in the reservoirs of buildings is supposed to be collected by the municipality and used in the manual irrigation of gardens. It mainly aims at understanding the social aspects of the retrofitting process through investigating the dynamics, opportunities, challenges, and barriers considered by both residents and municipality stakeholders, as well as the scenarios proposed by participants to ameliorate the suggested strategy and/or increase its feasibility chances. It compares the findings with those of other studies pertaining to the dynamics of green retrofitting and attempts to provide few opportunities to promote the retrofitting of ACC water systems at the local level.

CHAPTER II

MATERIALS AND METHODS

In this study, the social acceptance of retrofitting residential buildings with systems for the harvesting of ACC water to use it in the irrigation of public gardens in Tripoli, Lebanon, was investigated through both individual interviews and focus group discussions. Interviews were undertaken with 8 residents each residing in a different building equipped with AC units in the selected study area. Interviews were also conducted with relevant stakeholders from the municipality to assess their willingness to assist residents in project implementation. Focus group discussions were undertaken in buildings other than the ones considered for individual interviews but located in the study area, and the number of discussions adopted was 4 with 5 to 8 residents in each group based on the concept of data saturation and according to the literature (Coenen et al., 2011; Guest, Namey and McKenna, 2016). As in most qualitative research, the emphasis in this study was not on sample size, but on the ability to explore, analyze and exhaust themes through a thematic analysis approach in order to understand the dynamics, opportunities and challenges related to the implementation of the proposed strategy (Breen, 2006; Coenen et al., 2011; Guest, Namey and McKenna, 2016) . Along with qualitative research, the study quantified ACC water that could be generated from buildings overlooking a case study green space to assess whether it fulfills its daily manual irrigation needs and compare the findings to those of the literature. All methods are detailed in the following sections, after presenting the theoretical framework and describing the selected study area.

A. Theoretical Framework

As water provision is an essential component of urban green space management, AC water condensate harvesting through retrofitting existing buildings will not only engage residents in water collection but will also allow them to contribute to the maintenance of green spaces in their city. In fact, assigning some aspects of urban green space management and maintenance to non-governmental entities, such as citizens and community groups, is essential given the "public" nature of these spaces, and has been deemed to prevent their neglect or degradation due to the significant decline in governmental inputs (Azadi et al., 2011; Van Der Jagt et al., 2016). This approach to green space management is most effective, because it gathers knowledge and perspectives necessary for the maintenance of social-environmental systems, and feeds information back to decision-makers to enhance future policy choices and decisions (Stringer et al., 2006; Adjei Mensah et al., 2016; Molin, Fors & Faehnle, 2016). Most importantly, the involvement of citizens in the management of surrounding gardens enhances their sense of ownership of these spaces and improves the democratization of the local policy-making process (Adjei Mensah et al., 2016). This, in turn, increases the willingness of residents to care for these spaces, which consequently ameliorates their qualitative and/or quantitative performance (Azadi et al., 2011).

B. Study area

Situated on the Eastern shores of the Mediterranean, Lebanon has a total surface area of 10,452 km^2 with an estimated population of 6,848,925 most (87%) residing in urbanized areas (World Bank, 2018; CDR, 2016). The rate of urbanization in Lebanon has increased over the last fifty years from 221 km^2 in 1963 to 741 km^2 in 2005 and is

anticipated to reach 884 km^2 in 2030. This rise in urban population is centered in large cities, especially Beirut and Tripoli, although the populations of secondary cities also reflect significant growth (CDR, 2016; UN-Habitat, 2016).

The coastal areas of Lebanon enjoy a Mediterranean climate characterized by long, hot, and humid summers and relatively short, cool, and rainy winters. The coldest winter month is January, with temperatures ranging from 10°C to 16°C and the hottest summer month is August with temperatures ranging from 23°C to 32°C. Although precipitation patterns in this country differ markedly between regions and years, the most concentrated period of precipitation usually extends between November and March, whereby 70% of the average annual rainfall in the country falls (Weather Online, 2020). The Lebanese coast is characterized by high levels of humidity during summer months; the monthly averages could increase from 48% in October to 78% in August due to the influence of the sea (CAS, 2006). Accordingly, the most humid months in coastal areas are June, July, and August, with an average humidity of 73% (CAS, 2006).

Moving farther away from the coast, the country's Mediterranean climate is gradually altered. In summer, the daytime temperatures in the mountains can reach those of the coast, but they significantly drop by nightfall. Humidity levels in the mountains prove to be much lower than the coast in summer, as the minimum relative humidity registered there (50%) occurs in August, whereas the maximum (60 to 70%) occurs in January (CAS, 2006). In winter, the mountains experience much cooler temperatures than the coast and snow begin to fall starting mid-December (Doyle, 2016).

The study was conducted in Tripoli, the largest city in North Lebanon with a crowded and densely built environment extending over an area of 24.7 square kilometers, including 13 kilometers of seashore (UN-Habitat, 2016). Land cover in Tripoli is estimated to include 32% built up space, 27% agriculture lands, 13% roads, 12% 'empty land', 7% industrial/commercial areas, 4% 'informal area' and 5% other (UN-Habitat, 2016). The city consists of 58 neighborhoods, of which 11 have been further segregated into smaller ones. More than half of Tripoli's estimated 730,000 population resides in the poorest neighborhoods of the city namely, Tripoli El- tell, Tripoli El- Qobbe, and Tripoli El- Haddadine which surround the historic old city (UN-Habitat, 2016; World Population Review, 2020).

Tripoli is distinguished by its high percentage of street greenery, wide sidewalks, and large pedestrian spaces. The city entails several lots allocated principally to public gardens (Nazzal & Chinder, 2018). In the historic old city neighborhoods, however, most of these spaces are either not owned by the municipality or are poorly irrigated and maintained mainly due to maintenance and security expenses (Nazzal & Chinder, 2018). Therefore, the municipality awards temporary contracts to the private sector to manage and maintain these spaces (Nazzal & Chinder, 2018). Many contractors however impose entry fees to these spaces pushing the most-deprived citizens to consider street trees and canopies as leisure spots, and privately or semi-privately owned lands as picnic destinations during the weekend (Nazzal & Chinder, 2018).

Both aerial maps and Geographical Information System (GIS) were used to illustrate the urban areas within the city, along with the locations of current and future urban green spaces, and the proximity of green spaces to buildings. Site visits were

undertaken to describe these areas in terms of their economic status (income, level of poverty), population density, type of buildings (old vs. new), average floors per building and availability of ACs, and to contextualize green spaces through assessing their conditions and maintenance. Data on the percentages of irrigated vs. non-irrigated green spaces, the total amount of water needed for the irrigation of greenery in the city, and the method and frequency of irrigation (manually irrigated areas, routine operation of trucks, number of trucks, number of personnel involved, etc.) was acquired from the municipality of Tripoli.

Figure 1. Neighborhoods of Tripoli (UN Habitat, 2016)

Site visits and maps revealed that population density in Tripoli is mostly concentrated within the old city core, which consists of several neighborhoods, including Al Tall, Al Qobbe, and Tabbaneh, among many others. This area hosts the

highest poverty levels in the city, as most of its residents have a low socio-economic status, as they are either unemployed, or have a limited income which goes below the minimum wage in most of the cases. The vast majority of buildings in the old city core, which date back to the 70s, have a very poor quality; some of them are even partly ruined or damaged due to the wars and conflicts that happened in the city previously. Noticeably, as its buildings are mostly old, the number of floors in most of these buildings does not exceed 5-6 floors, and only very few AC units are installed on some of them, with only one or two AC units in the few equipped households. These neighborhoods are extremely crowded with buildings; they neither have much green spaces, nor have vacant lots for the implementation of more gardens. The overall situation in this part of the city therefore justifies not including it within the study area due to the lack of AC units associated with the low socio-economic status of residents, as well as the limited number of current and future green spaces.

Although not having the ultimate population density, the remaining parts of Tripoli, mainly including Al Maarad, Al Dam Wal Farez, Boulevard, Miten, Al-Mina, etc., are occupied by inhabitants belonging mostly to the middle class, as well as some high-income residents.

Figure 2. Selected study area in Tripoli

Figure 3. Zoomed-in study area

The area where the study was conducted, spanning across Boulevard, Al Dam Wal Farez, and Al Maarad, is densely built and most of its buildings date back to the 80s and 90s but are of relatively good quality and appearance, with some new buildings scattered and dispersed all throughout. Buildings in this area have an average number of

7 to 10 floors per building, with two households per floor. Importantly, most households there are equipped with an average of three AC units (2-4), and the demand for ACs is the greatest according to AC suppliers due to the relatively good socio-economic status of residents. The area includes and is surrounded by several public gardens and many medians, street trees and planted roundabouts.

Public gardens in the study area, as well as in the entire city, receive water from wells and from the water authority. These gardens are ideally irrigated daily in their entirety, as most of them have piping systems for irrigation. Nevertheless, the electricity shortage in the country prevents covering the irrigation of entire gardens due to the inability to operate water pumps all day long. As such, depending on the size of the garden and its water requirements, gardens are divided into areas or plots, and everyday a specific area is irrigated, or every plot is irrigated every other day with government water and/or well water. Plots made of trees are irrigated weekly as they can handle not receiving water for some time. Further exacerbating this matter is that many garden parts are barely irrigated due to damaged and unmaintained irrigation systems, and the consequent inability to cover all areas manually. In this case, workers request watering trucks from the municipality who takes too long to respond due to time constraints and other tasks being accomplished.

Adding to that, the available water resources in gardens are sometimes not used as the water is received salty and/or polluted, thus putting additional pressure on the municipality to provide reservoirs for manual irrigation. Therefore, the irrigation of public gardens is done both manually and through irrigation systems; manually irrigated areas are those that are too small, or those to which water does not reach due to electricity shortage or damage in the piping system. Manual irrigation is thus a

fundamental part of garden irrigation, and each garden needs at least one truck for supplemental irrigation every week, which is either not sent by the municipality at all, or sent during free time or in the weekend, implying their desperate need for an additional irrigation water source. Trucks are also sometimes not sent due to the unavailability of enough water from the water authority (water source in figure 3).

As for street greenery, medians, and planted roundabouts, most of them are dead as they are neglected, unmaintained, and insufficiently irrigated by the municipality. Only few medians are equipped with irrigation systems that are not functional, as they were damaged by homeless people and Syrian refugees who used to step and sit on them. These green spaces are however not completely unirrigated. They are watered once per week, but this is not enough, as they should be irrigated at least twice during the hot and humid months of the year. Both street greenery and gardens are only irrigated in summer. Workers do not irrigate in winter unless the amount of rainfall is not adequate. In this case, they irrigate only once per week.

The irrigation of gardens is mostly done before 10-11 am to reduce evaporation losses. Similarly, all street greenery irrigation is usually done by 12 pm. According to municipality workers, night irrigation is preferable but not possible due to the absence of night shift employees and because those who usually volunteer stopped to do that as they were not paid in return to their work. Importantly, the municipality does not cover the irrigation of all greenery in the city, as many areas that need irrigation are not listed on the schedule of workers. They reported only focusing on the irrigation of the wealthy areas within the city, whereas greenery in poor areas is neglected.

The municipality does not have any data about the exact amount of water consumed for the irrigation of public gardens in the city, as it depends on the size of the

garden and the species planted in it. As for street greenery, the department of gardens in the municipality has only one truck that operates for irrigation during the day and another truck sometimes complements its work in the evening. Every truck has only one employee for irrigation. These trucks operate according to a schedule set in advance by the head of the gardens department. The truck has a capacity of 16,000 liters. It needs 30 minutes to be filled from the water authority and 2 to 3 hours to be emptied. The irrigation worker does 2 to 3 rounds during weekdays, and 1 to 2 rounds in the weekend. This watering truck goes to gardens in need during free time, or in the weekend when there are little tasks to be accomplished.

Concerning the maintenance of garden plants, workers reported grubbing the soil every 6 to 7 months for it to stay healthy, and cutting grass, plants, and trees frequently to allow them to grow better and stronger and ameliorate the aesthetics of gardens. Different plant species have different time intervals for cutting. Trees are cut every 6 months, but dead leaves are picked frequently to enable these trees to grow healthily. They can be cut every 2 to 3 months, but workers do not have enough time for that. Grasses are cut weekly, or every 2 weeks, whereas plants are cut every 1 to 2 months. When available, roses are cut at the beginning of winter and cut pieces are planted again to save money. Garden plants are supplemented with fertilizers only when yellow and dry, which might only happen once per year. Soil is not supplemented with minerals as it acquires the essential elements from well water. There is also no specific timing for applying fertilizers; it is done only when needed.

C. Qualitative research

Guided by data collection and analysis methods described by Patton (2002) and Coenen et al. (2012), this study used two qualitative research approaches, namely one-to-one interviews and focus group discussions, to investigate public perceptions, awareness, and attitudes regarding the recovery of ACC water and its use for the irrigation of urban greenspaces. A triangulation of these two methods was performed mainly to enhance data richness and improve the trustworthiness of findings (Lambert & Loiselle, 2008).

The identification of residents who reside in apartments equipped with AC units was accomplished using a snowball sampling technique through which interviewees were asked to identify others who might potentially be interested to participate in the study (Orr, 2014). Each interviewee provided the contact information of several potential respondents, but the ones selected were only those residing in densely populated areas of Tripoli, where most people are from the middle-class, and which were deemed by AC suppliers to be the ultimate areas in which AC units are installed (AC supplier #1, 2020; AC supplier #2, 2020). Accordingly, one-to-one interviews were conducted with eight people who resided each in a different building equipped with AC units (Guest, Namey & McKenna, 2016). Participants varied in gender, but they were all close to each other in age, and knew about household tasks and responsibilities. Using the same technique, interviews were also conducted with relevant stakeholders and workers from both the gardens and the buildings department in the municipality of Tripoli to assess the local authorities' willingness to participate in the ACC water harvesting strategy in terms of water collection, financing, design, implementation, and maintenance. The contact information of recommended residents, stakeholders and

workers were written on a separate list that was shredded after interviews were completed. All interviewees were invited to participate via phone call, through which the researcher explained the aim of the study and the consent process and set a meeting time and date for discussion after acquiring the approval of the contacted party.

Along with the individual interviews, focus group discussions were conducted to allow a greater interplay between the residents of a building, which in turn generates more in-depth findings and consensus among them (Krueger & Casey, 2009). The number of focus groups was based on the concept of data saturation, in which discussions are conducted until no new themes emerged (Nyumba et al., 2017). Accordingly, three to six focus group discussions were undertaken from September to November 2020, as scholars found that this is the ideal number of meetings that could generate more than 90% of all required themes (Burrows & Kendall, 1997; Coenen et al., 2011; Guest, Namey and McKenna, 2016). As suggested by scholars, each focus group included five to eight residents, considering that larger groups are difficult to control and might limit the ability of each participant to share his/her personal experiences and opinions (Stewart & Shamdasani, 2015). Criteria for selecting the groups were as follows: the participants involved in each group resided in the same building, they had AC units in their apartments, they shared similar socio-demographics as homogeneity is preferred in this kind of discussions to maintain the comfort and confidence of participants (Nyumba et al., 2017).

To ensure the adequate planning and preparation for both the individual interviews and the focus group discussion sessions, a question guide consisting mostly of open-ended questions was prepared (Coenen et al., 2012; Nyumba et al., 2017). This guide included broad questions to allow the insights of participants to lead the

discussion (Kaczynski & Sharrat, 2010). Moreover, a basic prototype of an ACC water harvesting system installed on the exterior of a building was shown to participants to ensure that all understood the retrofitting dimension of the proposed project. Illustrated in figure 4, the prototype prepared was a very basic and preliminary one that mainly aimed at explaining to participants how AC units could be branched to external pipes, which all drain into a larger pipe connected to a reservoir placed at the bottom of the inferior building façade for ACC water harvesting. Through the proposed strategy, the reservoir is supposed to be emptied regularly by municipality workers, with its size and the frequency of its pick-up and use to be determined later in this study.

Figure 4. Proposed prototype of a retrofitted ACC water harvesting system on a residential building

The question guides were translated to Arabic, as all interviews were conducted using Arabic, the native language of participants. All interviews and discussions were audio-taped following participants' consent and transcribed verbatim then translated into English (Breen, 2006; Kaczynski & Sharrat, 2010). Subsequently, the findings were analyzed using a thematic analysis approach in which themes and codes occurring across interviews were identified (Breen, 2006).

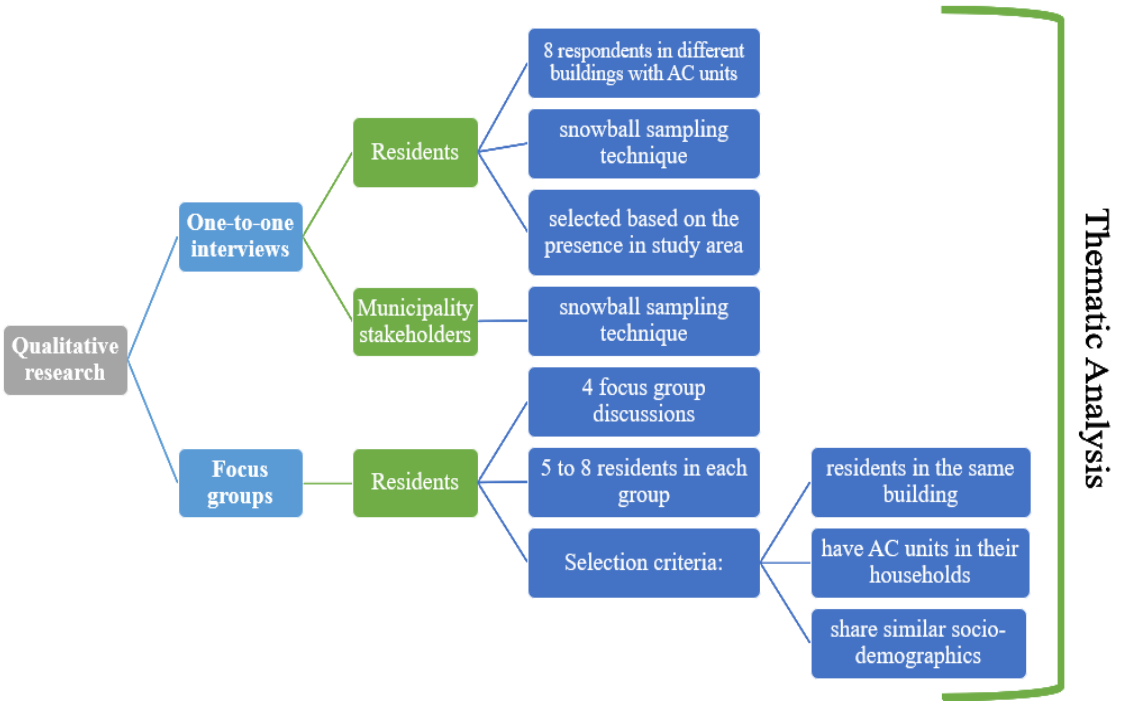

Figure 5. Qualitative research diagram

D. Ethical considerations

Data collection was undertaken in the district of Tripoli in compliance with the guidelines on human subjects for Social and Behavioral Sciences adopted by the Institutional Review Board (IRB) at the American University of Beirut (AUB). Answers provided by respondents were anonymous, as the discussions did not entail any questions that reveal a respondent's identity, or any personal information related to him/her. Participation in the interviews was strictly voluntary. Voice recordings were

placed on a password-protected phone and were only used by the researcher. The transcripts and recordings were stored securely in the principal investigator's office in a locked room and were only accessible by the research team. A written participation consent form approved by the IRB was signed by respondents prior to the initiation of discussions.

E. ACC water calculations

The amount of ACC water generated from the studied buildings was quantified using the air conditioner online condensate calculator developed by the San Antonio Water System (SAWS) (Building Green, 2016). The calculation of the amount of ACC water in the spreadsheet was based on the following equation (Building Green, 2016):

$$Qcond = \left[\frac{(DWlb \times 350) \times (t \times OA) \times 0.5}{(7000 \times 8.33 \times 7.481)}\right] \times 7.481$$

Whereby:

Q_{cond} = ACC water generated in gallons per minute (gpm)

t = Tonnage of system

OA = Percentage of outside air

DW_{lb} = Difference in specific humidity (SH) in gr/ft^3 = SH_{in} - SH_{out}

SH_{in}= Specific humidity of input air in gr/ft^3

$SH_{in} = (RH_{in} \times (0.0033 \times T_{in}^2)) - (0.1823 \times T_{in}) + 4.703) / 100$

Where:

RH_{in} = Input average daily % relative humidity

T_{in} = Input average daily temperature in Fahrenheit

SH_{out}= Specific humidity of the output air in gr/ft^3

$$SH_{out} = (RH_{out} x (0.0033 x T_{out}^2)) – (0.1823 x T_{out}) + 4.703) / 100$$

Where:

RH_{out} = Output % relative humidity

T_{out} = Output temperature in Fahrenheit

To execute these calculations, the input average daily temperature (T_{in}) and the average daily % relative humidity (RH_{in}) during summer months in Tripoli was obtained from online weather databases (Weather and Climate, 2019). Data on the cooling capacity (tonnage of system (t)) of AC brands most commonly sold, and the approximate percentage of outside air (OA) was acquired from the main AC suppliers in Tripoli (AC supplier #1, 2020; AC supplier #2, 2020). An estimation of both the potential output temperature (T_{out}) and % relative humidity (RH_{out}) was obtained from the AC suppliers and was left constant throughout the calculations.

The quantity of condensate generated was converted into gallons per hour (gph) by multiplying it by 60. The gph value was then converted to liters per hour (liters/h). This amount was then multiplied by the average number of ACs in a household and the average number of houses that have ACs per building. The amount of condensate generated per building was then used to estimate the size of the collection tank and the frequency of water tank pick-up and use.

CHAPTER III

RESULTS

A. Qualitative research

1. Individual interviews

The thematic analysis of the individual interviews revealed eight major themes. The first two themes, use of ACC water and collection of ACC water, indicate whether participants use this water in their daily lives and the methods employed for collecting it. Knowledge of ACC water quality/quantity revolves around residents' perceptions of the cleanliness of ACC water and its suitability for several purposes, along with their awareness of the potential quantity of ACC water. The fourth theme, challenges for use, portrays the reasons that discourage participants from using ACC water. Ideas provided by participants for the daily employment of ACC water were grouped under the fifth theme, suggestions for use. The last three themes, opinion about proposed system on biophysical impact, opinion about proposed system on cost, and opinion about proposed system on stakeholders' involvement entail participants' perceptions regarding the impact of the prototype on the aesthetics of both the buildings and the city, its cost and affordability, as well as the stakeholders who should be responsible for it and their respective roles.

First, interviews revealed that most respondents do not reuse ACC water; it either goes to the drain of the sewage network or is collected in gallons and thrown away. Few participants (only 3) use this water either occasionally or partially for domestic purposes, especially ironing, car battery/wipers, and floor and window cleaning. Reducing tap water consumption and preventing future water scarcity were deemed as the main reasons behind ACC water reuse.

> R1: Most of this water is usually wasted. Sometimes I collect certain amount of this water; my husband uses it for the car battery. He also uses it for the car wipers. I also use it for the iron, but not so often.

Almost all participants do not use ACC water for irrigation despite having plants in their households or in their vicinity. Only one participant stated unintentionally using this water for household garden irrigation to get rid of it due to the absence of a drain.

> R1: I have two small gardens because I am on the ground floor of the building. The pipe of my AC is always directed towards the garden, but I do not have the intention to irrigate the garden with it. I want to get rid of this water, so I irrigate with it. The pipe is mainly directed towards the garden because I have nowhere to put it in…

Respondents who reuse ACC water mostly collect it in gallons. Only one participant gathers it in a reservoir (30L) connected to a pipe used to fill plastic bottles.

> R1: The pipe of my AC is directed towards a big reservoir of water (around 30 liters) which is branched to a pipe that usually goes towards the garden. From this pipe, I usually collect the water in bottles…

Most participants justified their complete or partial employment of ACC water by the complexity of its manual collection, especially for domestic purposes. They believed that transporting heavy gallons from balconies to the inside of the house is difficult and time-consuming. They are afraid of water flooding problems on their balconies if they forgot to empty gallons, and of subsequent inside water spilling from AC units.

> R3: I can collect ACC water by letting the pipe drain into an empty gallon, and I think that I can reuse it, but I will not because I think that it takes a lot of time and effort to check whether the water gallon is full or not every now and then, and generally nobody in the house has time to check on this issue.

Some participants also stated that they do not use ACC water because workers branched it to the drain of the sewage network by default while installing ACs, and that they are not interested in it.

> R2: I do not reuse this water because the worker who installed the AC units in my household connected them to the sewage network. When he first installed it, I did not really care about this water, and it stayed like that since then. I can remove this pipe and collect the water but personally, I do not reuse it.

Regardless of whether they reuse ACC water or not, most participants perceived that ACC water is clean and safe to use for domestic purposes, iron, and car battery/wipers as it is distilled water, implying that it is free of minerals, impurities and lime residues that usually damage machines.

> R7: I know that I can reuse ACC water and I think that it has many uses; for example, I can use it for the iron, and for filling the battery of the car. I can also use it for cleaning the floor and the windows in my house. If I collect the water, I would have used it for these purposes because it is distilled water, therefore it does not contain lime residues that usually gradually destroys the machine in which it is being heated…

Some participants considered that ACC water is even cleaner than tap water and could be used for personal hygiene. Nonetheless, the majority perceived that ACC water is not potable, and that it cannot be ingested through drinking or cooking unless treated.

> R4: ACC water cannot be used for drinking because it requires the presence of ions to be categorized as potable water. I think that it needs a certain type of treatment for it to become potable water.

More than half of participants believed that ACC water is not suitable for irrigation and might potentially kill plants as it does not contain minerals essential for

plant growth. Others were not sure about its quality for irrigation and needed to know more about its suitability for plants.

> R1: This water is not really suitable for plants. It is distilled water; it does not contain any minerals that are essential for plant growth. It is supposed to be supplemented with a bit of minerals to contribute to soil and plant growth.
>
> R7: I do not really know if the plants could be irrigated with ACC water, I know that its quality is good but i am not sure if it is good for plants. I do not know if water that does not contain lime residues is good for plants.

As for the potential quantity of ACC water, all respondents were aware that the amount of water generated by AC units is significant, especially in summer. Most of them acknowledged that it depends on humidity and hours of operation.

> R5: As we usually collect ACC water in gallons to throw them later, I notice that each AC unit produces around a gallon of 10 liters per day in summer, and sometimes even more when the weather is too hot and humid, especially in august. The quantity is big, especially that I have 4 AC units in my house that operate daily in summer.

When asked about the conditions under which they would be encouraged to use ACC water for domestic purposes, most participants suggested having a system in the household or the building that pumps water back to the reservoirs of households. Some participants mentioned reducing the allowable daily water consumption and/or implementing metered systems for water as important incentives for ACC water reuse.

As for irrigation, respondents proposed several ideas for the use of ACC water in different contexts. At the level of household plants, most participants expressed their willingness to collect ACC water in gallons or buckets and use it for irrigation either manually or through a pipe if a garden is available. In this realm, these participants

suggested testing ACC water prior to its use and supplementing it with the minerals essential for plant growth.

> R5: I have no problem with using ACC water for the irrigation of my household plants. However, because it is free from minerals, I would first of all collect it in gallons. Then I would add to it some minerals like phosphate, for example, and then I would use it for the irrigation of the plants.

At the level of neighborhood greenery, most respondents proposed giving a monetary incentive to the concierge of each building to gather ACC water gallons from households and use it for irrigation. Nonetheless, some acknowledged that this it is difficult for all neighborhood residents to cooperate and coordinate with each other on manual ACC water collection in gallons.

Thinking of other possible ways to use ACC water for neighborhood and city green spaces, most participants believed that built-in ACC water drainage systems connected to reservoirs are not feasible in existing buildings, as they should have been done during construction.

> R4: Installing an internal piping system for ACC water is only feasible in buildings in new buildings because it is very difficult to implement this system in already existing buildings because you need to deteriorate all the building and build it again.

Consistent with the prototype proposed in this study, most participants perceived that the best way to use ACC water for irrigation is through an external piping system installed on buildings and connected to a reservoir at the bottom of the building used by the concierge to water neighborhood greenery or emptied by the municipality in watering trucks for city greenery irrigation.

> R6: At the level of buildings, and if ACC water was adequate for irrigation, the best way to use this water would be that all AC units in buildings be connected to external pipes which would drain into a larger pipe and then into a container that collects this water. Then the container would be connected to other pipes that would irrigate the different plants and trees in my neighborhood. When the municipality is in need for more water, they can also come and take water from the reservoirs of buildings for irrigation rather than not irrigating some areas due to the huge demand on water in the water authority.

Residents discussed the positive and negative aspects and implications of the proposed prototype, which were mainly related to its impact on the building, the neighborhood and the entire city, its cost and affordability, as well as its potential stakeholders and their respective roles and duties.

On biophysical impact, the majority of participants perceived that the installation of external ACC water harvesting systems on buildings provides a beautiful image of the city if widespread, reduces the demand on depleting governmental and groundwater resources, and stops the water scarcity already beginning to be felt in many parts of the city and the country due to the high temperatures encountered in summer.

> R2: Personally, I would love to be engaged in such an initiative because I think that it reduces water scarcity that is beginning to happen in many parts of the city, especially in summer, and simply because it provides a beautiful image of the city as it is beginning to undertake sustainability projects.

Most participants mentioned that the project could mitigate the problem of polluted and salty well water received in households and gardens, especially the ones located near the coast, due to groundwater over pumping. As such, they praised this project for its ability to provide an additional, clean, and non-salty water for the amelioration of gardens in the city.

> R1: Through this project, we are using "clean" water for the irrigation of urban greenery, because the water that they usually irrigate with is highly polluted and salty most of the times. Sometimes, they even irrigate greenery with wastewater and sewage that contain a lot of nitrate and ammonium that leads the plants to grow even faster, but definitely not in a healthy way. Therefore, if we adopt this strategy, we would be helping in the irrigation of plants with clean water and contributing to the health and flourishment of the greenery in our beloved city.

Some residents perceived that the installation of these systems might damage the appearance of the house and/or building, while others thought that it ameliorates it, especially because it eliminates the appearance of random leaking water pipes.

On cost, most respondents claimed that the installation and maintenance of these systems is costly and might not be possible in their buildings because their neighbors do not usually pay for basic needs, or because they believe that neighbors will not be interested in the project as they have other priorities and essential things to pay for.

> R2: Although I am fully with the idea, I think that it can never happen because most of my neighbors in the building do not pay even for the basic needs of the building. I think that this is the major problem.

They expressed their willingness to participate in the project only if most residents in their building do, and if the amount to be paid was affordable.

> R2: I will honestly not pay if most houses in the building do not.
>
> R5: Personally, I cannot pay for this system unless the sum is really minimal and I can afford it, keeping in mind that I have other essential things that I need to pay for.

All participants believed that an entity should finance the project and/or provide residents with monetary incentives and rewards such as tax or bill reduction.

> R3: Most people will not pay claiming that they have other priorities and essentials to provide for their family. They would, however, implement these systems if they were funded by NGOs, private companies or even the government or municipality. If these entities do not want to fully finance the project, they could at least give residents some monetary incentives like system price reduction, tax reduction, etc, or even make it voluntary and reward buildings who participate.

While some participants did not mind the type of financing entity, others believed that a private entity and/or NGO should assist in its financing, as they thought that it is unrealistic to think that the municipality would do that. One participant recommended that the municipality receives grants from NGOs depending on the amount of ACC water that they collect to give them an incentive to be involved in the project.

> R5: Receiving grants by municipality from NGOs depending on the amount that they collect weekly for irrigation is also a possible way to incentivize them to work adequately…

Finally, on stakeholders' involvement, most participants thought that the project is too idealistic claiming that both people and municipality do not care about the environment. They do not trust the municipality, as they believed that it will not be interested in the project and will neither abide by water collection nor assist in financing. They preferred that a private company or an NGO initiates it. Some even mentioned monitoring the work of the municipality by another entity or by civil society.

> R7: I believe that if the proposed project was initiated by NGOs, more people will be willing to participate in it because they will have trust that the water will be used for the amelioration of greenery in the city and for their welfare.

Most participants believed that the project's initiating party should undertake awareness campaigns and pilot projects to educate residents about the importance of ACC water and its potential uses, as well as the benefits of the prototype on the city.

> R1: It is an excellent and new idea, but its implementation needs effort. It needs to be tried on some buildings for people to become jealous and try to implement it also on their buildings.
>
> R1: The implementation of ACC water collection systems needs awareness campaigns. A group of specialized people should come and educate people about the quality of this water, its potential uses, and its benefits for them and for the city, because the level of education of people regarding these matters is really low. You need to try several smart ways to convince people to participate.

Others also proposed mandating these systems on buildings with a particular number of AC units in certain neighborhoods and penalizing those who do not install them. They stressed on the importance of monitoring and assisting buildings financially and technically in the realization of this suggestion.

> R3: The government could also mandate these systems on buildings with a particular number of floors and ACs, but this needs adequate monitoring and imposing fines and penalties or else it will not be effective.

2. Focus group discussions

Findings of the focus group discussions came as a confirmation for those of individual interviews, as there was a significant overlap between the themes retrieved in both sections.

First, most building residents from various neighborhoods revealed that ACC water in households is mainly not reused as it either drains to the sewage network, leaks to streets due to unavailability of a drain, or is collected and then thrown away. Some

respondents, on the other hand, reported occasionally or partially reusing this water for machines, such as iron and car battery/wipers, as well as floor cleaning.

> FG3: I honestly do not use all of it, as I told you previously, but I take as much as I need for ironing and for cleaning the floor. At least I am not wasting all of it like most people do.

The majority of these residents collect ACC water in gallons. Only one participant fills ACC water in plastic bottles to use it for the iron.

> FG4: If I want to use ACC water, I usually collect it in water bottles. When I am in need, I remove the pipe from the sewage network outlet, fill water bottles, and use them for ironing.

All respondents do not use ACC water for irrigation, although some of them have household plants.

> FG4: I have plants in my house, but, as I told you, I have never tried to water the plant with it.

Noticeably, most respondents reported having previously read or heard that ACC water is used in many countries for both domestic purposes and irrigation through different strategies and methods.

> FG1: In 2006, I guess, I went to Kuwait. We were sports teams from various countries, each team was assigned a particular compound to stay in. I remember that in the compound we stayed in, each room had a window and had a pot containing plants in front of it. I noticed that they branched the water from the AC on the window into a pipe that leads the water into the plants of each window…
>
> FG3: I once read that, in Australia, the government mandates residents to reuse this water instead of draining it into the sewage system by proposing a solution and a way to guide them on how to reuse this water. They take this water, put it in huge reservoirs, and add to it the residues of potato, apples, bananas, or any other type of vegetable or fruit residues, store it for about

> one week in the sun, and then they use it for the irrigation of plants, greenery, and public gardens. They consider that these food residues are like compost and fertilizers that help plants grow, and their addition to this water prevents wasting it....

Several reasons were provided by participants to justify their complete or partial unemployment of ACC water, especially for domestic purposes. Respondents in all groups mainly claimed that manual ACC water collection is difficult and time-consuming.

> FG2: … we do not use this water not because it is not clean but because it is difficult to collect it and transport gallons whenever we need water.

Along with the complexity of manual collection, several participants perceived that it is not aesthetic to put gallons on balconies and/or reported being afraid of water flooding problems on their balconies if they forgot to empty ACC water gallons, and of subsequent inside water spilling from AC units.

> FG1: I would not collect gallons manually honestly. It is difficult and I do not like the view of the gallon on the balcony. I feel that its aesthetics are not nice. Also, for example, I might forget to empty the gallon, or I might not have time for that. I do not want to put myself at a risk that my AC spills water into the inside of the room if the gallon becomes full.

Few other respondents revealed that they are too lazy to collect ACC water, although they have time for this practice. Some residents lacked motivation to reuse this water, as they do not pay for the amount of water they consume through metered systems.

> FG4: If there was a metered system for water in buildings, I would use ACC water for all the cleaning purposes in the house. If I find that this would save me money, I will close the tap and use ACC water instead.

Concerning ACC water quality, most respondents contended that ACC water is clean and safe to use for cleaning purposes and toilet flushing, as well as the iron and car battery/wipers, as they perceived that it is distilled water that is free of lime residues and impurities that usually damage machines.

> FG1: ACC water can be used for ironing and car battery/wipers because it does not contain any lime residues that could cause us problems like the tap water we receive. It does not contain calcium, sodium, potassium, etc.

Using ACC water for personal hygiene was controversial for residents. Some participants believed that ACC water is safe to use for personal hygiene as it is distilled water, and that it is especially good for the hair because, unlike tap water, it does not contain lime residues and salts that lead to hair loss. Others claimed that ACC water traps pollutants and odors present in rooms and are therefore not psychologically relaxed to use it for any purpose that allows its contact with the human body.

> FG3: I do not think we can bathe with it. When I put it for the iron, I see that it is not too clean. It contains residues, or maybe dust particles. I do not know honestly if this is from the pipe, or from the water itself. It does some kind of dust. I actually try to filter this water with a small filter or even with a cotton to reuse it for the iron.

Some even perceived that ACC water might originally be clean, but that it can potentially become polluted if the pipes it passes through or the container it is stored in are dirty or contain molds and mushrooms.

> FG2: It is supposed to be clean water, however, I think that it is not because the pipes that it circulates in are not clean.

All respondents believed that ACC water is not potable, as it is free of beneficial minerals.

> FG1: No, as far as I know, it is not potable because it does not contain minerals. It does not contain potassium, sodium calcium; it is water that comes from the humidity in the air.

Importantly, most participants believed that ACC water is not suitable for irrigation as it is free of minerals essential for plant growth.

> FG3: ACC water is not beneficial for plants. It does not contain the minerals that are present in normal tap water. It might lead to the death of plants.

Some also stated that ACC water might kill plants as they experienced or heard that it produces a white or green layer on floors and in containers, implying that it might contain algae or other types of particles and pollutants.

> FG4: I have plants in my house, but, as I told you, I have never tried to water the plant with it. I noticed, several times, that as the water spills into the balcony's ground, the floor becomes dry and forms a white layer. After seeing this, I thought that I do not have to use this water for irrigation because it might harm the plant, make it dry and lead to its death.

> FG4: ACC water might damage the plant and lead to its death because this water contains all the elements that were present in the room. The AC unit absorbs all the elements in the room such as smoke and dust.

As for ACC water quantity, the majority of respondents were aware that the amount of water generated by AC units depends predominantly on humidity and hours of operation. They acknowledged that ACs produce a lot of water when the weather is too hot and humid. Their estimation of the quantity that could be generated ranged between 7 to 10 liters for each AC unit daily.

> FG4: If the humidity is very high, it fills a 7-8L gallon each day within several hours of operation. I noticed that because I used to use this water to clean the balcony's floor, but I stopped after noticing a white layer that was formed that let the floor really dry.

In light of the challenges encountered in its use and their perception of its quality, respondents came up with several suggestions for ACC water reuse. Most respondents recommended having a built-in piping system that directs ACC water into separate reservoirs in buildings for domestic purposes and household plants irrigation. Others perceived that this internal system can only be implemented in new buildings. As such, they believed that ACC water reuse in their building can happen through giving collected ACC water gallons to concierge for irrigation and building cleaning, or for emptying it in the reservoirs of households.

Some respondents expressed their willingness to reuse ACC water for both domestic purposes and irrigation if metered systems were adopted to reduce their water consumption, if experts assured them about its safety and cleanliness, or if it was treated prior to use.

> FG2: If we had a metered system and we are paying for the amount of water we consume, we would definitely consider using this water to lower our water consumption, and consequently the amount of money we are required to pay.
>
> FG2: If an expert tells me that the water is clean and could be used for irrigation, and that the lack of minerals in the water does not affect plants in a harmful way, I would use it for irrigation.

When asked about the possible ways to reuse ACC water for irrigation in the city, most participants contended that retrofitting buildings with external piping systems and reservoirs, similar to the proposed prototype, is the best way to disseminate ACC water reuse on public gardens in the city. They believed that the municipality should be responsible for ACC water collection, as it is the entity that irrigates and maintains green spaces and public gardens in the city.

> FG3: Every building should be equipped with an external piping system through which the water from AC units is collected, stored in reservoirs, and then collected weekly, for example, by the municipality to be reused on public gardens. The duty of the municipality is actually to irrigate public gardens in the city. Therefore, it is its duty to collect this water too.
>
> FG4: Harvesting ACC water through external pipes connected to a collection tank which would be emptied by the municipality weekly and used for watering public gardens the city is the only solution to collect this water…

As in individual interviews, respondents' thoughts about the proposed system revolved around its biophysical impact, cost, and stakeholders' involvement.

Starting with the biophysical impact of the system, most respondents perceived that it is an eco-friendly project that provides a beautiful image of the city and prevents and/or mitigates well water dryness in the city during summer months due to electricity problems or weather conditions.

> FG4: We have a problem that sometimes the circuit breaker of the water stops and it does not let the water reach the roof. Moreover, the well gets dry, as we stated, they would need to dig it again. The year before the last one, we were obliged to over pump water and dig the well as it became dry. We used to stay around 2 to 3 days without water every now and then in summer. Therefore, the presence of this water could help not only the greenery in the city but could also help us as a building.

Some participants also mentioned that the project could mitigate the problem of polluted and salty well water received in households and gardens, especially the ones located near the coast, due to groundwater over pumping.

> FG2: The advantages of this method is that you get rid from lime residues. Maybe, if the water that we will be receiving in the future is saline, like what is happening in many households in Tripoli, then of course it will be beneficial for plants.

All participants acknowledged that, if widespread, the proposed strategy can ameliorate public gardens in the city, promote the creation of more green spaces and reduce disparities in green space maintenance across neighborhoods. Some even stated that the presence of this system on buildings could motivate residents to install green roofs. Most respondents also acknowledged that the installation of external pipes for ACC water collection fixes water leakage problems on building walls.

Nonetheless, opinions regarding the impact of the prototype on the physical aesthetics and aspects of buildings varied among respondents. Some participants perceived that the system ameliorates and organizes the appearance of building façades and could even be covered with special material, while others thought that it is not aesthetic.

> FG1: The proposed system ameliorates the aesthetics of building façades because it relocates ACs in an organized way and minimizes water spilling.

Other participants stated that the system is not feasible in existing buildings as it needs relocation of AC units to unified places in households. They perceived that installing the proposed system is easier in new buildings, or those under construction, and should preferably be done with central AC systems rather than split units. Few participants also stressed on the importance of knowing whether residents are willing to sacrifice space in the parking for the installation of the ACC water reservoir.

> FG1: We should also keep in mind that the reservoir will take some space from the parking. It is important to see whether residents are willing to sacrifice such a space.

All involved residents approached the issue of proposed system's cost in the same way, considering it as the major impediment for project realization. They

predominantly perceived that the system is costly and that their neighbors will refuse to pay for it as they do not usually pay for basic services in the building.

> FG3: The financing of all this project is the major problem honestly. It costs money; therefore, it is not easy.
>
> FG2: I think that the proposed idea is not possible in our building because many residents will not pay.

Only few of them stated that they are willing to pay for the system on a condition that all residents of the building do or if the amount was affordable, which, according to them, is unlikely.

> FG4: We will pay for the proposed system if all residents in the building do. It is something beneficial for us and for the city.

Some perceived that the system can only be implemented in high-income neighborhoods, as middle and low class residents have a lot of other priorities to pay for given the bad economic situation in the country nowadays, or in buildings where there is a building council that obliges residents to pay a fixed monthly sum for building services and maintenance.

> FG3: There is something that we should also consider, which is the financing of such a project. Who will pay for it? Therefore, I think that this might be possible in buildings where homeowners or renters are of the high income class. In these harsh days that we are living in Lebanon, nobody will tell you that he will be willing to pay money in order to save water and benefit the environment. In my house, for example, I needed to change the pipes recently.

In general, most respondents preferred that the municipality funds the system or provides them with direct monetary incentives for its installation such as rewards or tax reductions, or indirect ones, such as putting metered systems for water in buildings.

> FG3: In order to implement this system, the municipality could maybe assist in its financing, as our municipality is not poor and has a lot of financial resources that they do not employ.
>
> FG1: The only problem of the proposed system is its cost, as we told you previously. Here comes the role of the municipality to provide incentives for residents. For example, in my building, I pay 390,000L.L for the municipality per year. If they come and tell me, do this system, and we will charge you 340,000L.L rather than 390,000L.L, I would definitely do it. It is true that this 50,000L.L is nothing for the municipality, but when, as a resident, I find that they have reduced my bills, I will be encouraged and motivated.
>
> FG3: Having a metered system might also incentivize the houses in our building to pay for the installation of the AC water harvesting system.

Some residents proposed pricing the collected ACC water and selling it to the municipality, plant nurseries and/or NGOs, but assumed that this will not be effective as no one will ever pay them for this water. Others believed that the project is only possible if external funds for system installation and maintenance were provided to NGOs or private companies, as they thought that the municipality will never finance it even if they were capable of doing so.

> FG2: The proposed project might actually be feasible. If for example, the donations that come from outside are not provided to the government, but rather to NGOs, this would definitely be feasible. If the donor gives money to the municipality, they will take it for their own and nobody trusts them. But when there are trusted NGOs that receive donations and are tasked with the implementation, it could definitely happen. They can; they do not need the government, neither the municipality. It would be an independent project. If you give any trusted person money, he would be able to do it.

As for stakeholders' involvement, participants generally perceived that mutual commitment among both residents and government is necessary for project implementation. In this realm, most respondents felt that the implementation of the proposed project might be difficult in the city, as they do not trust that the municipality

will abide by water collection and/or use the collected water for its intended purpose. They stated that the municipality does not usually work for the welfare of the public and the city and does not assume its basic responsibilities.

> FG2: We did not, until now, see any eco-friendly project undertaken by the municipality for us to have trust in it. Whether we funded the system, or they did, we do not know whether the municipality will abide by a schedule of water collection or no.
>
> FG3: To ameliorate the proposed project, I think that the collection of the water should not be done by the municipality because we do not trust that it will actually abide by the schedule given to us.

In light of this challenge, some respondents preferred using the collected water in their own households or in their building gardens or wanted that trusted NGOs and/or private companies be responsible for funding, implementation, maintenance, and water collection, as they trust these entities more. In their opinion, the municipality should do more projects in the city, complete them until the end, and show transparency in their planning and implementation to gain residents' trust.

> FG1: For me, I think that in this case, it is more beneficial that I collect the water and I use it for my house. Why would I bother collecting it for the municipality if I do not trust that they will recuperate it? If there was trust in the municipality, I definitely would have given them the water. On the other hand, if an NGO comes and tells me that they want to implement that system and collect this water for irrigation, I will give them the water because I trust NGOs. The water would go for the amelioration of the public gardens, and will allow me to go to these spaces and enjoy their beauty.
>
> FG3: Our municipality does not even provide us with the most basic and simple services. If a private company proposes this project and bares its finances, people will trust it more than the municipality.

Moreover, all respondents believed that the entity who initiates the project, whether private or public, should necessarily conduct awareness campaigns to educate

people about the importance of ACC water reuse for the city, as most residents are careless about the environment.

> FG2: I agree that residents need awareness campaigns concerning ACC water for the strategy to happen. There is a huge proportion of people that are clueless on all these issues. They do not understand what you will be talking to them if you just tell them "ACC water" or "distilled water".
>
> FG3: The culture of our entire society needs to be changed. Awareness campaigns need to be done in order to make people more aware about this water and its potential uses, as well as the benefits of installing these systems. An old woman, for example, who does not know about this water, cannot be convinced about this system without extensive awareness campaigns. This takes time, exactly like the recycling of garbage, which needs a lot of awareness.

Many participants proposed pilot projects as an important means of convincing residents with systems and stressed on the role of the media and digital marketing campaigns in disseminating their locations, findings, and benefits.

> FG3: It is also important to note that the media has an essential role in disseminating knowledge about this issue and making these pilot projects famous and well-known, and showing their benefits to people, for them to be encouraged to install these systems.

Also, the majority of respondents believed that retrofitting existing buildings with the proposed systems should be mandated and enforced. They emphasized the importance of monitoring residents' practices and imposing fines on those who do not implement systems, considering that residents do not abide by building laws unless penalized.

> FG3: Even without awareness, when there is a law that mandates installing such a system and puts penalties and fines for the buildings who do not abide, it would become an effective and widespread practice... If people are not held accountable for violation, they will not care. This is the nature of human beings actually.

Overall, involved residents perceived that the implementation of the proposed prototype in the city requires a combination of financing, incentives, awareness campaigns, and legal enforcement. Some participants particularly stressed on the necessity of the coexistence of both incentives and legal enforcement for project implementation.

3. Stakeholders' interviews

Themes retrieved from the thematic analysis and individual interviews were mostly retained in this section to be able to compare between their responses and those of stakeholders. Most interviewed stakeholders in the municipality do not have AC units in their households, however, they hear and perceive that people either waste ACC water, or partially use it for the iron, car battery/wipers, irrigation, personal hygiene, and/or cleaning purposes. Others who have AC units in their homes, just like residents, waste it or use it partially for one or more of these purposes: ironing, car battery/wipers, strengthening and growing hair, showering, cream compositions, and carpet cleaning. Noticeably, however, none of the stakeholders reported using or having tried to employ ACC water for the irrigation of household or public garden plants.

While investigating their knowledge about ACC water quality, most stakeholders stated that they have never done research about this water and that they do not have enough knowledge about it. They only knew that this water is distilled, and does not contain minerals, lime residues, or pollutants, implying that it does not damage machines and can be used for the hair and the skin.

> R2: ACC water is of good quality and we can bathe with it, and use it for personal hygiene, I hear people say. I do not have any AC unit in my household, but I also hear them say that it is too good for cars. For example, if we find that the car engine is filled with water that has lime residues, we can empty it, clean it, and fill it with water from the AC, as it does not contain lime residues, it is of very good quality.

Interestingly, all respondents were curious to know whether ACC water is adequate for plants and were willing to use it for irrigation if it was. They did not know whether the lack of minerals in this water affects plants and whether it should be supplemented with minerals to be used for irrigation.

> R3: I have never used ACC water for plants, and consequently I do not know its advantages and disadvantages, because honestly, I know that is free from any minerals and components. I have not tried to use it. I might be wrong, and it might even be a misconception, I do not know.

Responses of stakeholders regarding the quantity of ACC water varied. Some of them acknowledged that the amount of ACC water generated depends on humidity and hours of operation, assuming that one AC unit could generate around 5-10 liters of water per day. Others, on the other hand, perceived that the amount of water produced is too little and cannot fulfill the irrigation demands of gardens.

> R4: I think that the AC generates very limited amounts of water. I do not think that it could fill more than one small gallon per day, even when there is a lot of humidity in the air. I previously observed AC units, and I do not expect that it could generate more than one small gallon per day, if at all.

Most municipality stakeholders expressed their tremendous interest in ACC water as a supplemental source of water for the irrigation of public gardens, as it might be the solution for many problems encountered daily. In fact, many workers reported the shortage of electrical supply in the country as a major cause of water scarcity in

irrigation, as these workers become unable to put water motors on for too long to pump water from wells due to the scarcity and high price of fuel oil nowadays. When this happens, these workers cannot cover all areas of gardens, if at all, and request watering trucks for manual irrigation that are never timely sent by the municipality.

> R3: ACC water could definitely solve the problem that I need additional water for irrigation when we have no electricity during the day. In general, all gardens usually request additional watering trucks to help them with irrigation due to the lack of electricity.

Further exacerbating this matter is that the municipality takes a lot of time to fix damaged irrigation systems in gardens, leaving some plots without irrigation for several weeks, and even months. Respondents believed that, when this happens, ACC water can compensate for the water needs of unirrigated plots through manual irrigation.

> R2: We always face problems with the piping systems. Lots of times the pipes get broken, and the municipality takes about two to three days to come and fix them. Sometimes, we wait a lot until they respond to our request. We stayed two months without water because of two faucet locks that are broken, and the municipality did not fix them. The faucet locks cost 84$; it took the municipality two months to replace them. They are not poor, the municipality. They have a lot of money; they can easily fix that if they wanted to.

Moreover, most respondents perceived that ACC water might be a supplemental source of irrigation when water is scarce few days in summer, and/or when well water received in gardens is salty due to over pumping, especially in areas near the coast. Some participants also stated that the presence of ACC water might motivate them to plant more green spaces in the city.

> R2: ...Reusing ACC water in hot and dry days just like these days is beneficial because we sometimes face problems with taking the water from the water authority because of the tremendous demand… When we do not

> have enough water, it is important for us to have a second, and even a third supplementary source of water.

Most stakeholders justified their unemployment of ACC water for the irrigation of street greenery and public gardens by the insufficient number of employees working in the gardens department. Others also believed that the quantity of ACC water cannot cover the irrigation needs of entire gardens, and that the water pressure of manual irrigation is not adequate for this purpose. As such, respondents expressed their willingness to use this water for irrigation if it was directly filled in the reservoirs of irrigation systems in gardens, and/or if they perceived that it was suitable for this purpose and its quantity was enough

> R1: We can maybe recuperate this water and put it in the reservoir of a public garden that is equipped with an irrigation system. Therefore, we would have used the water instead of wasting it.
>
> R2: If experts tell me that its quality is good for irrigation, I will use it, why not. The head of gardens department knows, and has studied these issues, I guess. If he tells me that AC water is good for irrigation, I will use it. My personal experience does not allow me to know whether it is good or not for this purpose. It might be better than well water, or vice versa.

Opinions of stakeholders regarding the proposed prototype came as a response to those of residents and revolved around aspects similar to those discussed above, namely biophysical impact, cost, and stakeholders' involvement. Some thoughts about the design of the system were the only addition to the list, as they were gathered from experts in the fields of gardens and buildings.

On biophysical impact, and consistent with residents' beliefs, the proposed participatory strategy has been deemed by stakeholders to be very important, as it provides a beautiful image of the city both locally and globally, prevents water scarcity,

replaces salty well water in some gardens, and motivates the municipality to implement more green spaces. Respondents welcomed the idea as they perceived that it compensates for the irrigation of gardens that do not have an irrigation system and/or that face problems with electricity, and for medians and street greenery that are mostly neglected, damaged, and unirrigated by employees, especially if the amount collected was significant.

> R4: The availability of water provided by the proposed idea itself is amazing. I wish everyone gives me water to allow this garden to flourish and grow. I suffer from problems with water, not because it is scarce, but because there is no electricity. Nowadays, the electricity is coming for only around 2 hours per day, and the municipality has asked us to try to reduce the hours of operation of motors as much as possible because fuel oil is too expensive nowadays. Moreover, the idea is welcomed because, as I told you, we face a lot of maintenance problems in the irrigation system that sometimes take too much time to be solved. The municipality is significantly lagging behind in this regard. Also, we have a problem because we only have one groundwater aquifer to irrigate this huge garden, located in the lower part of the garden. We definitely needed another one in the upper part, because the pressure of the water is really low. ACC water, if used for irrigation, could possibly enhance our ability to water all the garden effectively.

Some participants also reported that the implementation of this strategy could ameliorate water resource management in the city, as its use for irrigation could leave governmental water for distribution among households who lack access to this valuable resource.

> R1: The proposed strategy could also reduce the pressure on water in the city. Sometimes, the watering trucks are not able to irrigate because some households are not receiving water, therefore the municipality goes and fills their reservoirs from these trucks. The reuse of ACC water for irrigation could reduce the pressure on water, allowing the water authority to distribute water more evenly.

Several stakeholders believed that the system needs rearrangement of AC units on buildings but could minimize water leakage on buildings and ameliorate their aesthetics if implemented adequately.

> R5: As a municipality, we cannot consider external ACC water pipes as a nuisance, because if there were any other choice, it could have been implemented. There is no other choice. However, in every building, they should adopt the same strategy in terms of AC unit placement and pipe installation, to prevent damaging the external appearance of the building. This is what I recommend.

Concerning cost, all stakeholders acknowledged that the project is not too costly and could be implemented by the municipality as it is the wealthiest one in the country, and that it might even save them money as it reduces water consumption from the water authority.

> R1: I do not think that there exist any financial constraints that could face the municipality in the implementation of the proposed strategy. The municipality of Tripoli is the wealthiest and biggest municipality in Lebanon.
>
> R5: The municipality would do the project, why not? I think that the biggest incentive for the municipality to engage in this project is that it could save money because it usually pays for the water it gets from the water authority. If this was implemented, the expenses spent on water will definitely be less. It would save money, how much I do not know, but it would definitely save money.

Nonetheless, most of them stated that they are not willing to bare the financial expenses of system installation and maintenance, or to provide any financial incentives for residents.

> R1: I think that residents would really like this idea. However, when they will know that they will have to pay for the installation of the system and for the reservoir, because the municipality will not assist them in financing, I do not know if the idea will still look appealing to them…

> R3: Honestly, I do not think that the municipality would do the proposed project, especially if they will have to pay for and install the systems on buildings… It could be implemented in any area, but not in Tripoli.

For these stakeholders, residents should pay to install these systems on their buildings or get funding from NGOs for this purpose. They reported being ready to be involved in the project if they were only responsible for ACC water collection, as the operation does not cost them much.

> R3: If only engaged in water collection, the municipality would not have a problem to collect the water. This is because, as we say, we should profit from everything that is free. This does not differ from its regular operation, because workers are already getting water from many places. We usually get the water from firefighters or from the water authority. I do not think it would cost a lot of money, and would not take a lot of time, and even if it were the case, I do not think that it is a problem if employees worked a bit longer to get this water.

Remarkably, on stakeholders' involvement, most participants admitted the presence of a significant gap between planning and implementation in the municipality due to the irresponsibility of employees as well as the lack of political will to implement sustainable projects in the city.

> R1: You should know that there is always a gap between planning and implementation in the municipality. We are always impressed in certain ideas, but if we come to do it, it turns out challenging and difficult in most of the cases.

They mostly believed that the project is difficult as the municipality lacks employees in all departments, especially in the department of gardens where employees work in several fields at once. There has not been any employment in the municipality since 2015, with no clear reasons to explain this phenomenon.

> R1: We have a lack of employees in the municipality in all the departments, especially in the gardens department. Sometimes, we are obliged to let the employee do several things, even if it is not in his domain... If for the collection and recuperation of the ACC condensate we would need around two additional employees, currently, it is not possible.
>
> R2: Employing new workers for the proposed strategy is difficult, I do not know why honestly. The civil service board did not request any new workers since 2015. It has been around 4-5 years that they have not requested any additional worker.

Workers additionally stated that the process of water collection is too time-consuming and difficult, as their irrigation schedule is already packed, and they can barely irrigate the essential areas in the city during the day. They considered the project secondary, as they had a lot of more important tasks to be accomplished and services to provide, and they are already lagging behind in this regard. Some of them called on NGOs to help them with water collection and proposed giving them a permission to empty the collected water in gardens' reservoirs or municipality trucks.

> R1: I think that the implementation of the proposed project needs the participation of environmental NGOs. There are a lot of NGOs in Tripoli that are capable of helping this project become a reality. An NGO, for example, could be responsible for collecting the water and we, as a municipality, could give them the authority to empty the collected water in the reservoirs of the gardens, or bring it to the municipality and empty it in the reservoirs of trucks. We are ready to cooperate with NGOs. It would be really easy to reuse this water if there is someone to collect it, as the employees in the municipality already have plenty of tasks to do and we have very few employees currently.

Most stakeholders perceived that a major impediment for project realization is that both stakeholders and residents are reluctant to engage in sustainability projects as they are careless about the environment.

> R1: The mentality of people and stakeholders is the main disadvantage of the proposed strategy. You need someone who really cares about these

> things and about such ideas in particular. I am talking about the mentality of municipality stakeholders in particular. They should have the will to implement such projects. You also need professionals in the field who really understand how to implement the project and what is needed for that.

In an attempt to increase its feasibility chances, some respondents recommended modifying the design through branching these systems directly to nearby gardens in order to minimize the burden of water collection, however, they then acknowledged that this option is very costly and difficult due to road paving and underground pipe installation. Some of them recommended installing the pipes above ground but then perceived that it would be difficult as there are streets between buildings and gardens. As such, most stakeholders believed that the strategy needs advanced equipment such as suction apparatus in trucks or pumps in reservoirs, as well as high pressure pipes and advanced watering trucks to speed up water collection.

> R3: To ameliorate the proposed idea, I can only suggest having a pump in each reservoir to speed up the water collection process. Of course, the truck should also contain a machine that could easily suck the water in a short period of time. It is an easy operation.

Concerning prototype implementation, one stakeholder stated that the system should not be implemented on the principal façade of buildings. He/she recommended covering AC units with iron boards for decoration and aesthetics and urged placing reservoirs in places that are not used by anyone. He/she warned covering reservoirs, as it is considered a violation according to building laws.

> R5: The external AC units could also be covered with any type of iron boards for decoration or anything. Also, I would recommend that you prevent implementing that on the principal façade of the building. Always try to do that on the back of the building; that is on a façade that is not too visible to people. You cannot put the ACC water reservoir on the principal façade of buildings. It should be invisible underground. This is because on

> the sidewalks in front of each building, we do not usually put anything. You could put for example on the back of the building, or on the secondary, most invisible, sidewalks of the building if they were not dedicated for cars. We do not have a problem as long as it is not located on the principal façade of the building, and as long as it is invisible and does not take the place of any other thing. However, you should know that you cannot put a ceiling or cover this reservoir with any type of material, it would be a violation.

He/she believed that ACC water reservoirs could be placed in the parking, or on secondary sidewalks of buildings, if residents approve, and if they do not tighten the entrance and exit of cars.

> R5: You can put the reservoir on the secondary sidewalks of the building, but you should also be careful about the entrance and exit of cars. You should be careful that the reservoir does not tighten the area for cars to enter or to exit, because nowadays these sidewalks are too tight. They are of around 3 meters and a half. In short, you should put the reservoir in a place that does not bother anyone and that is not on the principal façade and sidewalk of the building. You can also put them in the parking on the back of the building, where the space is not dedicated for cars.

Generally, most stakeholders found the installation of these systems as a good idea if the quantity of ACC water generated is significant, if they were capable of getting more trucks and employees in the future, if residents were environmentally aware, if residents paid for system installation and maintenance, and if NGOs collaborated with the municipality.

B. ACC water calculations

Figure 6. Study area buildings

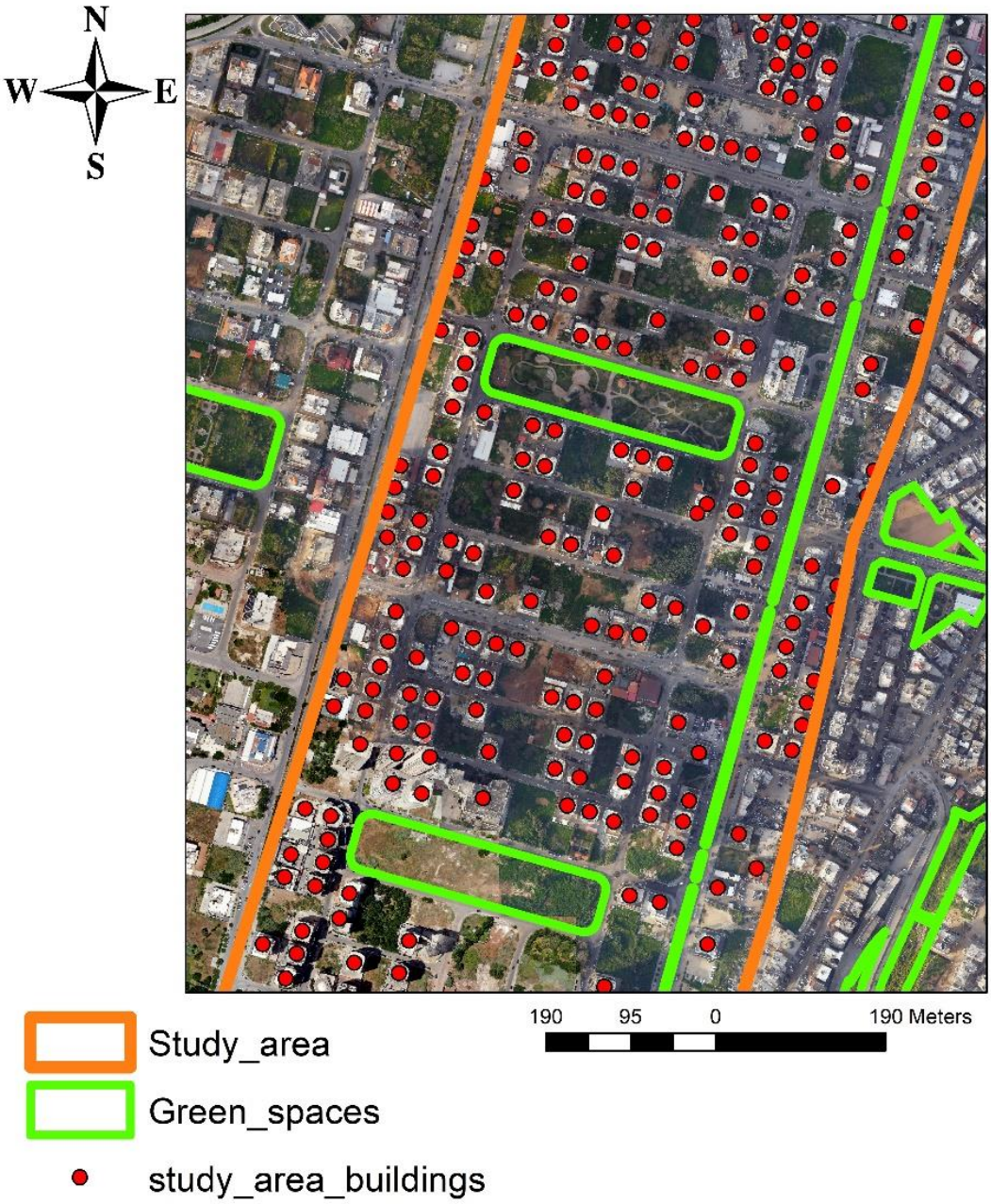

Figure 7. Zoomed view of public gardens in the study area

To quantify the amount of ACC water generated from buildings in the study area, the average daily temperature and the average daily percent relative humidity were taken as 32°C (89.6 F) and 73% respectively according to online weather databases (Weather Online, 2020; CAS, 2006). The output temperature in the room after operating

AC units was estimated at 20°C (68 F), the percent relative humidity at 10%, and the percentage of outside air at 5% by the main AC suppliers in Tripoli. According to them, AC units most commonly sold to the neighborhoods of the study area have a capacity of 12,000 BTU, which is equal to 1 ton.

Calculated through the adopted online calculator, the amount of ACC water generated from each AC unit was found to be 2.2 gallons/day, equivalent to 8.33 liters daily. As information provided by AC suppliers revealed that each house in the study area has an average of 3 AC units, the generated daily amount of ACC water was multiplied by 3 to yield 25 liters/day/household. Municipality data revealed that every building in the studied area had an average of 8 floors with two households in each, indicating that each floor generates 50 liters of ACC water per day and the entire building 400 liters/day, which is equivalent to 2,800 liters weekly. This implies that each building would need to install a 3,000 liters reservoir if it is to be emptied weekly by municipality workers. The entire study area, consisting of around 480 buildings computed through GIS, could therefore generate around 192,000 liters/day, corresponding to 1,344,000 liters/week.

Figure 8. Selected garden and its surrounding building layers

Al Biaa garden and its surrounding buildings, illustrated in figure 5, was taken as a case study site to identify whether the amount of ACC water generated from buildings could fulfill the manual irrigation needs of green spaces in the city. This garden was chosen as municipality stakeholders and workers stated that it is the one that has the most serious problems in its irrigation system, and that the water pumped from its well is not sufficient to irrigate it entirely. According to these workers, the garden optimally needs two water trucks per day (32,000 liters/day) to complement its

irrigation. As such, the amount ACC water generated from the three building layers surrounding the garden (figure 5) was cumulatively quantified and was consequently compared to its water needs.

The first layer, consisting of 40 buildings directly overlooking the garden, produces around 16,000 liters of ACC water per day, an amount equal to the capacity of one water truck needed for manual irrigation. The second layer, entailing 23 buildings, adds 9,200 liters/day to the previously calculated amount (25,200 liters/day in total), implying that these two layers do not yet fulfill the entire water needs of the garden, but can cover a significant part of it. When the quantity of ACC water generated from the third layer consisting of 37 buildings was added to the previous amount, it was found that the three layers of buildings surrounding the garden can produce 40,000 liters of ACC water daily, thus demonstrating that the amount can fulfill the entire manual irrigation needs of the studied garden by providing two water trucks per day (32,000 liters), and can even provide an excess of 8,000 liters/day for the irrigation of surrounding medians, roundabouts, and /or street greenery.

In this context, it is worth mentioning that the water requirements of the studied public garden (18,153 m^2) reported by the municipality (32,000 liters/day) were adopted in the calculations as they were found to be within the range reported for public gardens of similar size in the Mediterranean region. In fact, extrapolations from the literature have demonstrated that an 18,153 m^2 public garden located in Mediterranean cities could consume from 29,246.5 liters/day to 53,450.5 liters/day through manual irrigation during the dry season (Reyes-Paecke et al., 2018; Nouri, Borujeni & Hoekstra, 2019).

Considering more efficient irrigation techniques, such as drip irrigation, the literature contended that this technique could consume around 40% less water than

manual irrigation, implying that the range of water requirements of an 18,153 m^2 Mediterranean public garden could drop to 17,549.9 liters/day to 32,070.3 liters/day (World Bank, 2006, van der Kooij et al., 2013). Assuming that the studied garden consumes 32,000 liters of water per day through manual irrigation, as reported by municipality stakeholders, this amount could significantly drop to 19,200 liters/day through drip irrigation. This infers that, if drip irrigation was adopted, the amount of ACC water generated from the studied buildings becomes equivalent to around twice the water needs of the studied garden per day. Calculated ACC water could irrigate the studied garden with an area of 18,153 m^2 and water needs of 19,200 liters/day, as well as the other public garden in the study area with an area of 18,120 m^2 and subsequent water requirements of 19,165 liters/day.

All these findings demonstrate that, at the neighborhood scale, the amount of ACC water generated from buildings is significant and could fulfill the irrigation needs of large public gardens and street greenery, with more water use efficiency achieved if drip irrigation systems were installed and properly maintained in municipality gardens. Thus, ACC water generally presents a considerable potential in alleviating water scarcity in a water stressed area like the one considered in this study.

CHAPTER IV

DISCUSSION

This study revealed that ACC water is used only occasionally for small domestic purposes and helped identify three key issues that will affect the collection and use of ACC water for irrigation purposes. These are a knowledge gap about the quality and usability of ACC water for irrigation, the absence of a convenient system for ACC water harvesting from apartments, and the complexity of the governance of the operation. A similar knowledge gap regarding ACC water reuse for irrigation was reported by Siam et al. (2019) who showed that residents lacked awareness about the quality and quantity of ACC water and its possible reuse for landscape irrigation and agricultural purposes in Ramallah and Jericho. The Lebanese and Palestinian contexts greatly overlap, especially that these two countries border each other and are both located on the eastern shores of the Mediterranean with limited freshwater resources. Although quantitative in nature, results of the questionnaire administered to residents in Ramallah and Jericho were greatly consistent with the ones portrayed in this study, as it was found that most of the interviewed sample 63.51% either drained ACC water into streets or installed a special piping system to divert this water into the drain of the sewage network, while only few of them (36.47%) reported using ACC water either occasionally or partially for domestic purposes only (Siam et al., 2019). Importantly, 84.7% of the chosen Palestinian sample perceived that this water is not suitable for irrigation purposes as it is not clean or does not contain minerals (Siam et al., 2019). Moreover, and resonating with this study, most respondents believed that AC units generate limited quantities of ACC water, while the study demonstrated that a single

split AC unit could generate around 8.63 to 15.1 liters/day depending on humidity, an amount relatively similar to the one obtained in this study (Siam et al., 2019). The Palestinian study highlighted the need for exploring the potential of ACC water recovery in climates similar to that of Palestine, implying that this study confirmed its findings (Siam et al., 2019). Studies on water reuse, in general, point to the fact that the successful implementation of water reuse is contingent on public support which may not be secured if there are gaps in knowledge. For example, Baghapour et al. (2017) found that 75% of study participants in Shiraz city, Iran, refused to use treated wastewater for drinking and cooking due to misconceptions regarding its quality for these purposes. Similarly, Wade et al. (2021) revealed that the lack of knowledge and previous education significantly affected the willingness of residents to reuse water in Norman, Oklahoma.

Bridging knowledge gaps and clarifying misconceptions regarding water reuse quality and quantity, according to various scholars, can be achieved through education and awareness campaigns using various means including media (TV, radio, newspaper), advertisements, readily available user-friendly information packages, as well as flyers, booklets and platforms providing information on successful reuse projects (Baawain et al., 2020; Po, Kaercher & Nancarrow, 2013; Baghapour, Shooshtarian & Djahed, 2017; Pinto & Maheshwari, 2009; Alhumoud & Madzikanda, 2010). Wade et al. (2021) also suggested that experiential learning might be more convincing, as knowledge acquired would be both comprehendible and memorable. Akpan et al. (2020) added that acquiring endorsements from medical doctors, professionals and experts helps in the promotion of recycled water reuse among residents.

In the case of ACC water reuse tackled in this study, and consistent with participants and scholars' propositions, as well as Siam et al.'s (2019) recommendations, the misconception can be addressed by reaching out to residents and sharing information on the suitability of ACC water for irrigation. Sisco et al. (2017) and Galindo (2017) confirmed that ACC water is adequate for irrigation purposes as its quality resembles that of rainwater and distilled water, implying that it is free of sanitizers like chlorine and chloramine which harm plants. Residents not convinced with these findings could be informed that they can supplement plants with fertilizers as necessary (Sisco et al., 2017). Awareness raising should also encompass numerical estimates and facts portraying the significant potential quantity of ACC water, such as the ones provided in this study, which are in line with the literature revealing that a 12,000 BTU split AC unit could produce around 1 liter of ACC water per hour (Sisco et al., 2017). Endorsements of academics and experts in the field of water recycling appears to be a promising way to foster ACC water reuse, as it was proposed by most participants in this study.

The social dimension of retrofitting ACC water harvesting systems into existing buildings was addressed in this study at two levels: internal relationship between building residents and relationship between residents and the municipality. At the internal level, most interviewed residents in all buildings were not willing to participate in retrofitting, especially financially, as they believed that their neighbors would refuse to do so. This dilemma, according to them, occurs regularly when the building needs services, renovation, or maintenance of some parts. Although limited in number, studies perceived that conflict in multi-family residential buildings prevails due to opposing interests of residents regarding the way forward, which eventually stalls projects. This

requires extensive efforts and coordination among all or the vast majority of occupants, as well as a deep understanding of the criteria behind their decisions (Yau, 2012). In the field of green retrofitting, D'Oca et al. (2018) revealed that decision-making in multi-family residential buildings requires a majority in most countries. Consensus is further hindered by the potential unequal distribution of retrofit costs and benefits on individual households. To counter this paradigm, it was suggested that information focusing on the benefits of the proposed project be readily available at early stages. In this realm, it is particularly important, according to D'Oca (2018), to identify early adopters in order to foster the retrofitting "spill-over effect". Nonetheless, Wilson and Laffont (2016) claimed that awareness campaigns alone are not effective to induce innovation in buildings, and that the secret behind successful retrofitting projects is to include energy or water efficient retrofits in more holistic renovation initiatives.

Proposed scenarios by participants in this study were in harmony with the presented literature, as they recommended that the adoption of ACC water harvesting systems needs awareness among building residents, should be done during building renovation and/ or should be accomplished in the presence of a building council that imposes a fixed monthly sum to be paid by residents for building maintenance or renovation. The latter recommendation, found to be the most effective by participants, can be accomplished through the enforcement of Lebanese law 88/1983 which mandates all buildings with more than three homeowners to create a building council from all owners who elect a president for this council by the majority of voices. The president, in his turn, has the authority to mandate all residents to pay a monthly amount for maintenance and renovation of buildings. In case the amount was not timely paid, the concerned resident could be subjected to legal liability in courts (Shafi, 2010). The

project's initiating entity could therefore work with building council presidents to explain the value of ACC water and the benefits of retrofitting buildings with systems for its harvesting, along with the adequate framing of the project, to enable them to disseminate the acquired knowledge to members and avoid conflicts.

Moving to the relationship between residents and municipality stakeholders, findings of this study were compatible with the literature portraying the drivers, barriers, and challenges of green retrofitting. The "circle of blame", which posits that all concerned parties, including residents and stakeholders, blame each other for not cooperating in the realization of sustainability in buildings was dominant in the statements of participants (Jagarajan, 2017). In fact, interviewed residents welcomed the idea of retrofitting ACC water harvesting systems for the irrigation of public gardens, considering it as a promising way to alleviate water quality and/or quantity problems encountered daily, but claimed that they had a lot of other priorities to think of and that they need the cooperation of the municipality for system implementation and water collection. These residents perceived that the project is too unrealistic, especially in Tripoli, as the municipality does not and will not have the will to assist them neither financially nor technically. Consistent with most studies, the major challenges impeding residents from retrofitting AC water systems were found to be its installation cost and maintenance, the need for financing and monetary incentives such as tax reduction or rewards, the lack of trust in municipality as they do not usually work for the welfare of the city, the lack of awareness of residents and stakeholders, as well as the absence of communication and collective action between residents and municipality or other governmental entities (Achtnicht & Madlener, 2012; Jagarajan et al., 2017; Bertone, 2018; Tsantopoulos et al., 2018; He, Xu, Li & Zhao, 2018; Oguntona et al., 2019;

Makki & Mosly, 2020). Respondents also perceived that this project cannot happen unless the government mandates, and most importantly, enforces the retrofitting of these systems on buildings.

On the other hand, municipality stakeholders expressed their tremendous interest in installing ACC water systems on buildings, as the practice provides them with a supplemental source of water for the irrigation of public gardens, as they greatly face water shortage problems due to poor water quality, electricity shortage and damaged irrigation systems, among others. Nonetheless, and although they acknowledged the serious gap between planning and implementation in the municipality, as well as their irresponsibility and irresponsiveness, they considered this project secondary and expressed their unwillingness to assist residents in its implementation and maintenance. They claimed that residents are unaware of the environment and would not cooperate with them even if they initiated the project. These stakeholders even tried to escape from the task of water collection by calling on NGOs to help them with it and expressing their readiness to give them permissions to enter gardens and empty the collected ACC water in reservoirs dedicated for irrigation.

In light of this paradox, several studies ascertained that the "vicious circle of blame" could be converted into a "virtuous loop of feedback and adaptation" through the involvement and cooperation of a wide range of actors and establishing channels of communication and knowledge dissemination between them (Hartenberger & Lorenz, 2008). Positive change in the built environment, according to the literature and residents' proposed scenarios, can be accomplished through several means, the most important being government co-funding and incentives, laws, regulations and standards, and collaboration with scholars and academics. Chan (2017) found that "financial and

market-based incentives", "availability of better information on costs and benefits", "mandatory policies and regulations", and "green rating and labeling" were the ultimate strategies to promote the retrofitting of buildings. Potbhare et al. (2009) and Li et al. (2014) also ascertained that environmental awareness through workshops, seminars, conferences, and pilot projects is detrimental to induce positive change in the built-environment. To address the financial constraints of retrofitting projects, which were given a lot of importance by residents, Hartenberger & Lorenz (2008) argued that a radical change in market and communication should be performed in order to incorporate the social dimension of the Triple Bottom Line, to which little emphasis has been given by governments until this date. The continuous tailoring and adjustments of incentives through appropriate feedback on both environmental and social aspects of buildings and their linkages with financial performance and property values is imperative to prevent the blame game, and should necessarily involve property professionals, banks, and certifiers. According to Hartenberger & Lorenz (2008), sustainability in buildings would look appealing to residents if it was presented in a way that offers them added value. In this realm, the cooperation with NGOs, as suggested by residents and scholars, plays a crucial role as they might provide programs such as microfinance, which indirectly improves the economic well-being of communities through job creation and income generation, as well as capacity-building and self-reliance (Nikkhah & Redzuan, 2010).

Governments of different cities, in cooperation with NGOs, financial institutions, and other actors, have employed several financial, technical, and knowledge-based mechanisms to promote retrofitting practices among citizens. In Singapore, for example, the government procures financing for the purchase of energy

efficiency equipment and renewable energy through its pilot Building Retrofit Energy Efficiency financing scheme (Building and Construction Authority (BCA), 2020). Equally, the government of Tokyo offers tax incentives through the Energy Saving Promotion scheme, which exempt individuals from energy taxes when they retrofit their buildings with energy efficient equipment (Tokyo Metropolitan Center for Climate Change Actions, 2016). Aside from financial assistance, the governments of several cities attempted to raise awareness about the benefits of energy retrofitting. In New York, the government operates a renowned public education program named "Green NYC", through which they established a website dedicated to offer knowledge and tips (City of New York, 2020). Another example is Stockholm city, which provides online fact sheets for energy saving retrofitting, telephone supports, and advisory visits to residents and property owners. Other cities, such as Tokyo, Singapore, and Chicago, provide free or subsidized energy efficiency audits and textbooks (Tokyo Metropolitan Government, 2015). Several governments also consider leading-by-example as an efficient method to promote retrofitting practices, mostly accomplished through retrofitting city owned buildings. For example, in Johannesburg, energy efficiency upgrade opportunities were identified in 104 buildings, with 5 of these having already undergone upgrades and achieved tremendous reductions in GHG emissions (Tokyo Metropolitan Government, 2015).

In the context of retrofitting buildings with ACC water harvesting systems in Tripoli, North Lebanon, a SWOT analysis was undertaken to document the strength, weaknesses, opportunities, and challenges of the systems in order to identify ways forward.

Strength	Weaknesses
Technical: ACC water is of high quality for irrigation ACC water quantity is significant High humidity on coast during dry period **Social/economic**: Residents and stakeholders in favor because retrofitting convenient Residents and stakeholders in favor of retrofitting because practice provides a good image of sustainability to the city Residents in favor of retrofitting to improve the visual appearance of the building by organizing layout of AC units Residents in favor of retrofitting because it reduces ACC water outlets into streets	**Technical:** System needs pumps in reservoirs and high pressure pipes **Social/economic:** Residents and stakeholders do not collect and/or reuse ACC water Residents and stakeholders do not agree that ACC water can be used for irrigation Residents and stakeholders not willing to pay to retrofit the system Residents do not cooperate through building committees Municipality employees are not enough to operate the system No trust between residents and local authorities
Opportunities	**Challenges**
Technical: Green space quality improved More green spaces can be established Green spaces irrigated with high quality water low in salts **Social/economic:** Residents contribute to water saving Building committee to oversee operations may engage in other sustainable practices NGOs interested in funding sustainable urban initiatives NGOs interested in awareness campaigns System saves money spent on water purchased by municipality	**Technical:** Electricity shortage in the country affects operation of ACs and pumping of water **Social/economic:** Harsh economic situation in the country Political instability No enforcement of laws Gap between planning and implementation in the municipality

Figure 9. SWOT analysis of ACC water harvesting system retrofitting

The study revealed the presence of solid foundations for initiating the proposed ACC water harvesting project. First, at the technical level, ACC water is of high quality for irrigation, and its quantity is significant due to the high levels of humidity on the coast during the dry season. At the socio-economic level, interviewed residents and stakeholders were in favor of retrofitting their buildings with ACC water collection systems as they found that this practice is convenient, provides a good image of sustainability to the city, improves the visual appearance of the building by organizing the layout of AC units, and reduces ACC water outlets into streets.

Along with the technical and socio-economic strength of the system, there exists several opportunities that could be seized for project implementation. In fact, the proposed strategy could improve the quality of green spaces in the city by providing an additional source of high quality water for their irrigation and could also encourage the establishment of more of these spaces. Socially, the project may benefit from the interest of respondents in water saving, the presence of several NGOs interested in awareness campaigns and in funding sustainable urban initiatives, as well as the ability of the municipality to save money spent on the purchase of water for irrigation. It also gives a chance to building committees that usually oversee operations to engage in other sustainable practices.

Nonetheless, the project has been found to present several weaknesses and threats that should be considered and addressed in light of both the available opportunities and the scenarios proposed by study participants. With regards to technical aspects, it has been found that the system needs advanced equipment, such as pumps in reservoirs and high pressure pipes, to speed-up the water collection process. This challenge can be overcome by reaching out to NGOs who are usually interested in

funding similar sustainable urban initiatives and establishing channels of communication with them throughout all stages of the project. Moving the social/economic disadvantages, the study revealed that residents do not usually collect and/or reuse ACC water and, most importantly, do not agree that this water could be used for the irrigation of garden and/or household plants. Addressing this challenge requires extensive awareness campaigns on the quality and quantity of ACC water for irrigation and the benefits of retrofitting the proposed system on buildings, and possibly pilot projects, to be undertaken by environmental NGOs interested in the promotion of sustainable practices in Tripoli.

Another obstacle encountered is that residents do not usually cooperate with each other to deliver essential building services. This could be solved by the creation of building committees to oversee operations and promote the installation of the proposed system through framing it under the umbrella of maintenance and/or renovation works. Adding to that, residents and municipality stakeholders were not willing to finance system installation and maintenance. Stakeholders also stated that the employees in the municipality are not enough to operate the system. This could be alleviated by several funding opportunities or monetary incentives that could be provided by NGOs through external grants dedicated only for sustainable projects, and by employing workers and/or volunteers and training them on water collection, in the aim of assisting municipality employees to enable them to accomplish their tasks in a timely manner.

The lack of trust between residents and local authorities, the gap between planning and implementation in the municipality, and the lack of law enforcement could all be addressed through emphasizing an interest in the implementation of the proposed strategy common to both residents and stakeholders, which, in this case, is the

amelioration of green space quality and quantity and the provision of a good image of sustainability to the city. The participation of NGOs and other private entities is also essential in this regard, as these entities might contribute to the project both financially and technically and might serve as mediators between residents and local authorities to strengthen their trust in each other.

Retrofitting existing buildings with ACC water harvesting systems for the irrigation of public gardens in Tripoli might not be a feasible option currently due to the harsh economic situation, political instability, and significant electricity shortages in the country that could affect the implementation of any project of this kind. Nonetheless, as a first stage, the initiative could start by the manual collection and reuse of ACC water on household plants and/or neighborhood greenery until the situation allows for more investment in this direction.

CHAPTER V

CONCLUSION

This study has explored the potential of reusing ACC water from residential buildings for the irrigation of green spaces in the city of Tripoli, North Lebanon. Results confirmed that the quantity of ACC water generated from buildings in the immediate proximity of a case study green space would fulfill its manual irrigation demands, even exceeding reported daily irrigation needs. Importantly, the study revealed the presence of solid foundations for initiating the proposed ACC water harvesting project due to the adequate quality and quantity of this water for irrigation, as well as its ability to ameliorate green spaces in the city and increase their number. Nonetheless, there was generally no social acceptance for retrofitting ACC water harvesting systems into existing buildings mainly due to the lack of respondents' awareness on ACC water, lack of cooperation between building residents, lack of system financing, and complexity of system governance. The harsh economic situation and political instability in the country were also identified as important impediments for such initiatives. All these weaknesses and threats of the proposed strategy were addressed in light of both the available opportunities and the proposed scenarios by residents in order to guide the implementation of future projects of this kind. Future research needs to include the design of retrofitted ACC water harvesting systems and the development of policies related to regulations and financial schemes for ACC water collection.

APPENDIX A

Research Proposal

1. **Thesis title:** Participatory strategy for water condensate harvesting from air-conditioning home units and its use in public gardens: A Case Study in Tripoli, Lebanon

   Research Questions:
   - Are the residents and municipality stakeholders in Tripoli aware that water condensate harvested from air-conditioning home units is suitable for the irrigation of plants?
   - Are the residents and municipality stakeholders willing to contribute to a participatory water condensate harvesting program from air-conditioning home units for irrigation use of public gardens in the city?

   Objectives of the study:
   The objective of this study is to explore the potential of introducing a participatory program for water condensate harvesting from air-conditioning home units for use in the irrigation of public gardens in the city of Tripoli, North Lebanon.

2. **Recruitment of participants:** The study will employ a triangulation of two inductive qualitative research approaches, namely one-to-one interviews and focus groups, to investigate public perceptions regarding the recovery of AC water condensate and its use for the irrigation of public gardens in Tripoli, North Lebanon. One-to-one interviews will be conducted with eight respondents living in the district of Tripoli, each one of them residing in a different building and selected based on the availability of ACs in his/her household. Interviews will also be conducted with relevant stakeholders from the municipality of Tripoli in order to assess their perceptions and preferences towards the AC condensate harvesting strategy. The recruitment of stakeholders will be accomplished using the "reputational approach", which is based on a snowball sampling technique through which knowledgeable stakeholders will be consulted to identify others who might potentially be interested to participate. Contact information of potential subjects will be shared with the investigators only if approval was sought by the seed participant to share this information. Participant's contact information will be written on a separate list and immediately shredded after interviews are done. Along with the individual interviews, three to six focus group discussions will be conducted in the district of Tripoli, as the literature reveals that this range is enough to retrieve most of the themes. As suggested by scholars, each focus group will ideally entail five to eight residents, considering that larger groups are difficult to control and might limit the ability of each participant to share his/her personal experiences and opinions. The participants involved in each group will be residents in the same building, will have AC units in their households, and will tentatively share similar socio-demographics, such as gender, age and social class, as homogeneity is preferred in this kind of discussions to maintain the comfort and confidence of participants.

   Both stakeholders and residents will be invited to participate via phone call, through which the caller will explain the aim of the research project and the consent process and will set a meeting time and date for discussion.

   The phone call invitation will include the following script: *"Hello, my name is Tala Meraaby and I am an MS. Student at AUB. I am conducting a research project which aims at understanding the perceptions and attitudes of residents towards the reuse of air-conditioning water condensate for the*

irrigation of public gardens in Tripoli, Lebanon. I would like to meet with you to ask you some questions about the topic. If you agree on that, please know that your answers will be anonymous, and you can withdraw from the discussion at any time without providing any justification. The session will be audio-taped for the purpose of data collection. Voice recordings will be placed on a password-protected phone. The transcripts and recordings will be stored securely in the principle investigator's office in a locked room and will only be accessible by the research team. These recordings will be deleted after interpretation. Results of the discussions will be used for academic purposes only. Do you agree to participate?"

3. **Protection of participants' privacy and data confidentiality:** Protection of participants privacy and data confidentiality is ensured. Answers provided by respondents will be anonymous, as the discussions will not entail any questions that reveal a respondent's identity, or any personal information related to him/her. Participation in the discussions and interviews will be strictly voluntary, and participants can withdraw at any time without providing any justification. The discussion and interview sessions will be audio-taped for the purpose of data collection. Voice recordings will be placed on a password-protected phone and will only be used by the researcher. The transcripts and recordings will be stored securely in the principle investigator's office in a locked room and will only be accessible by the research team. These recordings will be deleted after interpretation. Participants will not encounter any risks or benefits from the participation in this research project, and results of the discussions will be used for academic purposes only. Participants will be informed of all of the above during initial contact via phone call and before the interview or focus group discussion starts. A written participation consent form will be administered to respondents and signed by them prior to the initiation of discussions.

4. **Research method/procedure:** To ensure the adequate planning and preparation for both the individual interviews and the focus group discussion sessions, a question guide consisting of open-ended questions will be prepared in advance. This guide will include broad questions to allow the insights of participants to run the discussion.

   For residents, these questions include:

   1) What do you do with the water condensate generated from the AC units in your household?
      Follow-up probes: If not reused: Why don't you reuse it? /If reused: For what purposes do you reuse it? How do you collect it? How much water is collected per day?
   2) What do you know about the quality of the AC water condensate?
      Follow-up probes: How did you know about it? On what information are your perceptions based?
   3) If experts tell you that the water is clean, would you reuse it for irrigation and/or domestic purposes?
      Follow-up probes: Why? What is your incentive?
   4) If experts tell you that the water is clean, what are some management strategies and/or systems to collect this water and use it for the irrigation of the plants in each of the following contexts: your household, your neighborhood and your city?
      Follow-up probe: Which one do you prefer the most?
   5) Would you be interested in harvesting this water through external pipes connected to a collection tank which would be emptied by the municipality and used for watering public gardens the city?
      Follow-up probes: Why? What is your incentive?
   6) What are your thoughts regarding this strategy?

Follow-up probe: What are its benefits and constraints?

7) How do you see that this strategy could be implemented or improved?
   Follow-up probe: Do you encourage its implementation?
8) What do you think are the implications of this strategy on both the city and the country?
   Follow-up probe: What are the incentives that should be provided for its implementation?

As for the municipality stakeholders, they will mainly be asked about the following topics:

- Perception of AC water quality and quantity
- Willingness to adopt a strategy for harvesting AC water and its use for irrigation
- Data on green spaces within the city
- Data on irrigation patterns adopted

The question guides will be translated to Arabic, as all interviews will be conducted using the native language of participants. Moreover, and in order to guarantee the consistency of the procedure followed in each session, an interview schedule will be adopted, which will mainly entail: the welcoming, the assertion of confidentiality, the introduction of the topic, and finally the questions and discussion.

All interviews and discussions will be audio-taped following participants' consent and will be transcribed verbatim after translating them into English.

5. **Data analysis and disposition of data collected at the end of the study:**
The transcribed and translated findings will be analyzed using a thematic analyses approach in which themes and codes occurring across interviews will be identified. The recordings will be deleted after interpretation. To meet AUB archives, analyzed data will be retained with the Principle Investigator and stored on her password protected computer for a period of three years.

6. **Preparation of report and intentions regarding dissemination of findings:**
The thesis report will be disseminated in the form of presentations or articles related to this research. The full final outcome will be sent to the AUB library for archiving.

Written Consent document for residents' interviews

American University of Beirut
Faculty of Agriculture and Food Sciences
Department of Landscape Design and Ecosystem Management
Principle investigator: Dr. Salma Talhouk
Student-investigator: Tala El Merheby

Consent document

Dear Sir/Madam,

You are asked to participate in a research project conducted by the American University of Beirut that assesses residents' and stakeholders' perceptions and attitudes towards developing a strategy for water condensate harvesting from air conditioning home units and its use in public gardens in the city of Tripoli, North Lebanon. Please read the information below to decide if you would like to participate or not. Please do not hesitate to ask any questions that you may have.

You are asked to participate in an individual interview that will last no longer than forty minutes. You were selected to participate in this interview based on the availability of air-conditioning units in your household. You will be asked to orally answer a set of eight main questions that will explore your perceptions and attitudes towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli.

The interview will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, handwritten notes will be taken instead. Voice recordings will be placed on a password-protected phone and will only be used by the researcher. The recordings, handwritten notes and transcripts will all be stored securely in the principle investigator's office in a locked room and will only be accessible by the research team. Recordings will be deleted after interpretation.

Your participation in this study does not involve any physical risk or emotional risk to you beyond the risks of daily life. You will receive no direct benefits from participating in this research; however, your participation does help researchers better understand the perceptions and attitudes of residents regarding air conditioning condensate reuse. The results of the interview will be used for academic purposes only. Please note that your name will not be disclosed, and the researcher will not ask you any questions that might reveal your identity or any personal information about you. Your participation in this research project is strictly voluntary and you can withdraw at any time without providing any justification. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in no way affects your relationship with AUB. For any questions or inquiries related to the project, please do not hesitate to contact the investigators on the following addresses:

Dr. Salma Talhouk **Tala El Merheby**

American University of Beirut
Faculty of Agriculture and Food Sciences

Department of Landscape Design and Ecosystem Management

P.O. Box: 11-0236, Riad El Solh
Phone: (01) 350 000 ext. 4508
E-mail: ntsalma@aub.edu.lb

American University of Beirut
Faculty of Agriculture and Food Sciences
Ecosystem Management Program

Mobile: (76) 313 404
E-mail: thm12@mail.aub.edu

For any other study-related inquiries, comments or complaints, please do not hesitate to contact the AUB Social and Behavioral Science Institutional Review Board (IRB) at (01) 350 000 ext. 5445 or irb@aub.edu.lb.

Please sign the following declaration prior to your participation in the interview.

I have been asked to participate in an individual interview for a research project assessing the perceptions and attitudes of residents and stakeholders towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli. I understand that the following statements are part of my consent:

- The research requires me to orally answer a set of eight questions.
- My participation in this research project is strictly voluntary and I may withdraw at any time without providing any justification.
- The interview will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, handwritten notes will be taken instead.
- I have read and understood the information presented above, and I acknowledge that all my questions have been answered.

Signature: _____ Date: _____

Thank you for your active participation and contributions.

Written Consent document for residents' Focus Group Discussions

American University of Beirut
Faculty of Agriculture and Food Sciences
Department of Landscape Design and Ecosystem Management
Principle investigator: Dr. Salma Talhouk
Student-investigator: Tala El Merheby

Consent document

Dear Sir/Madam,

You are asked to participate in a research project conducted by the American University of Beirut that assesses residents' and stakeholders' perceptions and attitudes towards developing a strategy for water condensate harvesting from air conditioning home units and its use in public gardens in the city of Tripoli, North Lebanon. Please read the information below to decide if you would like to participate or not. Please do not hesitate to ask any questions that you may have.

You are asked to participate in a focus group discussion that will last no longer than one hour. Participants in the discussion will be your neighbors in the same building. You were selected to participate in this interview based on the availability of air-conditioning units in your household, and because you all reside in the same building. As a group, you will be asked to orally answer a set of eight main questions that will explore your perceptions and attitudes towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli.

The discussion session will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, the researcher will turn off her recorder once it is your turn and take handwritten notes instead. Voice recordings will be placed on a password-protected phone and will only be used by the researcher. The recordings, handwritten notes and transcripts will all be stored securely in the principle investigator's office in a locked room and will only be accessible by the research team. Recordings will be deleted after interpretation.

Your participation in this study does not involve any physical risk or emotional risk to you beyond the risks of daily life. You will receive no direct benefits from participating in this research; however, your participation does help researchers better understand the perceptions and attitudes of residents regarding air conditioning condensate reuse. The results of the discussion will be used for academic purposes only. Please note that your name will not be disclosed, and the researcher will not ask you any questions that might reveal your identity or any personal information about you. Your participation in this research project is strictly voluntary and you can withdraw at any time without providing any justification. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in no way affects your relationship with AUB. For any questions or inquiries related to the project, please do not hesitate to contact the investigators on the following addresses:

Dr. Salma Talhouk
American University of Beirut
Faculty of Agriculture and Food Sciences

Department of Landscape Design and Ecosystem Management
P.O. Box: 11-0236, Riad El Solh
Phone: (01) 350 000 ext. 4508
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Tala El Merheby
American University of Beirut
Faculty of Agriculture and Food Sciences
Ecosystem Management Program

Mobile: (76) 313 404
E-mail: thm12@mail.aub.edu

For any other study-related inquiries, comments or complaints, please do not hesitate to contact the AUB Social and Behavioral Science Institutional Review Board (IRB) at (01) 350 000 ext. 5445 or irb@aub.edu.lb.

Please sign the following declaration prior to your participation in the focus group discussion.

I have been asked to participate in a focus group discussion for a research project assessing the perceptions and attitudes of residents and stakeholders towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli. I understand that the following statements are part of my consent:

- The research requires the participants in the focus group discussion, including myself, to orally answer a set of eight questions.
- My participation in this research project is strictly voluntary and I may withdraw at any time without providing any justification.
- The discussion session will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, the researcher will turn off her recorder once it is your turn and take handwritten notes instead.
- I have read and understood the information presented above, and I acknowledge that all my questions have been answered.

Signature: _____ Date: _____

Thank you for your active participation and contributions.

Written Consent document for stakeholders' interviews

American University of Beirut
Faculty of Agriculture and Food Sciences
Department of Landscape Design and Ecosystem Management
Principle investigator: Dr. Salma Talhouk
Student-investigator: Tala El Merheby

Consent document

Dear Sir/Madam,

You are asked to participate in a research project conducted by the American University of Beirut that assesses residents' and stakeholders' perceptions and attitudes towards developing a strategy for water condensate harvesting from air conditioning home units and its use in public gardens in the city of Tripoli, North Lebanon. Please read the information below to decide if you would like to participate or not. Please do not hesitate to ask any questions that you may have.

You are asked to participate in an individual interview that will last no longer than one hour. You were selected to participate in this interview as you are a contributor to the decision-making process in the municipality. You will be asked to orally answer a set of six main questions that will explore your perceptions towards the water condensate generated from the air-conditioning units in residential buildings' households and your willingness to use this water for the irrigation of public gardens in Tripoli. You will also be asked to provide some data on the green spaces in the city and their irrigation patterns.

The interview will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, handwritten notes will be taken instead. Voice recordings will be placed on a password-protected phone and will only be used by the researcher. The recordings, handwritten notes and transcripts will all be stored securely in the principle investigator's office in a locked room and will only be accessible by the research team. Recordings will be deleted after interpretation.

Your participation in this study does not involve any physical risk or emotional risk to you beyond the risks of daily life. You will receive no direct benefits from participating in this research; however, your participation does help researchers better understand the perceptions and attitudes of residents regarding air conditioning condensate reuse. The results of the interview will be used for academic purposes only. Please note that your name will not be disclosed, and the researcher will not ask you any questions that might reveal your identity or any personal information about you. Your participation in this research project is strictly voluntary and you can withdraw at any time without providing any justification. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in no way affects your relationship with AUB. For any questions or inquiries related to the project, please do not hesitate to contact the investigators on the following addresses:

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For any other study-related inquiries, comments or complaints, please do not hesitate to contact the AUB Social and Behavioral Science Institutional Review Board (IRB) at (01) 350 000 ext. 5445 or irb@aub.edu.lb.

Please sign the following declaration prior to your participation in the interview.

I have been asked to participate in an individual interview for a research project assessing the perceptions and attitudes of residents and stakeholders towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli. I understand that the following statements are part of my consent:

- The research requires me to orally answer a set of six main questions and to provide information on the green spaces in the city and their irrigation patterns.
- My participation in this research project is strictly voluntary and I may withdraw at any time without providing any justification.
- The interview will be audio-taped for the purpose of data collection. If you refuse to be audiotaped, handwritten notes will be taken instead.
- I have read and understood the information presented above, and I acknowledge that all my questions have been answered.

Signature: _____ Date: _____

Thank you for your active participation and contributions.

Data collection guide

To ensure the adequate planning and preparation for both the individual interviews and the focus group discussion sessions, a question guide consisting of open-ended questions was prepared. This guide includes broad questions to allow the insights of participants to run the discussion.

Interviews and focus group discussions undertaken with residents:

I. Introduction for Focus groups/Interviews:

"Hello, my name is Tala El Merheby and I will be the moderator of this focus group discussion today/ your interviewer today. I am an MS. Student at the American University of Beirut, and I am conducting these focus group sessions/ interviews as part of my research project which aims at understanding the perceptions and attitudes of residents towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli, Lebanon. I would like to thank you for accepting to participate in this discussion/ interview. The session will take no longer than one hour/40 minutes, and I will be asking you a set of eight questions that you will answer and discuss as a group. The session will be audio-taped for the purpose of data collection. **If you refuse to be audiotaped, I will turn off my recorder once it is your turn and take handwritten notes instead.** Please note that your name will not be requested, and I will not ask you any question that might disclose any of your personal information. You can withdraw at any time without providing any justification. The results of these discussions will be used for academic purposes only. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in no way affects your relationship with AUB. **Also, I would like to emphasize that all information discussed should be kept confidential and should not be shared with anyone."**

II. Questions:

1) What do you do with the water condensate generated from the AC units in your household?
   Follow-up probes: If not reused: Why don't you reuse it? /If reused: For what purposes do you reuse it? How do you collect it? How much water is collected per day?

2) What do you know about the quality of the AC water condensate?
   Follow-up probes: How did you know about it? On what information are your perceptions based?

3) If experts tell you that the water is clean, would you reuse it for irrigation and/or domestic purposes?
   Follow-up probes: Why? What is your incentive?

4) If experts tell you that the water is clean, what are some management strategies and/or systems to collect this water and use it for the irrigation of the plants in each of the following contexts: your household, your neighborhood and your city?
   Follow-up probe: Which one do you prefer the most?

5) Would you be interested in harvesting this water through external pipes connected to a collection tank which would be emptied by the municipality and used for watering public gardens the city? [show prototype (appendix A)]
   Follow-up probes: Why? What is your incentive?

6) What are your thoughts regarding this strategy?
   Follow-up probe: What are its benefits and constraints?

7) How do you see that this strategy could be implemented or improved?
   Follow-up probe: Do you encourage its implementation?

8) What do you think are the implications of this strategy on both the city and the country?
   Follow-up probe: What are the incentives that should be provided for its implementation?

Interviews undertaken with municipality stakeholders:

I. Introduction for Stakeholder interviews:

"Hello, my name is Tala El Merheby and I will be your interviewer today. I am an MS. Student at the American University of Beirut, and I am conducting these interviews as part of my research project which aims at understanding the perceptions and attitudes of residents towards the reuse of air-conditioning water condensate for the irrigation of public gardens in Tripoli, Lebanon. I would like to thank you for accepting to participate in this interview. The session will take no longer than one hour, and I will be asking you a set of six main questions. I will also ask you to provide some data on the green spaces in the city and their irrigation patterns. The session will be audio-taped for the purpose of data collection. **If you refuse to be audiotaped, I will turn off my recorder once it is your turn and take handwritten notes instead.** Please note that your name will not be requested, and I will not ask you any question that might disclose any of your personal information. You can withdraw at any time without providing any justification. The results of these discussions will be used for academic purposes only. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in no way affects your relationship with AUB. **Also, I would like to emphasize that all information discussed should be kept confidential and should not be shared with anyone."**

II. Questions:

Perception of AC water quality and quantity

1) What do you know about the water condensate generated from the AC units of households in residential buildings?
   Follow-up probes: What is the quality of this water? How much water do you think could be produced? What is the fate of this water? On what information are your perceptions based?

Willingness to adopt a strategy for AC water harvesting

1) If experts tell you that the water produced from ACs is clean and of significant amount, would you consider using it for the irrigation of public gardens in the city?
   Follow-up probes: Why? What is your incentive as a municipality?

2) As a municipality, would you be interested in installing collection tanks connected to external pipes in the building, emptying these tanks and using the collected water for the irrigation of public gardens in the city? [show prototype (appendix A)]
   Follow-up probes: Why? What is your incentive?

3) What are your thoughts regarding this strategy?
   Follow-up probe: What are its benefits and constraints?

4) How do you see that this strategy could be implemented or improved?
   Follow-up probe: What are its implications of this strategy on both the city and the country?

Data on green spaces

1) What is the percentage of current and future green spaces in the city? How are they distributed?
2) What is the percentage of irrigated vs. non-irrigated green spaces in the city? Where are they located? How are they distributed?
3) How are green spaces in the city maintained?

Data on irrigation patterns

1) How much water is needed for the irrigation of green spaces in the city?
2) What is the method and frequency of irrigation adopted?
   - Which areas are irrigated manually?
   - What is the routine operation of watering trucks?
   - What is the number and size of watering trucks used for irrigation?
   - What is the number of personnel involved in irrigation?

APPENDIX B

النسخة المترجمة للعربيّة للمستندات:

عنوان البحث : إستراتيجية تجميع مخزون المياه من وحدات تكييف الهواء المنزلية واستخدامها في ريّ الحدائق العامة: دراسة في طرابلس ، لبنان

دعوة للمشاركة عبر الهاتف

مرحباً ، اسمي تالا المرعبي و أنا طالبة ماجستير في الجامعة الأميركية في بيروت. إنني أحضّر بحثاً هادفاً إلى رصد تصورات ومواقف السكان و المسؤولين والعمال في بلدية طرابلس عن مشروع إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامّة في طرابلس، لبنان.

لذلك، أود أن ألتقي بك / بكِ لطرح بعض الأسئلة حول هذا الموضوع. فإذا كنتَ / كنتِ موافقاً / موافقةً على ذلك، فيرجى أخذ العلم بأنّه لن يتم طلب اسمكَ / اسمكِ ، ولن أطرح عليكَ / عليكِ أيّ سؤال قد يكشف عن أيّ من معلوماتكَ / معلوماتكِ الشخصية. أيضاً ، بمكنكَ / بمكنكِ الانسحاب في أيّ وقت دون تقديم أيّ مبرر. ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. سوف توضع السجلات الصوتية على هاتف محمي بكلمة سرّ ولن يستخدمها احد سوى الباحث، وسيتم حذف التسجيل بعد ذلك، كما سيتم تخزين النصوص والتسجيلات بشكل آمن في مكتب الباحثة الرئيسيّة في غرفة مقفلة ولن يتمكن من الحصول عليها إلا فريق البحث، وسيتم استخدام نتائج هذه المناقشات للأغراض الأكاديمية فقط. هل ترغب / ترغبين في المشاركة؟

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نموذج الموافقة النصّي للمقابلات الفردية مع السكّان

الجامعة الأميركية في بيروت
كلية الزراعة والعلوم الغذائية
قسم تصميم المناظر الطبيعية وإدارة النظم الإيكولوجية
الباحث الرئيسي: د. سلمى نلحوق
الباحث التلميذ: تالا المرعبي

النموذج النصّي للموافقة

حضرة السيد/ السيدة،

يرجى منكَ / منكِ المشاركة في مشروع بحثي تجريه الجامعة الأميركية في بيروت لتقييم تصورات ومواقف السكان والمسؤولين والعمال في بلدية طرابلس تجاه مشروع وضع استراتيجية لتجميع مخزون المياه من وحدات تكييف الهواء المنزلية واستخدامها في ريّ الحدائق العامة في مدينة طرابلس ، شمال لبنان . يرجى قراءة المعلومات أدناه لتحديد ما إذا كنتَ / كنتِ ترغب / ترغبين في المشاركة أم لا. من فضلكَ / فضلكِ لا تتردّد(ي) في طرح أي أسئلة قد تكون لديكَ / لديكِ.

يُرجى منكَ / منكِ المشاركة في مقابلة فردية لا تستغرق أكثر من أربعين دقيقة. لقد تم اختيارك / اختيارك للمشاركة في هذه المقابلة بناءً على توفر وحدات تكييف الهواء في منزلكَ/ منزلكِ . سيُطلب منكَ / منكِ الإجابة شفهياً على مجموعة من ثمانية أسئلة رئيسية تستكشف تصوراتكَ / تصوراتكِ ومواقفكَ / مواقفكِ تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامة في طرابلس.

ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتَ / رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك. سوف توضع السجلات الصوتية على هاتف محمي بكلمة سرّ ولن يستخدمها احد سوى الباحث، وسيتم حذف التسجيل بعد ذلك، كما سيتم تخزين النصوص والتسجيلات و الملاحظات المكتوبة بشكل آمن في مكتب الباحثة الرئيسيّة في غرفة مقفلة ولن يتمكن الحصول عليها إلا فريق البحث.

مشاركتكَ / مشاركتكِ في هذه الدراسة لا تسبب لكَ / لكِ أي خطر جسدي أو خطر معنوي يتجاوز مخاطر الحياة اليومية. لن تتلقى / تتلقي أي فوائد مباشرة من المشاركة في هذا البحث. على الرغم من ذلك ، فإن مشاركتكَ / مشاركتكِ تساعد الباحثين على فهم تصورات ومواقف السكان بشكل أفضل فيما يتعلق بإعادة استخدام مخزون مياه التكييف. سيتم استخدام نتائج المناقشة للأغراض الأكاديمية فقط.

يرجى أخذ العلم أنه لن يتم ذكر اسمكَ / اسمكِ، ولن يقوم الباحث بطرح أي أسئلة قد تكشف عن هويتكَ / هويتكِ أو أي معلومات شخصية عنكَ / عنكِ. مشاركتكَ / مشاركتكِ في هذا المشروع البحثي تطوعية تمامًا ويمكنكَ / يمكنكِ الانسحاب في أي وقت دون تقديم أي مبرر. إن قرار الانسحاب الخاص بكَ / بكِ لن يسبب لكَ / لكِ أي عقوبة أو خسارة للمزايا التي يحق لكَ / لكِ الحصول عليها. التوقف عن المشاركة لا يؤثر بأي شكل من الأشكال على علاقتكَ / علاقتكِ مع الجامعة الأميركية في بيروت. لأيّة أسئلة أو استفسارات تتعلق بالمشروع ، يرجى عدم التردد في الاتصال بالباحثين على العناوين التالية:

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كلية الزراعة والعلوم الغذائية
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تالا المرعبي
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كلية الزراعة والعلوم الغذائية
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هاتف: 313 404 (76)
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لأيّة استفسارات أو تعليقات أو شكاوى أخرى متعلقة بالدراسة ، يرجى عدم التردد في الاتصال بمجلس المراجعة المؤسسية لمؤسسة العلوم الاجتماعية والسلوكية (IRB) على الرقم 01/350000 تحويلة 5445 أو المراسلة عبر العنوان التالي: irb@aub.edu.lb

يرجى التوقيع على هذه الموافقة قبل مشاركتك / مشاركتكِ في المقابلة الفردية .

لقد طُلب منّي المشاركة في مقابلة فردية لمشروع بحثي بهدف تقييم تصورات ومواقف السكان والمسؤولين والعمال في بلدية طرابلس تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامة في طرابلس. وإن العبارات التالية هي جزء من موافقتي:

- يتطلب البحث منّي أن أجيب شفهياً على مجموعة من ثمانية أسئلة.
- مشاركتي في هذا المشروع البحثي تطوعية تمامًا ويمكنني الانسحاب في أي وقت دون تقديم أي مبرر.
- ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات .إذا رفضتُ/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.
- لقد قرأت وفهمت المعلومات الواردة أعلاه ، وتلقيت الأجوبة اللازمة والكافية على جميع استفساراتي .

التوقيع:_____ التاريخ:_____

شكرا لمشاركتك / مشاركتكِ !

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نموذج الموافقة النصّي لجلسات المناقشة مع السكّان

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يُرجى منكَ / منكِ المشاركة في مناقشة جماعية لا تستغرق أكثر من ساعة واحدة. المشاركون في المناقشة سيكونوا جيرانكَ / جيرانكِ في نفس المبنى. لقد تم اختيارك / اختيارك للمشاركة في هذه المناقشة بناءً على توفر وحدات تكييف الهواء في منزلكَ/ منزلكِ، و لكونكَ/ كونكِ تقطن / تقطنين في نفس المبنى مع باقي المشاركين. كمجموعة ، سيُطلب منكم الإجابة شفهياً على مجموعة من ثمانية أسئلة رئيسية تستكشف تصوراتكم ومواقفكم تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامة في طرابلس.

ستكون جلسة المناقشة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتَ/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك. سوف توضع السجلات الصوتية على هاتف محمي بكلمة سرّ ولن يستخدمها احد سوى الباحث، وسيتم حذف التسجيل بعد ذلك، كما سيتم تخزين النصوص والتسجيلات و الملاحظات المكتوبة بشكل آمن في مكتب الباحثة الرئيسيّة في غرفة مقفلة ولن يتمكن الحصول عليها إلا فريق البحث.

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شكل من الأشكال على علاقتكَ / علاقتكِ مع الجامعة الأميركية في بيروت. لأيّة أسئلة أو استفسارات تتعلق بالمشروع ، يرجى عدم التردد في الاتصال بالباحثين على العناوين التالية:

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يرجى التوقيع على هذه الموافقة قبل مشاركتكَ / مشاركتكِ في المناقشة .

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- يتطلب البحث من المشاركين في المناقشة ، بما في ذلك أنا ، أن يجيبوا شفهياً على مجموعة من ثمانية أسئلة.
- مشاركتي في هذا المشروع البحثي تطوعية تمامًا ويمكنني الانسحاب في أي وقت دون تقديم أي مبرر.
- ستكون جلسة المناقشة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتُ/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.
- لقد قرأت وفهمت المعلومات الواردة أعلاه ، وتلقيت الأجوبة اللازمة والكافية على جميع استفساراتي .

التوقيع:_____ التاريخ:_____

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نموذج الموافقة النصّي للمقابلات الفردية مع المسؤولين والعمال في البلدية

الجامعة الأميركية في بيروت
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يُرجى منكَ / منكِ المشاركة في مقابلة فردية لا تستغرق أكثر من ساعة واحدة. لقد تم اختيارك / اختيارك للمشاركة في هذه المقابلة لأنكَ / لأنكِ مساهم / مساهمة في عملية صنع القرار في البلدية. سيُطلب منكَ / منكِ الإجابة شفهياً على مجموعة من ستّة أسئلة رئيسية تستكشف تصوراتكَ / تصوراتكِ ومواقفكَ / مواقفكِ تجاه مخزون المياه الناتج عن وحدات تكييف المنازل في المباني السكنية ورغبتكَ / رغبتكِ في استخدام هذه المياه لريّ الحدائق العامة في طرابلس. سيُطلب منكَ / منكِ أيضًا تقديم بعض البيانات عن المساحات الخضراء في المدينة وأنماط الريّ الخاصة بها.

ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتَ/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك. سوف توضع السجلات الصوتية على هاتف محمي بكلمة سرّ ولن يستخدمها احد سوى الباحث، وسيتم حذف التسجيل بعد ذلك. سيتم تخزين النصوص والتسجيلات و الملاحظات المكتوبة بشكل بشكل آمن في مكتب الباحثة الرئيسيّة في غرفة مقفلة ولن يتمكن الحصول إليها إلا فريق البحث.

مشاركتكَ / مشاركتكِ في هذه الدراسة لا تسبب لكَ / لكِ أي خطر جسدي أو خطر معنوي يتجاوز مخاطر الحياة اليومية. لن تتلقى / تتلقي أي فوائد مباشرة من المشاركة في هذا البحث. على الرغم من ذلك ، فإن مشاركتكَ / مشاركتكِ تساعد الباحثين على فهم تصورات ومواقف السكان بشكل أفضل فيما يتعلق بإعادة استخدام مخزون مياه التكييف. سيتم استخدام نتائج المناقشة للأغراض الأكاديمية فقط.

يرجى أخذ العلم أنه لن يتم ذكر اسمكَ / اسمكِ، ولن يقوم الباحث بطرح أي أسئلة قد تكشف عن هويتكَ / هويتكِ أو أي معلومات شخصية عنكَ / عنكِ. مشاركتكَ / مشاركتكِ في هذا المشروع البحثي تطوعية تمامًا ويمكنكَ / يمكنكِ الانسحاب في أي وقت دون تقديم أي مبرر. إن قرار الانسحاب الخاص بكَ / بكِ لن يسبب لكَ / لكِ أي عقوبة أو خسارة للمزايا التي يحق لكَ / لكِ الحصول عليها. التوقف عن المشاركة لا يؤثر بأي

شكل من الأشكال على علاقتك / علاقتكِ مع الجامعة الأميركية في بيروت. لأيّة أسئلة أو استفسارات تتعلق بالمشروع ، يرجى عدم التردد في الاتصال بالباحثين على العناوين التالية:

د. سلمى تلحوق
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كلية الزراعة والعلوم الغذائية
قسم تصميم المناظر الطبيعية وإدارة النظم الإيكولوجية

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تالا المرعبي
الجامعة الأميركية في بيروت
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لأيّة استفسارات أو تعليقات أو شكاوى أخرى متعلقة بالدراسة ، يرجى عدم التردد في الاتصال بمجلس المراجعة المؤسسية لمؤسسة العلوم الاجتماعية والسلوكية (IRB) على الرقم 01/350000 تحويلة 5445 أو المراسلة عبر العنوان التالي: irb@aub.edu.lb

يرجى التوقيع على هذه الموافقة قبل مشاركتك / مشاركتكِ في المقابلة الفردية .

لقد طُلب منّي المشاركة في في مقابلة فردية لمشروع بحثي بهدف تقييم تصورات ومواقف السكان والمسؤولين والعمال في بلدية طرابلس تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامة في طرابلس. وإن العبارات التالية هي جزء من موافقتي:

- يتطلب البحث منّي أن أجيب شفهياً على مجموعة من ستّة أسئلة و تقديم بعض المعلومات عن المساحات الخضراء في المدينة وأنماط الريّ الخاصة بها.
- مشاركتي في هذا المشروع البحثي تطوعية تمامًا ويمكنني الانسحاب في أي وقت دون تقديم أي مبرر.
- ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتُ/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.
- لقد قرأت وفهمت المعلومات الواردة أعلاه ، وتلقيت الأجوبة اللازمة والكافية على جميع استفساراتي .

التوقيع:_____ التاريخ:_____

شكرا لمشاركتك / مشاركتكِ !

Institutional Review Board
American University of Beirut
21 JUL 2020
APPROVED

دليل جمع البيانات

لضمان التخطيط والإعداد المناسبين لكل من المقابلات الفرديّة وجلسات المناقشة ، تم إعداد دليل أسئلة يتكون من أسئلة عامة للإستفادة من أفكار المشاركين لإدارة المناقشة.

المقابلات الفرديّة مع السكان:

I. المقدمة:

"مرحباً ، اسمي تالا مرعبي ، وسأكون مُحاوركَ / مُحاوركِ اليوم. أنا طالبة ماجستير في الجامعة الأميركية في بيروت ، وأجري هذه المقابلة الفرديّة كجزء من مشروعي البحثي الهادف إلى فهم تصورات ومواقف السكان تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامّة في طرابلس ، لبنان. أود أن أشكركَ / أشكركِ على قبولكَ / قبولكِ المشاركة في هذه المناقشة. لن تستغرق الجلسة معكَ / معكِ أكثر من أربعين دقيقة ، وسأطرح عليكَ / عليكِ مجموعة من ثمانية أسئلة رئيسيّة. **ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. إذا رفضتِ/ رفضتَ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.**

يرجى أخذ العلم أنّه لن يتم طلب اسمكَ / اسمكِ ، ولن أطرح عليكَ / عليكِ أيّ سؤال قد يكشف عن أيّ من معلوماتكَ / معلوماتكِ الشخصية. أيضاً ، يمكنكَ / يمكنكِ الانسحاب في أيّ وقت دون تقديم أيّ مبرر. سيتم استخدام نتائج هذه المناقشات للأغراض الأكاديمية فقط. إن قرار الانسحاب الخاص بكَ / بكِ لن يسبب لكَ / لكِ أي عقوبة أو خسارة للمزايا التي يحق لكَ / لكِ الحصول عليها. التوقف عن المشاركة لا يؤثر بأي شكل من الأشكال على علاقتكَ / علاقتكِ مع الجامعة الأميركية في بيروت. **أيضا ، أود أن أؤكد أن جميع المعلومات التي سوف يتم مناقشتها يجب أن تبقى سريّة ولا ينبغي مشاركتها مع أي شخص. "**

II. الأسئلة:

1) ماذا تفعل / تفعلين بمخزون المياه المتولدة من وحدات التكييف في منزلكَ / منزلكِ؟
الأسئلة الفرعية: في حالة عدم إعادة الاستخدام: لماذا لا تعيد(ي) استخدامها؟ / في حالة إعادة الاستخدام: لأيّ أغراض تقوم(ي) بإعادة استخدامها؟ كيف تجمعها / تجمعينها؟ ما مقدار الماء الذي يتم جمعه يوميًا؟

2) ماذا تعرف / تعرفين عن نوعية المياه المتولدة من وحدات التكييف؟
الأسئلة الفرعية: كيف عرفت(ي) عنها؟ على أي معلومات تستند تصوراتكَ / تصوراتكِ؟

3) إذا أخبركَ / أخبركِ الخبراء أن المياه نظيفة ، فهل ستعيد(ي) استخدامها لأغراض الريّ و / أو للأغراض المنزلية؟

الأسئلة الفرعية: لماذا ا؟ ما هو حافزكَ / حافزكِ؟

4) إذا أخبركَ / أخبركِ الخبراء أن المياه نظيفة ، فما هو تصوركَ / تصوركِ لجمع هذه المياه واستخدامها لريّ النباتات في كل من السياقات التالية: البناية ، المنطقة (أو الحي) والمدينة؟
السؤال الفرعي: أي منهم تفضل(ي) أكثر؟

5) هل ترغب / ترغبين بتجميع هذه المياه من خلال أنابيب خارجية متصلة بخزّان تجميع يتم إفراغه من قبل البلدية بحيث تستخدم لريّ الحدائق العامة في المدينة؟ [عرض النموذج الأولي – ملحق رقم 1]
الأسئلة الفرعية: لماذا ا؟ ما هو حافزكَ / حافزكِ؟

6) ما هي أفكارك / أفكاركِ بشأن هذه الاستراتيجية؟ [عرض النموذج الأولي – ملحق رقم 1]
السؤال الفرعي: ما هي فوائدها وقيودها؟

7) كيف ترى / ترين إمكانية تنفيذ هذه الاستراتيجية أو تحسينها؟
السؤال الفرعي: هل تشجع(ين) على تنفيذها؟

8) ما هي تداعيات هذه الاستراتيجية على كل من المدينة والبلد؟
السؤال الفرعي: ما هي الحوافز التي ينبغي توفيرها لتنفيذها؟

جلسات المناقشة مع السكان:

I. المقدمة:

"مرحباً ، اسمي تالا مرعبي ، وسأكون مشرفةً على مناقشات هذه المجموعة اليوم. أنا طالبة ماجستير في الجامعة الأميركية في بيروت ، وأجري هذه الجلسات الجماعية كجزء من مشروعي البحثي الهادف إلى فهم تصورات ومواقف السكان تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامّة في طرابلس ، لبنان. أود أن أشكركم على قبولكم المشاركة في هذه المناقشة. لن تستغرق الجلسة معكم أكثر من ساعة واحدة ، وسأطرح عليكم مجموعة من ثمانية أسئلة ستجيبوا عليها وتناقشوها كمجموعة. **ستكون جلسة المناقشة مسجلة صوتًا بغرض جمع البيانات. إذا رفض أحد منكم أن يتم تسجيله صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.**

يرجى أخذ العلم أنّه لن يتم طلب اسمكم ، ولن أطرح عليكم أيّ سؤال قد يكشف عن أيّ من معلوماتكم الشخصية. أيضاً ، يمكنكم الانسحاب في أيّ وقت دون تقديم أيّ مبرر. سيتم استخدام نتائج هذه المناقشات للأغراض الأكاديمية فقط. إن قرار الانسحاب الخاص بكم لن يسبب لكم أي عقوبة أو خسارة للمزايا التي يحق لكم الحصول عليها. التوقف عن المشاركة لا يؤثر بأي شكل من الأشكال على علاقتكم مع الجامعة الأميركية في بيروت. **أيضا ، أود أن أؤكد أن جميع المعلومات التي سوف يتم مناقشتها يجب أن تبقى سريّة ولا ينبغي مشاركتها مع أي شخص. "**

II. الأسئلة:

1) ماذا تفعلون بمخزون المياه المتولدة من وحدات التكييف في منزلكم؟
الأسئلة الفرعية: في حالة عدم إعادة الاستخدام: لماذا لا تعيدوا استخدامها؟ / في حالة إعادة الاستخدام: لأيّ أغراض تقوموا بإعادة استخدامها؟ كيف تجمعوها؟ ما مقدار الماء الذي يتم جمعه يوميًا؟

2) ماذا تعرفون عن نوعية المياه المتولدة من وحدات التكييف؟
الأسئلة الفرعية: كيف عرفتم عنها؟ على أي معلومات تستند تصوراتكم؟

3) إذا أخبركم الخبراء أن المياه نظيفة ، فهل ستعيدوا استخدامها لأغراض الريّ و / أو للأغراض المنزلية؟ الأسئلة الفرعية: لماذا ؟ ما هو حافزكم؟

4) إذا أخبركم الخبراء أن المياه نظيفة ، فما هو تصوركم لجمع هذه المياه واستخدامها لريّ النباتات في كل من السياقات التالية: البناية ، المنطقة (أو الحي) والمدينة؟
السؤال الفرعي: أي منهم تفضلون أكثر؟

5) هل ترغبون بتجميع هذه المياه من خلال أنابيب خارجية متصلة بخزان تجميع يتم إفراغه من قبل البلدية بحيث تستخدم لريّ الحدائق العامة في المدينة؟ [عرض النموذج الأولي – ملحق رقم 1]
الأسئلة الفرعية: لماذا ؟ ما هو حافزكم؟

6) ما هي أفكاركم بشأن هذه الاستراتيجية؟ [عرض النموذج الأولي – ملحق رقم 1]
السؤال الفرعي: ما هي فوائدها وقيودها؟

7) كيف ترون إمكانية تنفيذ هذه الاستراتيجية أو تحسينها ؟
السؤال الفرعي: هل تشجعون على تنفيذها؟

8) ما هي تداعيات هذه الاستراتيجية على كل من المدينة والبلد؟
السؤال الفرعي: ما هي الحوافز التي ينبغي توفيرها لتنفيذها؟

المقابلات الفرديّة مع المسؤولين والعمال في البلدية:

I. المقدمة:

"مرحباً ، اسمي تالا مرعبي ، وسأكون مُحاوركَ / مُحاوركِ اليوم. أنا طالبة ماجستير في الجامعة الأميركية في بيروت ، وأجري هذه المقابلة الفرديّة كجزء من مشروعي البحثي الهادف إلى فهم تصورات ومواقف السكان تجاه إعادة استخدام مخزون مياه التكييف لريّ الحدائق العامّة في طرابلس ، لبنان. أود أن أشكرك / أشكركِ على قبولك / قبولكِ المشاركة في هذه المناقشة. لن تستغرق الجلسة معك / معكِ أكثر من ساعة واحدة ، وسأطرح عليكَ / عليكِ مجموعة من ثمانية أسئلة رئيسيّة. سوف أطلب منكَ / منكِ أيضًا تقديم بعض البيانات عن المساحات الخضراء في المدينة وأنماط الريّ الخاصة بها. **ستكون المقابلة مسجلة صوتًا بغرض جمع البيانات. إذا رفضت/ رفضتِ أن يتم تسجيلك صوتيًا ، فسيتم تدوين ملاحظات مكتوبة بخط اليد بدلاً من ذلك.**

يرجى أخذ العلم أنّه لن يتم طلب اسمكَ / اسمكِ ، ولن أطرح عليكَ / عليكِ أيّ سؤال قد يكشف عن أيّ من معلوماتكَ / معلوماتكِ الشخصية. أيضاً ، يمكنكَ / يمكنكِ الانسحاب في أيّ وقت دون تقديم أيّ مبرر. سيتم استخدام نتائج هذه المناقشات للأغراض الأكاديمية فقط. إن قرار الانسحاب الخاص بكَ / بكِ لن يسبب لكَ / لكِ أي عقوبة أو خسارة للمزايا التي يحق لكَ / لكِ الحصول عليها. التوقف عن المشاركة لا يؤثر بأي شكل من الأشكال على علاقتكَ / علاقتكِ مع الجامعة الأميركية في بيروت. **أيضا ، أود أن أؤكد أن جميع المعلومات التي سوف يتم مناقشتها يجب أن تبقى سريّة ولا ينبغي مشاركتها مع أي شخص. "**

II. الأسئلة:

<u>تصورات عن نوعية المياه المتولّدة من وحدات التكييف في المنازل</u>

1) ماذا تعرف / تعرفين عن مخزون المياه الناتج عن وحدات تكييف الهواء المنزلية ؟
الأسئلة الفرعية: ما هي نوعية هذه المياه؟ ما هي كمية المياه المتوقَّع إنتاجها ؟ ما هو مصير هذه المياه؟ على أي معلومات تستند تصوراتك؟

<u>الرغبة في إعادة استخدام مخزون مياه وحدات تكييف الهواء المنزلية</u>

1) إذا أخبرك / أخبركِ الخبراء أن المياه نظيفة وذات كمية كبيرة ، هل تفكر / تفكرين في تقرير إعادة استخدامها لري الحدائق العامة في المدينة؟
الأسئلة الفرعية: لماذا ؟ ما هو حافزكم كبلدية؟

2) بصفتك مسؤول / عامل في البلدية ، هل ترغب / ترغبين في تركيب خزانات تجميع متصلة بأنابيب خارجية في كلّ مبنى ، وإفراغ هذه الخزانات بحيث تستخدم المياه المجمّعة لري الحدائق العامة في المدينة؟ [عرض النموذج الأولي – ملحق رقم 1]
الأسئلة الفرعية: لماذا ؟ ما هو حافزكم كبلدية؟

3) ما هي أفكارك / أفكاركِ بشأن هذه الاستراتيجية؟ [عرض النموذج الأولي – ملحق رقم 1]

السؤال الفرعي: ما هي فوائدها وقيودها؟

4) كيف ترى / ترين أن هذه الاستراتيجية يمكن تنفيذها أو تحسينها؟
السؤال الفرعي: هل تشجع(ين) على تنفيذها؟

معلومات عن المساحات الخضراء

1) ما هي نسبة المساحات الخضراء الحالية والمستقبلية في المدينة؟ كيف هي موزّعة؟
2) ما هي نسبة المساحات الخضراء المروية مقابل غير المروية في المدينة؟ أين تقع هذه المساحات؟ كيف هي موزّعة؟
3) كيف يتم الاعتناء بالمساحات الخضراء في المدينة؟

معلومات عن أنماط الريّ

1) ما مقدار المياه اللازمة لريّ المساحات الخضراء في المدينة؟
2) ما هي طريقة ونيرة الريّ المعتمدة؟
- ما هي المساحات المروية يدوياً؟
- ما هي العملية الروتينية لشاحنات الريّ؟
- ما هو عدد وحجم شاحنات الريّ المستخدمة؟
- ما هو عدد العاملين في الريّ؟

APPENDIX C

APPROVAL OF RESEARCH

July 21,2020

Salma Talhouk, PhD
American University of Beirut
ntsalma@aub.edu.lb

Dear Dr. Talhouk,

On July 21, 2020, the IRB reviewed the following protocol:

Type of Review:	Initial, Exempt
Project Title:	Participatory strategy for water condensate harvesting from air-conditioning home units and its use in public gardens: A Case Study in Tripoli, Lebanon
Investigator:	Salma Talhouk
IRB ID	SBS-2020-0159
Funding Agency:	None
Documents reviewed:	Received July 3,2020: • IRB application • Proposal • Written Consent document for residents' Focus Group Discussions (English and Arabic versions) • Written Consent document for residents' Interviews (English and Arabic versions) • Written Consent document for stakeholders' Interviews (English and Arabic versions) • Interviews and focus group discussions undertaken with residents (English and Arabic versions) • Interviews undertaken with municipality stakeholders (English and Arabic versions)

The IRB approved the protocol from July 21, 2020 to July 20, 2021 inclusive.

Please find attached the stamped approved documents:

- Proposal (received July 3,2020),
- Written Consent document for residents' Focus Group Discussions (English and Arabic versions, received July 3,2020),
- Written Consent document for residents' Interviews (English and Arabic versions, received July 3,2020),
- Written Consent document for stakeholders' Interviews (English and Arabic versions, received July 3,2020),
- Interviews and focus group discussions undertaken with residents (English and Arabic versions, received July 3,2020),
- Interviews undertaken with municipality stakeholders (English and Arabic versions, received July 3,2020).

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Only these IRB approved consent forms and documents can be used for this research study.

Thank you.

The American University of Beirut and its Institutional Review Board, under the Institution's Federal Wide Assurance with OHRP, comply with the Department of Health and Human Services (DHHS) Code of Federal Regulations for the Protection of Human Subjects ("The Common Rule") 45CFR46, subparts A, B, C, and D, with 21CFR56; and operate in a manner consistent with the Belmont report, FDA guidance, Good Clinical Practices under the ICH guidelines, and applicable national/local regulations.

Sincerely,

Lina El-Onsi Daouk, MSc, CIM
SBS IRB Administrator

Cc: Michael Clinton, PhD
IRB Vice Chairperson
Social & Behavioral Sciences

Fuad Ziyadeh, MD, FACP, FRCP
Professor of Medicine and Biochemistry
Chairperson of the IRB

Ali K. Abu-Alfa, MD, FASN, FAHA
Professor of Medicine
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APPENDIX D

I. Individual Interviews

Sentence	Idea	Theme
Most of this water is usually wasted sometimes I collect certain amount of this water my husband uses it for the car engine He also uses it for the car wipers, I also use it for the iron, but not so often	I occasionally use AC water in car battery/wiper, and iron	Use of AC water
I collect it with plastic water bottles I put the pipe of the AC inside the bottle and I collect it	I collect the water in a bottle	Collection of AC water
AC water does not contain lime residues It is distilled water it is good for the car to prevent the tubes and engine from clogging and becoming damaged	I believe AC water is good for engines because it is distilled it is good for pipes because it does not clog pipes no lime residue	Knowledge of AC water quality / quantity
I have two small gardens because I am on the ground floor of the building The pipe of my AC is always directed towards the garden but I do not have the intention to irrigate with it. I want to get rid of this water, so I irrigate with it. The pipe is mainly directed towards the garden because I have nowhere to put it in this water is not really suitable for plants it is distilled water it does not contain any minerals that are essential for plant growth It is supposed to be supplemented with a bit of minerals to contribute to soil and plant growth I did not yet notice anything abnormal on the plants when I water them with AC water I irrigate both my gardens with tap water as I have never tried using AC water only for their irrigation. If I had the option to connect the pipe to the drain, I would not direct it towards green spaces honestly.	I don't believe AC water is good to irrigate plants in my garden because it is distilled, and it does not contain minerals essential for plant growth even though i did not notice negative effects on plants	Use of AC water - Knowledge of AC water quality / quantity
If it had minerals, I would definitely use it for the irrigation, it is even a better option.	I am willing to use AC water for irrigation if it contained minerals	Use of AC water - Knowledge of AC water quality / quantity -

		Suggestion for use
I know some things about AC water due to the fact that I am a biology teacher and that I have taken an ecology course twenty four years ago in university I know that water from AC units is distilled water; it is constituted from H2O, therefore, it is very pure and does not contain any lime residues. For irrigation, we are definitely in need to supplement it with minerals for it to help soil and plant growth. Even in our curriculum, we teach the students that distilled water does not help the plants and soil to grow in a normal and adequate way. It should contain some minerals.	As a biology teacher I know that AC water is distilled and pure and is not suitable for plants as it does not contain minerals	Knowledge of AC water quality / quantity- Challenges for use
I think that if inside the water container that I use, I put a quarter spoon of minerals of any mixed type, for example, those that contain vitamins, nitrate, magnesium, anything for the plant, it would definitely help it grow in a better way. Hence, for irrigation, I think that it is poor in minerals, therefore, tap water suits plants better.	I believe that AC water needs to be supplemented with minerals to be used for irrigation and that tap water is better for this purpose	Suggestion for use
This water is distilled water, it is really clean to use for many purposes such as personal hygiene: bathe with it, wash your hands, etc, but the problem is that it is too difficult and impractical to have to transfer heavy gallons from outside towards the inside to bathe or wash hands with it. I do not have a problem with using it for personal hygiene, it is a very clean source of water. You can even drink it; it is potable.	I believe that AC water is clean and safe to use for personal hygiene and for drinking but it is difficult to transfer it in gallons	Knowledge of AC water quality / quantity- Challenges for use
It is 100% clean if the gallon in which it is collected is clean and the pipe is clean. I do not have any problem with the cleanliness of this water, but with its way of collection and gallon transfer. I cannot transfer heavy gallons from outside every time I need to shower or use this water.	I believe that AC water is clean and safe to use for personal hygiene and for drinking but it is difficult to transfer it in gallons	Knowledge of AC water quality / quantity- Challenges for use
I got this information mainly from my experience in teaching and in ecology; I did not hear about it from the outside.	I did not hear about AC water's quality from	Knowledge of AC water quality / quantity

People do not usually know about the quality of this water, nor that it could be recycled and reused.	people because they are not usually aware of it	
Most people do not have any place to drain their pipes; the pipes of their ACs are always spilling water into the street or even into people passing. The vast majority have the pipes of their ACs connected to the sewage system and the water gets wasted.	I know that most people waste this water because they have their AC pipes either spilling to the street or connected to the sewage network	Use of AC water
In my house, I have two AC units that drain into the sewage system and only one AC that drains into the floor of my garden because I do not have any drainage system for it. The water that I collect for the car and for the iron come from this AC that does not have a drainage system. I always put aside around one to two bottles of AC water for my husband, and I direct the excess water into the plants.	I have only one AC unit that cannot be branched to the sewage network from which I take water for the car and the iron and I drain the excess into the garden	Use of AC water - Collection of AC water
The pipe of my AC is directed towards a big reservoir of water (around 30 liters) which is branched to a pipe that usually goes towards the garden. From this pipe, I usually collect the water in bottles. Sometimes, I even get water from this pipe to clean the floor near the garden, considered as a balcony, if you want. At the end of the day, it is clean water; I can do whatever I want with it	I collect the water in a 30 liters reservoir branched to a pipe used for filling water bottles, cleaning or draining the water into the garden	Collection of AC water - Use of AC water
AC water could also be used for house cleaning, but it is really difficult to transfer gallons from the outside; this is the only problem. If I had a long pipe that reaches the inside of the house, it would not be a problem.	I am willing to use AC water for cleaning purposes only if I had a long pipe that reaches the inside of the house	Suggestion for use
The amount of water generated depends on the hours of operation of the ACs; I usually empty the 30 liters reservoir every two days if the AC is put on during the day and night. If it is only on during the night, it generates around 15-20 liters in two days.	I believe that the amount of AC water depends on hours of operation because it generates 30 liters in two days if it is on all day and night and 15-20 liters if it is on only during the night	Knowledge of AC water quality / quantity

I empty the reservoir every two days to prevent the AC from spilling water from the inside.	I empty the reservoir every two days to prevent inside spilling	Knowledge of AC water quality / quantity
If experts tell me that the water is suitable for irrigation, I do not have a problem with using it if the amount of water fulfills the irrigation demands and needs of my plant.	I am willing to use AC water for irrigation if assured about its safety and if the amount is sufficient	Suggestion for use
The AC located near my garden generates substantial amounts of water that could be sufficient for the irrigation of the plants near it. However, the garden on the other side of the house cannot be irrigated with this water because it is difficult to transfer heavy gallons of AC water from this side of the house towards the other side. For my other garden, I do not have an AC located near it and there is no way to get the water form the AC of the living room to drain there. The water needs adequate pressure to reach the garden. In the other garden, I put the reservoir and branched it to the pipe in order to get adequate water pressure for irrigation. If there was any greenery near the balcony of the living room, I would have definitely directed the AC pipe for the irrigation, but unfortunately, there is not	I am willing to use AC water only for the irrigation of the garden near the AC unit because there is no system to direct the water to the other garden and it is difficult to do that manually	Challenges for use
Most houses nowadays contain AC units. If our buildings had any built-in drainage systems, whereby the water goes through pipes and then to a reservoir that is used for the irrigation of greenery, it would be perfect. It would also be amazing if they put a motor for it, whereby the water goes up the building again and fills the household reservoirs. It has many applications and uses. It generates a huge quantity also. Every building is wasting a lot of water from ACs. If this water is reused, it is really a huge advantage for us. However, unfortunately, we do not have such a built in system.	I am willing to use AC water for irrigation and household purposes if there was a built-in drainage system that directs water into reservoir for irrigation or back to households	Suggestion for use
If we want to fix the problem of lack of built-in systems in buildings, pipes could be installed on the outside of buildings and these pipes could be directed towards	I think that external pipes could be retrofitted on buildings	Suggestion for use

a large reservoir. As I told you, they could even install a motor inside the building to direct the water again into the reservoirs of households.	to solve the problem of lack of built-in system	
However, I think that redirecting the water back into the reservoirs of households is a bit difficult because buildings nowadays are too high, therefore, they would require several motors to generate more pressure, or I do not know. The simpler option is putting the reservoir at the bottom of the building, as such, the concierge could use it for the irrigation of the plants in front or near the building and also for floor cleaning instead of using the water from wells of the buildings because, with time, the water from wells is becoming more and more salty in Tripoli, and the quality of the water used for irrigation and for many applications is becoming worse.	I think that the best option is to install external pipes connected to a reservoir at the bottom of the building to allow the concierge to use the water for irrigation and other applications instead of using well water that is becoming salty and polluted	Suggestion for use
Installing an external AC water system could reduce water scarcity as in most buildings, the concierge uses huge amounts of water for cleaning. He opens the tap of the reservoir and leave it open from for around hours. Can you imagine how much water he wastes? The same scenario occurs when he wants to wash the cars. Instead of using tap water, we can use AC water for these purposes. It saves us a lot of water pumped from groundwater which is already beginning to become depleted and its pressure is being less over the years. Therefore, I think that the presence of this additional source of water reduces the demand on water resources. It helps in car cleaning, floor, garage, and house cleaning. If there is any way to direct this water to the reservoirs of households, it would also be great.	I think that the installation of an AC water system reduces the demand on depleting water resources due to the ability to use it for many purposes by the concierge and even by households if there was a way to pump it back	Opinion about proposed system on biophysical impact
AC water is cleaner than incoming municipal water or water coming from wells. I do not even think that there is a problem with the cleanliness of the pipes or the reservoir used to collect this water	I believe that AC water is cleaner than tap water and well water and its pipes and reservoir do	Knowledge of AC water quality / quantity

because there is a daily flow of water inside them	not get dirty due to continuous water flow	
In our area, previously, they have specified that each building should have around three to four trees of orange and a bit of greenery in front of it so that Tripoli stays renowned as “Tarablus Al-Fayhaa”, and the smell of orange be in it. However, not all buildings abided by that. The idea of taking this water from building reservoirs for irrigation is very nice. The concierge could even use this water for the irrigation of greenery in front of the building.	I think that it is a good idea to collect AC water from buildings and use it for the irrigation of city greenery and/or building gardens	Opinion about proposed system on biophysical impact
AC water that is being wasted, why not use it and benefit from it? People should be a bit aware that we should not waste water because a day will come where we will not find enough water neither for drinking nor for other applications. Most of the water of Lebanon is being wasted; some of it is going to streets, another part is going to the sea and to rivers because we do not have techniques for the collection and saving of water in a serious efficient way. This is a very important technique; the quantity of the water generated from the AC units is very big. If we assume that we have 20 residential units, for example, and every unit generated at least 10 liters of AC water per day, this is 200 liters of AC condensate per day. It is not any water, it is water that is very clean and of very high quality that we can use for many applications, at least, for irrigation and cleaning, which are two important things.	I think that it is a good idea to collect AC water from buildings and use it for irrigation to prevent wasting more water and because its quantity is significant and it is of very good quality	Opinion about proposed system on biophysical impact
This system also reduces the demand on water and prevent us from falling in water scarcity problems in the future. If this water was used at the level of one building, for example, this water, which is usually wasted, could go towards the cleaning of the cars and the interior of the building, as well as the irrigation of the greenery nearby. All of these practices consume greater than 100 liters of water	I think that collecting AC water from buildings and using it at the building level can reduce demand on water resources that are already becoming scarce and solve the problem of saltwater intrusion	Opinion about proposed system on biophysical impact

per day, so why not consume this water from AC water rather than tap water or groundwater? You should not forget that nowadays, we are suffering from the problem of saltwater intrusion into groundwater as a result of the excessive pumping during the dry season, as the water already present is becoming insufficient due to weather changes. Consequently, we can use this water instead as it is deficient in salt or any other harmful specimens. If at the level of one street containing at least 30 buildings, this strategy was implemented, you would have reduced tap water and ground water consumption by at least 100 liters for every building.	into groundwater due to excessive pumping	
You should know also that this water is beneficial because sometimes, if the motor of the well is broken or damaged, we do not receive water to the building for around two to three days. Sometimes, if it is too dry and hot, we also do not receive water. They would need to dig the well further for the water to come.	I think that AC water reuse is beneficial to mitigate well dryness problems occurring due to hot weather in summer or motor damage	Opinion about proposed system on biophysical impact
We would use it for all purposes, except for drinking, because I think that it requires a minor treatment procedure for it to become potable.	I am willing to reuse AC water for all purposes except for drinking because it needs prior treatment	Opinion about proposed system on stakeholders involvement
I am willing to install such a system, however, honestly, most of my neighbors will have a problem with the financial expenses of such a project, as well as the change of the place of the external AC units which will oblige them to make holes in the walls and then close them and dig new holes. All of this will cost them money and will disturb them through introducing at least three days of works at home.	I am willing to install AC water system, but my neighbors might not accept to pay for it or to change the locations of their AC units	Opinion about proposed system on cost
if the government or the municipality bares the financial expenses and technical aspects of such a project, and without damaging any home, my neighbors would definitely be interested in implementing it, but, unfortunately, as you live in this	My neighbors and I are willing to implement AC water system is the building if the government or municipality pays for it,	Opinion about proposed system on cost

country you know that it is too hard for the government or the municipality to do such a step, especially in financial terms.	but this too unrealistic in our country	
All AC units in the building should be placed in specified locations when such a project is to be implemented; this would improve the appearance of the façade of the building that will become more organized. Moreover, if the piping system was installed in an organized way, like the way adopted in the prototype you showed me, it will never damage the appearance of the building. Instead, it will beautify the building because it is definitely better than the random water pipes that spill water from everywhere on the streets, on the cars and on the people. I think that this system will make the building façade even more organized, especially if you put the pipes in a nice way and in parallel with the building's walls as you showed me. There is even million ways to make these pipes potentially invisible, but these ways are usually known by the specialists who will implement the technical aspects of the project.	I think that installing an AC water system similar to the prototype will ameliorate the aesthetics of the building and could even be designed to be invisible by specialists	Opinion about proposed system on biophysical impact
This strategy reduces the wasting of the water that is happening in residential units and in buildings and contributes to water saving in a huge way. It reduces the consumption of water from groundwater, because at the end of the day, if the weather stays like that or gets even more hot and dry, groundwater will become dry too and we will not be able to receive much water, if at all.	I think that the proposed AC water collection and reuse strategy reduces water wastage and prevents water scarcity	Opinion about proposed system on biophysical impact
Through this project, we are using "clean" water for the irrigation of urban greenery, because the water that they usually irrigate with is highly polluted and salty most of the times. Sometimes, they even irrigate greenery with wastewater and sewage that contain a lot of nitrate and ammonium that leads the plants to grow even faster, but definitely not in a healthy way. Therefore, if we adopt this strategy,	I think that the proposed AC water collection and reuse strategy ameliorates greenery in the city because it enables them to be irrigated with clean water rather than polluted and salty water usually used	Opinion about proposed system on biophysical impact

we would be helping in the irrigation of plants with clean water and contributing to the health and flourishment of the greenery in our beloved city.		
I do not think that there are any disadvantages for this strategy; the only problem is that in our city, even in our entire country, every person thinks on its own. We never saw a collective idea being implemented at all; residents in the same building do not get along and do not all agree to pay even for the smallest of things. This is the main problem. If I told you that I am willing to implement this project, my neighbor could not accept, my other neighbor too. Many residents would say that it is not worth it to pay a significant amount of money for the number of liters that each household generates because they are not aware about the actual quantity that could be generated per day, nor the benefits of this water for now and for the future. In general, there is no awareness for such green initiatives and projects, people are irresponsible and negligent. This is the main huge problem.	I think that the only problem of this strategy is the lack of willingness of residents to pay for this system and cooperate with each other and their lack of awareness about the quality, quantity, and importance of this water	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
The implementation of AC water collection systems needs awareness campaigns. A group of specialized people should come and educate people about the quality of this water, its potential uses, and its benefits for them and for the city, because the level of education of people regarding these matters is really low. You need to try several smart ways to convince people to participate.	I think that the implementation of AC water collection systems needs awareness campaigns and education among residents	Opinion about proposed system on stakeholders involvement
I think that the installation of this system should be tried on one or two buildings, as such, people will see that they are working efficiently and that they are something beneficial so they might then be interested to install a system. This is the case in many green initiatives applied on buildings, such as solar energy, for example.	I think that the implementation of AC water collection systems needs pilot projects	Opinion about proposed system on stakeholders involvement

The municipality needs to act. There is a huge irresponsibility in all the tasks that the municipality is meant to accomplish in the city. They should take this project seriously and they should monitor the buildings to see who implements it and who does not. There should be a monitoring body to observe the work of the municipality and whether they are abiding by the collection of this water according to the schedule and mechanism of collection set.	I think that the implementation of AC water collection systems cannot be accomplished unless the municipality acts and its work is monitored by another entity because it is usually irresponsible	Opinion about proposed system on stakeholders involvement
The civil society should also monitor this issue. For example, the owners of buildings could call the municipality and remind them to collect the water if they did not, and so on	I believe that building residents should also remind the municipality with water collection and monitor its work	Opinion about proposed system on stakeholders involvement
The municipality is the one who should be responsible for the collection, however, I do not trust its work honestly. I do not know if they would abide by it or no. Unfortunately, if any private company was responsible instead of the municipality, the project would work efficiently and successfully. This is because private companies are interested in their work and their success, but all governmental agencies are not and this is so unfortunate. All the project only requires water reservoirs and watering trucks. It is not something impossible. NGOs could be responsible for that instead of the municipality. However, you feel that civil society and NGOs talk a lot but they do not implement on the ground. I hope that in the future their work is more effective, they could be responsible	I do not trust the municipality and I prefer that a private company or an NGO be responsible of the project for it to happen	Opinion about proposed system on stakeholders involvement
It is an excellent and new idea, but its implementation needs effort. It needs to be tried on some buildings for people to become jealous and try to implement it also on their buildings.	I think that the implementation of AC water collection systems needs pilot projects	Opinion about proposed system on stakeholders involvement
People will definitely agree on anything if someone is financing it. If they do not pay anything from them, they would agree. An entity should be responsible for the financial expenses of this project for it to	I think that AC water systems cannot be implemented unless financed by the	Opinion about proposed system on cost

happen, I guess. People are not loosing anything, they are gaining instead. It is something beautiful, but you need the government to invest in it, which is unlikely	government, which is unlikely	
I think that the expenses of this project are not huge as it only needs pipes, which could even be plastic pipes instead of metal, water reservoirs and cisterns. Personally, I think that during these harsh days, if the amount of money that I need to pay is acceptable and not too much, I would pay and install this system. But, if it costs a huge amount of money, during these days especially, and I have 5 AC units in my house, I would pay only if someone would do it in a small amount of money	I am willing to pay for this system only if the amount to be paid by each household is affordable	Opinion about proposed system on cost
The proposed strategy will ameliorate the green areas within the city and the spaces in the city that were meant for planting but are neglected could be revived again. It provides a good image and appearance of the city. It does not have any single disadvantage for the city, on the contrary, it improves the greenery. This is something that all people like and all people wish could happen. Greenery is something so important for our mental and physical health. We need places to relax, interact with people, undertake physical activity and so on.	I think that the proposed strategy provides a beautiful image of the city and ameliorates green spaces that are important for the physical and mental health of residents	Opinion about proposed system on biophysical impact
I collect this water through a pipe, which is connected to a drain present on each balcony through which the water goes to the sewage network.	I do not use AC water; it drains to the sewage network	Use of AC water
I do not reuse this water because the worker who installed the AC units in my household connected them to the sewage network. When he first installed it, I did not really care about this water, and it stayed like that since then. I can remove this pipe and collect the water but personally, I do not reuse it.	I do not use AC water because the worker connected the pipe directly to the sewage network and I do not care about it	Use of AC water - Challenges for use
I know and I always notice that the shops located in our neighborhood drain this water through a pipe into water gallons to	I know that some shop owners collect this water in gallons and	Collection of AC water -Use of AC water

avoid the spilling of this water into the street. Sometimes I also see them using this water to clean the parts of the sidewalks located in front of their shops.	either throw it or use it for sidewalk cleaning	
I know that AC water can be reused for ironing ; instead of filling the iron with tap water, I would fill it with the condensate water generated from the ACs because it is filtered water. It can also be used maybe for the cleaning of the household. I think that this water can only be reused for these purposes, I cannot come up with any other uses.	I know that AC water can only be reused for ironing and household cleaning because it is filtered water	Knowledge of AC water quality / quantity
I am not really aware about this water and its uses, therefore, I do not know what can also be done with it.	I do not know for what other purposes (irrigation, cleaning) AC water could be used	Knowledge of AC water quality / quantity
I think that I can use it to irrigate the plants because this water is of good quality since it is distilled water, and I hear that distilled water is clean because it is formed though the heating of the water, which renders it free from impurities and minerals.	I believe that I can use AC water for irrigation because it is distilled meaning that it is free of impurities and minerals	Knowledge of AC water quality / quantity
I think that I have to start collecting this water and reusing it for domestic purposes like ironing, floor cleaning, toilet flushing, etc., and for the irrigation of my household plants, since I hear that it is clean and safe.	I think that I have to start using AC water for domestic purposes and irrigation because I hear that it is clean and safe	Knowledge of AC water quality / quantity
I do not know exactly how much water an AC unit produces per day, but I notice that the gallons installed by the shop owners in my neighborhood to collect this water get filled every 6-7 hours, therefore I can assume that a single unit could generate approximately 3 gallons per day.	I believe that an AC unit could generate around 3 gallons per day from my observation of shops' gallons	Knowledge of AC water quality / quantity
Since I live alone, usually, two ACs operate in my house, implying that I will have approximately 6 gallons to use for domestic purposes and irrigation, which are sufficient for daily consumption	I believe that the amount of AC water generated from the ACs in my house is sufficient for my daily cleaning and irrigation needs	Knowledge of AC water quality / quantity
I am starting to think about reusing it because they have shifted the water payment system into a metered system.	I think that I should start using AC water to save	Suggestion for use

So the more I use water, the more I pay. I think that this would be a good way for me to reduce my water consumption, and consequently to reduce the amount of money that I am paying each month for water, at least in the summer months.	money due to metered system	
I think that the beginning of metered systems adoption systems in Lebanon is mainly profit-driven. Another purpose of establishing this metered system could be that they wanted to reduce the consumption of water, because when people have to pay for the amount they consume, they would have an incentive to consume less in order to pay less. Therefore, they might have installed this system to reduce the water scarcity in Lebanon and to have an even distribution of the water across households.	I believe that metered systems are being adopted for profit and to reduce water scarcity in the country and distribute water resources more evenly	Suggestion for use
If I were to use AC water for my household plants only, after being assured that its safe for this purpose by experts, I would collect it by putting the pipe in an empty gallon and then I would irrigate the plants manually. I think that it is the simplest and easiest way to do that.	I think that collecting AC water in gallons is the simplest way to use it on household plants	Suggestion for use
At the level of the building/sidewalk or neighborhood greenery, a way to reuse this water can be that together with the residents of each building, we can agree on collecting this water in gallons and at the end of each day, the concierge of each building collects the gallons and irrigates the trees in our neighborhood with this water. However, this is a difficult option due to the lack of communication between all residents and the problems that might be encountered in this regard.	I think that it is too difficult for all residents in a neighborhood to agree on manual AC water collection in gallons for the irrigation of neighborhood greenery	Challenges for use
A better way to reuse this water at the level of the building/neighborhood could be that each household could connect the drainage pipes into their sinks and then all the water drained into these sinks will be directed into a single large pipe, and this large pipe could drain into a large container where the water will be collected. Then we can connect this	I think that it is not possible to drain AC water in internal pipes to a reservoir because water will pass through sinks that are too polluted which will lead to its contamination; it	Challenges for use

container to a pipe and irrigate the trees in the neighborhood. However, I think that this is not possible because the water collected will not be of a good quality since it passes through the same sinks as the stormwater and the water used for domestic purposes (for example cleaning). These sinks have a lot of pollutants trapped inside them, consequently leading to the impairment of the quality of the water collected in this container. Therefore, if this water is to be used for the irrigation of the trees, it should be first taken by a company or by the municipality to treat it and then it could be used.	needs to be treated prior to its use	
The most promising solution to reuse AC water in the city is to install external pipes directed into a reservoir installed at the bottom of the building, and the municipality needs to come and take the water according to a schedule for irrigation. Nevertheless, the municipality needs to be responsible and abide by water collection, or else we will not be willing to participate in this project.	I think that the best way to reuse AC water for irrigation in the city is to install external pipes and reservoir on buildings for the municipality to collect water, but only after making sure that the municipality will abide by that	Suggestion for use - Opinion about proposed system on stakeholders involvement
Personally, I would love to be engaged in such an initiative because I think that it reduces water scarcity that is beginning to happen in many parts of the city, especially in summer, and simply because it provides a beautiful image of the city as it is beginning to undertake sustainability projects.	I want to be engaged in the proposed strategy because it reduces current water scarcity problems and provide a beautiful image of the city	Opinion about proposed system on biophysical impact
Although I am fully with the idea, however, I think that it can never happen because most of my neighbors in the building do not pay even for the basic needs of the building. I think that this is the major problem. I will honestly not pay if most houses in the building do not. If any entity finances this project, or maybe provides a monetary incentive like a tax reduction, I think that we will not have any problem with its installation.	I am not willing to participate and pay for the system unless most of my neighbors do so or an entity finances it or provide us with a monetary incentive	Opinion about proposed system on cost

I think that selling the water produced to the municipality instead of giving it for free could incentivize residents to install the system, but it will never happen as the municipality will not pay for it, even though it is really wealthy. It might also be unethical because this water will be used for the amelioration of greenery in our city and for improving its aesthetics and image.	I think that selling the water to the municipality could incentivize residents, but it is unrealistic and unethical	Opinion about proposed system on cost
The best way to make AC water system projects a reality is that a private entity initiates it; they coordinate with people and assist them with financing the projects. People will have trust in these entities and will be assured that they will pay them or provide them with incentives and that they will abide by water collection, as they do not usually trust the government.	I think that installing AC water systems could only happen if a private entity initiates it and assists in its financing as residents do not trust the government	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
We do not use the water generated from the ACs; the workers who installed the ACs in our house connected each unit to a pipe that drains into the sewage network	I do not use AC water because the workers connected the pipes directly to the sewage network	Use of AC water
I can collect AC water by letting the pipe drain into an empty gallon, and I think that I can reuse it but I will not because I think that it takes a lot of time and effort to check whether the water gallon is full or not every now and then, and generally nobody in the house has time to check on this issue	I think that I can reuse AC water but I will not because its manual collection and use is difficult and time-consuming	Challenges for use
I believe that we cannot collect and reuse the water generated from the AC of the living room because my parents usually smoke there, therefore the water quality would be impaired and it will have the smell of smoke	I believe that AC water from the living room cannot be reused as it contains the smell of smoke from the room	Knowledge of AC water quality / quantity - Challenges for use
Previously, we used to collect the water generated from our household AC units (except for the one in the living room) in gallons, but we stopped doing that because sometimes we didn't have time to check on this issue and sometimes we even used to forget about it, and this most of the time resulted in the flooding of the	I used to collect AC water but stopped due to gallon flooding and AC spilling towards the inside of rooms	Challenges for use

water gallon. Consequently, the AC starts spilling water into the inside of the room.		
We used to use this water for the cleaning of the floor of the balconies. However, when we started noticing that it is spilling into the inside of the rooms and that is leading to water logging problems on the balconies, we stopped collecting and using this water	I used to employ this water in balcony floor cleaning but stopped due to water logging	Challenges for use
We used to use this water because, given that our house is big, we used to find it easier to take the water gallons on each balcony and employ it to clean the balcony itself and the room located in its vicinity, rather than transporting water buckets in and out of the kitchen/ bathroom. So when we went out to clean the balconies, we used to notice that the gallons are full, so we used them. It is easier and more practical, and it also reduces our water consumption.	I used to employ this water in balcony and room floor cleaning simply due to its proximity to each room and because it reduces our water consumption	Use of AC water
I honestly think that if I had a system in my house that allows me to use this water without having to collect it in gallons, I would not have any problem using it for most purposes except drinking or cooking	I am willing to use AC water for many purposes except drinking or cooking if I had a system in place	Suggestion for use - Knowledge of AC water quality / quantity
I hear that many people use it for the iron and for the car battery and wipers because it does not damage machines with lime residues	I hear that AC water is good for machines as it is free of lime residues	Knowledge of AC water quality / quantity
I also never tried to use it for the irrigation of my household plants, although it might be good for this purpose because we all know that the water condensate generated from the AC is clean and of good quality because it is distilled water and formed through the contact of the cold AC surface with the hot wind, so it would be free from minerals or pollutants. This is at least what I hear from everyone	I believe that AC water is good for the irrigation of household plants because I hear that it is free of pollutants	Knowledge of AC water quality / quantity
I am not really aware of the quantity of this water as it depends on the humidity outside; sometimes it took few hours only to fill an entire gallon and sometimes it	I believe that the quantity of AC water depends on the humidity in the atmosphere	Knowledge of AC water quality / quantity

took half a day. It all depends on the humidity in the atmosphere.		
I think that the quantity of this water is really significant especially in July and august, as the humidity in these months is really high and the weather is too hot.	I believe that the quantity of AC water is significant in July and august due to high humidity and temperature	Knowledge of AC water quality / quantity
This water, like any other sources of water, might be beneficial for domestic use and/or irrigation nowadays because it is clean, therefore it can be used to reduce the well water scarcity that we are facing in summer, as well as the problem of water saltiness. Sometimes in summer, the wells of the buildings get dry for several days due to the hot weather and sometimes we receive water that is too salty and that irritates our eyes and skin because people over pump water from these wells. However, it really needs a system in buildings to be used, because its manual collection is too difficult.	I believe that AC water reuse is beneficial to reduce well water scarcity and saltiness problems in summer, but that this needs systems in buildings	Challenges for use- Suggestion for use
Adding to that, I was recently informed that the water payment system in our city is starting to shift into a metered system. If this was implemented in my neighborhood, I would definitely try to figure out a way to reuse AC water to reduce the amount of money I am paying for water. You know that in Lebanon we have to pay for a lot of services, and I would really like to reduce my payment.	I am willing to find out a way to reuse AC water to save money if metered system was implemented in neighborhood	Suggestion for use
If I were to use AC water for my household plants, I would collect it in gallons and then boil it to be sure that all of the impurities (even if minor ones) inside it are removed. I would maybe also add some minerals to it, and then I would use it for the irrigation of my household plants. But I wouldn't poor it directly from the gallons to the plants because the plants in our household are edible ones (we use them to make food), so I cannot irrigate them with any water without making sure that it is safe.	I believe that I should boil the water and/or add to it some minerals if I want to use it for the irrigation of my household plants because they are edible ones	Suggestion for use - Knowledge of AC water quality / quantity

I do not trust any general statement regarding the quality of this water, and I cannot believe that it is 100% safe unless someone comes and tests the quality of the water generated from the AC units in my household particularly. There is a lot of dust particles that might be trapped within this water as a result of different weather and environmental conditions in each area, that is why I think that the AC water quality should definitely be tested for each household.	I need to be assured about the quality of AC water in my household through testing because it might contain dust particles	Suggestion for use - Knowledge of AC water quality / quantity
At the level of the building and/or neighborhood plants and greenery, I think that the best way is to bring experts to check how we can implement an external piping infrastructure in the building that would connect the AC water of the households into the trees/plants, because definitely, nobody is willing to take his gallon and irrigate the sidewalk plants by himself.	I think that the best way to use AC water on neighborhood plants is to design an external infrastructure on buildings that is directly branched to the trees, plants or gardens	Suggestion for use
Sometimes, it might not be feasible to direct the pipes directly to greenery due to the presence of streets in between. Therefore, the external pipes could be connected to a reservoir that is either emptied by a private entity or the municipality to irrigate with it or branched to a pipe used by the concierge to irrigate.	I think that branching external pipes to a reservoir used by municipality or concierge for irrigation is better in the presence of streets	Suggestion for use
I am definitely with the idea of installing external AC water harvesting systems because we are already consuming huge amounts of water and this will contribute to the reduction of these amounts.	I think that the implementation of AC water harvesting systems reduces water consumption in the city	Opinion about proposed system on biophysical impact
I also think that fixing the underground infrastructure can also push us to plant even more greenery (building gardens) and connect them with pipes for irrigation. The only disadvantage of installing a piping system is that it might not be feasible because it might need deconstruction and reconstruction, as well as time and money. But if we are talking about new buildings, I would definitely recommend that.	I think that built-in drainage systems are only feasible in new buildings, and could encourage planting more greenery	Suggestion for use

I am willing to install an external piping system and a reservoir at the bottom of my building especially because it solves the problem of leaking water pipes from the houses of our neighbors and provides free water that is not employed by residents for irrigation.	I think that external AC water harvesting systems solve water leakage problems and provide free water for irrigation	Opinion about proposed system on biophysical impact
If there was a way to direct this water back to households through the external system, we would also consider using this water for domestic purposes if we were assured that it is safe. We could use part of it and give the remaining water to the municipality.	I think that AC water could be partly reused in households also if there was a way to do that and if it were safe	Opinion about proposed system on biophysical impact
I think that the municipalities could take the water also from companies that do not consume as much water as households in terms of domestic/ irrigation reuse of AC water.	I think that AC water harvesting systems could also be installed on company buildings	Opinion about proposed system on biophysical impact
I do not honestly know how much this system costs nowadays, however, I think that if the sum was divided among us, it will not be big. My family and I would pay for that even if not all households participated. We really care about the environment and want to ameliorate our city and brighten its image and reputation. It might also help in the flourishing of the gardens that are neglected due to the potential lack of water in their wells.	I am willing to pay for external AC harvesting system even if not all houses participated as it is environmentally friendly, provides a beautiful image of the city and ameliorates gardens	Opinion about proposed system on cost - Opinion about proposed system on biophysical impact
At the level of the city, however, I think that installing these systems on buildings cannot happen unless there was massive awareness campaigns that were done and that might even not be welcomed by many people who believe that this is something secondary and not important.	I think that the implementation of AC water harvesting systems cannot happen unless there is awareness campaigns that might not be effective	Opinion about proposed system on stakeholders involvement
The financing of these projects is key for their success. Most people will not pay claiming that they have other priorities and essentials to provide for their family. They would, however, implement these systems if they were funded by NGOs, private companies or even the government or municipality. If these entities do not want to fully finance the	I think that the implementation of AC water harvesting systems cannot happen unless there is financing from NGOs, private or governmental entities, or monetary incentives and rewards	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement

project, they could at least give residents some monetary incentives like system price reduction, tax reduction, etc, or even make it voluntary and reward buildings who participate.		
The government could also mandate these systems on buildings with a particular number of floors and ACs, but this needs adequate monitoring and imposing fines and penalties or else it will not be effective.	I think that the implementation of AC water harvesting systems could be mandated by the government with fines and penalties	Opinion about proposed system on stakeholders involvement
In my household, there are two management strategies for AC water. I have one AC unit that is connected to a pipe which is directly connected to the sink, meaning that the water drains into the sewer systems. The second management strategy is that the other AC units are each connected to a pipe which drains into an empty gallon. I usually use this water collected in gallons as water for my car, and for the cleaning of the floor. However, since I do not clean the floor on a daily basis, sometimes I have to throw the excessive amounts of water that are generated from the ACs.	I collect AC water in gallons and partially use it for the car and for floor cleaning	Collection of AC water -Use of AC water
I waste the excessive amount of water because the amount of water collected through the gallons is usually sufficient for me for the car uses and for the cleaning of the floor twice a week. Sometimes it also generates excess water that I usually throw. To avoid having to throw more gallons manually, I prefer it to be directed to the sewer system.	AC water quantity is big; I do not need all of it for the car and for cleaning	Knowledge of AC water quality / quantity - Use of AC water
The amount of water generated by AC units depends on the humidity in the air and on the of ACs that operate each day. I think that they generate approximately 2-3 gallons per day.	I believe that AC water quantity depends on humidity and number of operating ACs per day; each AC produces around 2-3 gallons per day	Knowledge of AC water quality / quantity
This water can be reused for purposes other than car and cleaning, for example, personal hygiene (washing hands, brushing teeth, bathing), because it is	I believe that AC water can be used for personal hygiene and domestic purposes because it is	Knowledge of AC water quality / quantity

distilled water meaning that it is usually safe and very clean because it is formed through the contact of the hot air with a cold surface, which means that it is pure and free from pollutants. It does not contain any minerals. I believe that this water could be used for all forms of domestic uses.	clean as it is distilled and free of pollutants and minerals	
AC water cannot be used for drinking because it requires the presence of ions to be categorized as potable water. I think that it needs a certain type of treatment for it to become potable water	I believe that AC water is not potable because it does not contain ions and needs to be treated	Knowledge of AC water quality / quantity
I do not use AC water for personal hygiene or all domestic purposes because I think that it is difficult, for example, to manually hold the gallon and bath with it or use it for washing my hands. Also, pouring the water from gallons, in my opinion, wastes more water than if we open the tap to wash our hands for example.	I believe that the manual collection and use of AC water for personal hygiene and/or domestic purposes is difficult and wastes water	Challenges for use
I have a storage tank on the roof, and I think that I can connect this water to it but maybe it is too far from the roof, but I think that there still exists a technique to do it.	I think that branching AC water to the roof's storage tank is a good idea but I do not know how	Suggestion for use
I have no problem with using AC water for the irrigation of my household plants. However, because it is free from minerals, I would first of all collect it in gallons. Then I would add to it some minerals/nutrients (like phosphate for example) and then I would use it for the irrigation of the plants	I am willing to use AC water on household plants after supplementing it with minerals	Knowledge of AC water quality / quantity- Suggestion for use
I usually tend to encourage the reuse of water because in Lebanon, we have water resources, but if we will continue overconsuming them, like we are doing right now, we will end up depleting these resources, which will result in drastic water scarcity problems.	I encourage AC water reuse to prevent future water scarcity problems	Use of AC water
I think that AC water reuse is beneficial because the water that is generated from the ACs through the process of condensation is cleaner than tap water	I encourage AC water reuse because it is cleaner than tap water and has a better quality	Knowledge of AC water quality / quantity

that we are receiving. This is because we are not sure about the quality of the water we are receiving, but the AC water is a condensate, so we are sure that is clean and free from impurities. This AC water condensate is well-known for its good quality.		
At the level of the building, we can collect AC water through gallons and then the concierge can daily collect this water to irrigate the trees in the neighborhood. However, I definitely think that we need to give the concierge an incentive to do that, such as a small amount of money, that is only dedicated for this purpose. This amount could be dedicated to all the things related to sustainability, for example if we want to sort and gather plastic bottles, etc.	I think that the concierge could be given a monetary incentive to collect gallons from houses and use the water for the irrigation of sidewalk trees and greenery	Suggestion for use
If we want to consider a piping system as a second way to do that, I believe that both an internal and an external system are not feasible.	I think that both internal and external AC water systems are not feasible	Challenges for use
Installing an internal piping system for AC water is only feasible in buildings in new buildings, because it is very difficult to implement this system in already existing buildings because you need to deteriorate all the building and build it again.	I think that internal AC water systems are only feasible in new buildings because they need deterioration and reconstruction	Challenges for use
Installing an external piping system is not feasible too; first, because external pipes are subjected to various harmful conditions, so they would require a lot of maintenance and costs. Another reason is that it is not nice to see a building which is full of external pipes, so it is not aesthetic.	I think that external AC water systems are not feasible because they are too costly and not aesthetic	Opinion about proposed system on cost - Opinion about proposed system on biophysical impact
Unlike internal piping system, the external piping system is not impossible if all buildings residents agree to bare its financial incentives or if they receive funding from NGOs or governmental institutions.	I think that the implementation of external piping system is not impossible if funding is available	Opinion about proposed system on cost
External pipes could be connected to a reservoir that could be emptied weekly by	I think that an NGO or the municipality should	Opinion about proposed system

an NGO or by the municipality for the irrigation of city gardens as they are responsible for that.	be responsible for water collection	on stakeholders involvement
Pilot projects should be conducted to raise people's awareness about this kind of systems and to make sure that the municipality or any other entity undertaking the project or assisting with it is trusted and responsible.	I think that installing external piping system needs pilot projects to raise awareness and enhance people's trust in responsible entity	Opinion about proposed system on stakeholders involvement
If external piping systems were not feasible, and since we have huge rates of unemployment in Lebanon, I would propose that some statistics about people that are unemployed, especially women, would be collected by the municipality and then the municipality contacts them, and each person interested would be assigned one geographical area (constituted of 4 to 5 buildings for example) where they will be responsible for the follow up on the collection of the gallons. They would be given an amount of money for every number of gallons collected (10 gallons for example), so they will have an incentive to encourage that practice. The gallons could be collected at the reception of each building, where this person will come and check them, and then they will be taken by the municipality and used for the irrigation of urban greenery. However, in order to do that, the municipality has to seek some NGOs and grants that are already there and are ready to invest in eco-friendly practices.	If external systems not feasible, I propose using already available grants by municipality or NGO to hire unemployed women to follow up on the collection of gallons by buildings in every small area and their pick up by the municipality for irrigation use	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
Each AC unit in my household is connected to a pipe. I collect this water by putting this pipe in empty gallons, and the made in my house empties the gallons when they become full.	I do not use AC water; I collect it in gallons and throw it	Use of AC water - Collection of AC water
I do not think that this water could be reused, and I would not reuse it because I think that it is not clean and its quality is bad, because it traps the dust particles generated from the ACs (the ones on the filters for example), and maybe the ones inside the drainage pipes. I always notice	I do not and will not use AC water because I believe that it is not clean; it contains dust particles and has a grey color	Use of AC water- Knowledge of AC water quality / quantity

that the water generated from the AC units in my household has a grey color, that is why I would not reuse any water that is not clean.		
If AC water was clean and safe, I would reuse it for cleaning the floor and the windows. I think that these are its potential uses. I might also use it for the irrigation of my household plants, if I decide to buy any in the future.	I am willing to use AC water for cleaning and irrigation if I was assured that it is clean and safe	Suggestion for use - Knowledge of AC water quality / quantity
I think that it is difficult to use it for personal hygiene because our buildings are not equipped with systems that direct this water and filter it and consequently allow us to use this water easily like in many other parts of the world. It is not easy and also time-consuming to transfer gallons from outside every time someone in the house needs to shower, wash their hands or flush the toilet, for example.	I think that it is too difficult to use AC water for personal hygiene due to the absence of a system in building	Challenges for use
I think of reusing AC water, preferably if a system was available, because if it is clean, I do not want it to be wasted. It would be beneficial to use for cleaning rather than wasting it. If I know that this water is clean, I would definitely think of reusing it for domestic purposes and for irrigation if I had any plants, or if I planted any in the future, because now they are starting to shift the water payment system into a metered system, implying that the more you consume, the more you pay. Therefore, I believe that in this case reusing this water is very beneficial because it would save me a lot of money and it would save water also.	I am willing to use AC water for cleaning and irrigation to avoid wasting water, reduce water consumption, and save money	Suggestion for use
As we usually collect AC water in gallons to throw them later, I notice that each AC unit produces around a gallon of 10 liters per day in summer, and sometimes even more when the weather is too hot and humid, especially in august. The quantity is big, especially that I have 4 AC units in my house that operate daily in summer.	I believe that the quantity of AC water is significant; each AC generates 10 L or more in summer	Knowledge of AC water quality / quantity
To reuse this water at the level of the sidewalk plants and trees, the residents of the building would collect this water in	I think that sidewalk plants could be daily irrigated manually	Suggestion for use

gallons and a person from the household would go down and irrigate the plants for example, depending on the amounts that each household could generate. Or simply, each household could collect the amounts generated from their AC units (even if minimal amounts), and then the concierge of the building would come, collect these gallons and use them to irrigate the trees and plants on the sidewalks on a daily basis.	through collected gallons by residents or by concierge	
To make it more advanced and try to cover the irrigation of green areas in other parts of the city, buildings can install external piping systems that link AC units into a large pipe and then into a reservoir located at the bottom of the building where all this water would be collected. The reservoir could be connected to a pipe used by the concierge to irrigate nearby greenery or it could also be emptied by the municipality as they are the entity responsible for the maintenance of gardens and street greenery in our city.	I think that external AC water piping systems and reservoirs could be installed on buildings and used by concierge or municipality to water nearby greenery or city greenery	Suggestion for use
Installing external piping systems in buildings for AC water collection does not only help in irrigation but can also allow us to use this water in our houses if we could pump it back or even take water from the reservoir for the car or other building services.	I think that external systems enable us to use water not only for irrigation, but also domestic purposes if it could be pumped back to houses	Suggestion for use - Opinion about proposed system on biophysical impact
It is a good idea to implement these systems because they enable us to recycle water and this is very important because we are hearing that water scarcity is starting to happen in some areas in Lebanon, especially Beirut, and it will be a very serious condition in the future if we did not figure out how to adequately manage our water resources.	I think that external systems are important to prevent future water scarcity	Opinion about proposed system on biophysical impact
I think that retrofitting buildings with external AC water piping systems is not possible because I assume that it is a costly option. Residents need to invest in the installation of these systems and their maintenance. Nobody will be willing to pay for something that will not benefit	I think that installing external AC water systems is not possible because it is costly and people will not be willing to pay for it	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement

them directly because people are already overwhelmed with responsibilities during these harsh days and they have many other priorities to take into consideration or to pay for. Residents would only accept to install such systems either if they do not pay for it at all, or if they get penalized for not doing so.	unless they get assisted or penalized	
In my building, i think that most residents will not pay for that because they will not find it important.	I think that building residents will not pay for system	Opinion about proposed system on cost
Personally, I cannot pay for this system unless the sum is really minimal and I can afford it, keeping in mind that I have other essential things that I need to pay for	I cannot pay for external system unless the amount is minimal	Opinion about proposed system on cost
If these systems are to be implemented in the entire city or in neighborhoods, as proposed, they need to be financed by external or other grants provided to NGOs or private companies, but not governmental ones, because we do not trust that they will employ the money correctly. These could assist residents in financing the systems or could do agreements with the municipality to provide rewards to buildings who install these systems such as reducing sum paid for water, electricity, municipality, etc.	I think that external systems should be financed by NGOs or private companies who could agree with the municipality to provide rewards to buildings who install them	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
Receiving grants by municipality from NGOs depending on the amount that they collect weekly for irrigation is also a possible way to incentivize them to work adequately and plant more greenery in the city which ameliorates its aesthetics and is mostly welcomed by all residents.	I think that receiving grants by municipality from NGOs depending on amount of water collected gives them incentive to work	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
If no financial assistance was granted to us, the only way that these systems could be implemented is to make these systems mandatory on buildings and penalize the ones who do not install it. This needs adequate monitoring and should be done in neighborhoods where people are of the middle or high class.	I think that the best way is to make these systems mandatory in middle and high class neighborhoods if no financial assistance is granted	Opinion about proposed system on stakeholders involvement
Awareness campaigns alone will not be sufficient to disseminate this practice	I think that awareness campaigns alone are not	Opinion about proposed system

because even if people were aware and loved the idea, they might not want to pay or might not be able to pay for it. They either need assistance, incentives, or legal obligation.	effective to implement this project	on stakeholders involvement
In my household, each AC unit is connected to a pipe which drains into a sink which directs the water into the sewer systems, therefore, the water is thrown away; we do not use it for anything.	I do not use AC water; it goes to the sewage network	Use of AC water
We can reuse it as water for the iron, but we do not because nobody has time to check on the gallons, and to fill them in the iron. Moreover, since we are not always aware about this issue, we fear that the gallons become full and cause water logging problems on the balcony, therefore we prefer not to collect this water. Thus, we do not use it because no one is willing to take care of this issue in my household.	I do not use AC water for the iron because its manual collection is difficult and time consuming and might cause water logging problems on balconies	Challenges for use
Sometimes, we even buy AC water condensate to use it for the iron instead of collecting the ones in our house and reusing them. We prefer paying a small amount of money than having to check on the water gallons every now and then and being at risk of encountering water spills and flooding problems.	I buy AC water for the iron because I am not willing to collect it manually and encounter flooding problems	Challenges for use
AC water is clean because it is distilled water, but it definitely cannot be used for drinking, it is not potable.	I believe that AC water is clean because it is distilled but it is not potable	Knowledge of AC water quality / quantity
I always hear that AC water is clean, this is something that is well-known, but I do not really know why they say that.	I do not know why AC water is clean; I hear people say that	Knowledge of AC water quality / quantity
I think that this water is good for all purposes except drinking, cooking and irrigation. It needs to be treated before being used for drinking and cooking. It is maybe not good for irrigation because I can assume that if it distilled, it does not contain minerals that are essential for plants. Supplementing it with minerals	I believe that AC water needs to be treated for drinking and cooking and needs mineral supplements to be used for irrigation	Knowledge of AC water quality / quantity- Suggestion for use

might be the solution, but I am not really sure about that.		
Even if AC water reuse might save me money and reduce my payment for water, I would not reuse it if I have to do that manually, unless there is an easier way or a system to do that.	I am not willing to use AC water to save money unless there is a system for that	Suggestion for use
Considering that I do not collect AC water, I am not really aware about the amount of water that could be generated, but I hear from my friends who collect this water in their homes in summer that the amount is big and that it is greater than their daily needs for cleaning, car purposes and ironing.	I hear from my friends that the amount of water generated by AC units is significant	Knowledge of AC water quality / quantity
In households, people who have plants and who are willing to collect this water manually in gallons or buckets could use it to irrigate their plants if they were assured about its safety, but I would not do that	I think that interested people could use collect it manually and use it on plants if it is safe, but I will not do that	Suggestion for use
At the level of buildings, and if AC water was adequate for irrigation, the best way to use this water would be that all AC units in buildings be connected to external pipes which would drain into a larger pipe and then into a container that collects this water. Then the container would be connected to other pipes that would irrigate the different plants and trees in my neighborhood. When the municipality is in need for more water, they can also come and take water from the reservoirs of buildings for irrigation rather than not irrigating some areas due to the huge demand on water in the water authority.	I think that the best way to use AC water for the irrigation of green spaces is to install external pipes on buildings connected to a container branched to a pipe to irrigate sidewalk greenery or employed by municipality when they do not have enough water for irrigation	Suggestion for use
Installing external piping systems on buildings like the one in the prototype is an amazing idea but, in my opinion, it is too idealistic, especially in Lebanon, where both the people and the government are negligent about the environment and its welfare and believe that we have plenty of water resources and that we do not need to save water. It can maybe happen voluntarily at the level	I think that installing systems like the prototype is too idealistic in Lebanon because people and the government do not care about the environment and think we have a lot of water	Opinion about proposed system on stakeholders involvement

of individual buildings, but not neighborhoods or entire city.		
The proposed strategy might also not be possible because it is costly and not all residents within one building will accept to pay for the installation and maintenance of this systems, and unfortunately, this is and will be the case in most buildings in Tripoli.	I think that proposed system might not be possible because it is costly and not all residents in building will pay	Opinion about proposed system on cost
Some people, including myself, might be willing to pay for this system if most neighbors paid but will not accept relocating the AC units installed in their homes because it might damage the walls and ruin the internal design of the house.	I am willing to pay if most residents did but I will not accept relocating the AC units in my house	Opinion about proposed system on cost - Opinion about proposed system on biophysical impact
Moreover, in our country, people do not have any incentive to reduce their water consumption because most residents either pay a fixed sum for water or consume free water from wells. If the government mandated people to pay for the amount of water they consume, this idea would be more possible.	I think that AC water reuse through external systems would be more possible if government mandated people to pay for amount of water they consume	Opinion about proposed system on stakeholders involvement
I also think that even if this project happens, the municipality will not agree to carry out the water collection because it is too time consuming and they do not irrigate city greenery much.	I think that the municipality will not agree to collect AC water because it takes time and they do not care much about irrigation	Opinion about proposed system on stakeholders involvement
It is better that NGOs initiate this project through awareness campaigns and financial aid schemes for buildings in need but this is also not possible because I believe that there are no trusted environmental NGOs in Tripoli.	I think that NGOs should be responsible for project and do awareness campaigns and financial assistance but no trusted NGOs in Tripoli	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
Until the responsible entity figures out how to make this project feasible, I think that people who are willing to collect AC water manually could use their gallons for the irrigation of their nearby plants or give the collected ones to the concierge and pay him a small amount of money to	I think that project could start by manually collecting AC water and using it for nearby plants irrigation by residents or concierge	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost

irrigate nearby greenery with it on a daily basis.		
The municipality could also maybe dedicate a reservoir for this water and an NGO could come take the collected water from buildings and empty them in this reservoir to ease the work of municipality workers.	I think that collected gallons in buildings could also be collected by NGO and emptied in dedicated reservoir in municipality	Opinion about proposed system on stakeholders involvement
I do not use the water generated from the AC units in my household, it gets wasted. Each AC unit is connected to a pipe draining into the sewage network. This is how it is usually done by workers when ACs are installed.	I do not use AC water; workers directed it to the sewage network	Use of AC water
I know that I can reuse AC water and I think that it has many uses; for example, I can use it for the iron, and for filling the battery of the car and the motor with water. I can also use it for cleaning the floor and the windows in my house. If I collect the water, I would have used it for these purposes because it is distilled water, therefore it does not contain lime residues that usually gradually destroys the machine in which it is being heated.	I believe that AC water can be used for iron and the car and for cleaning floor and windows because it does not contain damaging lime residues	Use of AC water - Knowledge of AC water quality / quantity
I did not think of reusing this water because its method of collection is difficult and not practical at all because if the humidity in the air is really high, several gallons will be generated per day, and we will have to check on them and substitute the gallons every now and then, but nobody has time to do that. Also, even if we were to collect them, sometimes we might forget to check on this issue and this would result in water flooding on the balconies, that might leak water to the rooms also and I will not take that risk because it needs continuous monitoring and awareness.	I do not use AC water because its manual collection is difficult and time consuming as it generates a lot of water if the humidity is high/ I am not willing to take the risk of water flooding on balcony	Knowledge of AC water quality / quantity- Challenges for use
I do not really know if the plants could be irrigated with AC water, I know that its quality is good but i am not sure if it is good for plants. I do not know if water that does not contain lime residues is good for plants.	I do not know if AC water is good for plants	Knowledge of AC water quality / quantity

I would irrigate my household plants with AC water if it is better than tap water and if I was assured that it is suitable for this purpose.	I am willing to use AC water for irrigation if I was assured that it is good for plants	Suggestion for use
I think that if we are living in a city outside Lebanon, AC water reuse would definitely reduce the water footprint because this water would reduce the broader water footprint, however, in Tripoli for example, we are allowed to use approximately 1 meter cube of water per day (this is the limit), and this limit is way greater than the water we are actually using daily. Therefore, residents are not given an incentive to reduce their water consumption. Nevertheless, if for example this water limit was considerably reduced, and the residents find that they are sometimes exceeding it, we will definitely have an incentive to collect this water and reuse it. We would also seek other water alternatives maybe to reduce our consumption.	I think that AC water reuse cannot happen unless the government reduces the allowable daily water consumption limit to give an incentive to people	Suggestion for use
To reuse AC water for irrigation, we could bring engineers and experts to install for us a piping system in the building, where all the pipes connected to the ACs in the households would drain into a large pipe. They would do that by only deteriorating a small part of the wall (the place in which the pipe would be installed) and then this pipe could drain into a storage tank/ container.	I think that we can install a built-in piping system connected to a container in building for AC water harvesting by deteriorating only a small part of the façade	Suggestion for use
To avoid deterioration or construction caused by internal systems, we can even simply install visible pipes on the external façade of buildings and connect them to a container.	I think that we can install external pipes and container to avoid additional deterioration and reconstruction work	Suggestion for use- Opinion about proposed system on biophysical impact
Installing an external piping system connected to a reservoir will only cost a certain amount of money that would be minimal if we divide it on all the residents of the building and will not need continuous maintenance unless any accident occurs and causes damage in the pipes or reservoir.	I think that external piping system does not cost much if divided on all residents of building and does not need continuous maintenance	Opinion about proposed system on cost

Once the water is collected in a container, we would assign the task to the concierge to fill buckets or gallons from this large container and to irrigate the plants. We cannot connect the piping system to each tree because this will require the municipality to remove the sidewalk, install the piping systems, and then reconstruct it. So, I think that it is difficult, therefore the concierge can do it manually.	I think that the piping system cannot be branched directly to nearby greenery and needs the concierge to irrigate them manually from container	Suggestion for use
At the level of city gardens, as proposed in the prototype, I think that the municipality should ideally be responsible for water collection from the AC water containers in dedicated watering trucks and should use this water for irrigation if it was suitable for this purpose.	I think that municipality should ideally be responsible for water collection to irrigate city gardens	Opinion about proposed system on stakeholders involvement
I do not think that the municipality will be interested in this project and especially in water collection, therefore, if a system is to be installed, I prefer pumping this water back to my household to use it for several purposes or giving it to environmental NGOs that could really make use of it for irrigation or other applications rather than wasting it.	I prefer pumping AC water back to my household or giving it to NGOs because municipality is not trusted and will not be interested in it	Opinion about proposed system on stakeholders involvement
In my opinion, this project is more suitable for NGOs; they could do it better as they can offer technical assistance to residents, convince the ones who might be reluctant to participate and collect the water by assigning a small team and bringing one or two watering trucks for this purpose.	I think that proposed project is more suitable for NGOs because they can assist residents in installation and water collection and convince them with systems	Opinion about proposed system on stakeholders involvement
I believe that if the proposed project was initiated by NGOs, more people will be willing to participate in it because they will have trust that the water will be used for the amelioration of greenery in the city and for their welfare.	I think that more people will participate in project if initiated by NGOs because they trust them but do not trust municipality	Opinion about proposed system on stakeholders involvement
Moreover, I think that this project would be welcomed by many residents in Tripoli that are environmentally aware because it is a win-win situation: it ameliorates the aesthetics of their buildings by minimizing water leakage from random	I think that AC water systems retrofitting would be welcomed by residents because it ameliorates aesthetics of building and city and	Opinion about proposed system on biophysical impact

water pipes, ameliorates green spaces that they usually love and admire, and reduces water scarcity problems that many of them are encountering and poor and salty water quality received in some households near the cost.	reduces water scarcity and poor water quality	
On the balconies, I have pipes that are connected the ACs; I put each of these pipes in a water gallon to collect the water, and then I reuse it for the iron, and to clean the floor and the windows, and sometimes I give it to the concierge to wash my car.	I collect AC water in gallons and use it for the iron, car, and floor and window cleaning	Collection of AC water - Use of AC water
I would never use AC water for the irrigation of my household plants because it cannot be used for this purpose; it kills the plant, and it is not suitable for it at all. I think that the soil does not tolerate this type of water.	I believe that AC water is not good for plants; it kills them	Knowledge of AC water quality / quantity
I have tried before to irrigate a plant with this water and I noticed that the soil changed its color and the plant started to die gradually. Therefore, I stopped using it and I used the tap water instead. But honestly, I do not know why this water might harm the plants	I tried to use AC water on my plant and it died but I do not know why this water is not good for plants	Knowledge of AC water quality / quantity
Returning to the management of AC water, sometimes, a single AC generates approximately 3-4 gallons per day, so I have water far more than what I need for ironing, floor cleaning, and car cleaning, therefore, I throw the excess water.	I partially use AC water for ironing, floor cleaning and car because the amount generated is big	Use of AC water - Knowledge of AC water quality / quantity
I use AC water for the iron because it is distilled, and I hear that distilled water does not deteriorate it because it does not contain damaging lime residues.	I believe that AC water is good for the iron because it is free of lime residues	Knowledge of AC water quality / quantity
I reuse a part of AC water because I believe that by doing that, I will be significantly reducing my water consumption, since I believe that in Lebanon, we are on the edge of water scarcity.	I reuse AC water to reduce my water consumption and prevent water scarcity	Use of AC water
I think that AC water is cleaner than tap water because the pipes through which tap water circulates might sometimes contain some pollutants that are trapped	I believe that AC water is cleaner than tap water which might be dirty due to unmaintained	Knowledge of AC water quality / quantity

inside, or the water itself might not be tested properly. The AC condensate, in contrary, is distilled water that is free from impurities and therefore I assume that it is cleaner than the tap water.	pipes or inappropriate testing	
I would not use AC water for drinking or brushing my teeth, for example, because I think that even if the tap water sometimes contains some particles, however, it would be purified by the filter that is put on the tap. I am assuming that AC water is water is safe but I am not really sure about it, that is why I might use it for washing my hands, bathing, etc. but not for brushing my teeth because I will be at risk of ingesting this water, and this might cause me problems if the water was not safe.	I am willing to use AC water for personal hygiene but not for drinking or brushing teeth because I am not sure if it is safe for these purposes	Knowledge of AC water quality / quantity
If experts assure me that AC water is suitable for irrigation, I am willing to irrigate my household plants with it either directly through the water pipe present on the same balcony where the plants are, or I would collect it in the gallons, as usual, and irrigate the plants with it	I am willing to manually irrigate my household plants with AC water if experts assure me that it is safe	Suggestion for use - Knowledge of AC water quality / quantity
If this water is to be used on neighborhood trees and plants, I would maybe propose on the residents in households in which there are ACs to collect this water in gallons on a daily basis and give them to the concierge of the building who would then use these gallons and irrigate the plants with them manually and could use the excess water, if any, for the cleaning of the stairs in the building and sidewalk facing our building, or for washing the cars of the residents of the building.	I propose manual collection of gallons by buildings and giving them to concierge for the irrigation of nearby plants in neighborhood and using excess water for building and car cleaning purposes	Suggestion for use
For the irrigation of green areas in the city, I think that a team from the municipality could be hired and would first of all do awareness campaigns about the importance of this water and its potential uses, especially for irrigation, through circulating brochures on the households in each building. Through these brochures, they would also ask the	I propose hiring a team from the municipality to raise awareness about AC water, pick up gallons collected by residents, empty them in containers and using them for irrigation of city greenery after	Suggestion for use

residents not to throw this water and to collect it. Therefore, the residents would start collecting this water in gallons. Then, the municipality would assign a geographical area in Tripoli for each member of the team hired previously, and they would come and collect the water from the buildings, and then they would fill it in containers or cisterns and would irrigate the green areas with it. But of course, before the irrigation step, they should test this water to be sure that it is hundred percent safe for irrigation. If they found that it was not, they could either treat It and then reuse it, or they could simply use it for the cleaning processes they are in charge of, or even fill with it the fountains.	testing the water to make sure that it is safe for irrigation	
Another easier way to use AC water for the irrigation of city greenery is to install external pipes on buildings that could directly connect to green areas or that could direct the water to a reservoir for water collection. AC water in reservoirs can be used by the concierge or collected by the entity responsible for the maintenance of green spaces (municipality or contractor) for irrigation.	I think that installing external pipes on buildings connected to green areas or reservoirs emptied by municipality or contractor is another easier way to use AC water on green spaces	Suggestion for use
I believe that the external piping system proposed and similar to the prototype is useful to make use of this water rather than spending a lot of time and effort in its manual collection, especially if the water is to be used for green spaces far from buildings.	I think that proposed prototype is better than manual collection of AC water for city greenery irrigation	Opinion about proposed system on biophysical impact
External AC systems are useful because they provide an alternative water source like the one produced by desalination and other treatment technologies used in the gulf, for example, but at a much lower cost, which would prevent us from being trapped in water scarcity problems in the future because the weather is becoming too hot and dry.	I think that external AC water systems provide alternative water source that is cheap and that would prevent future water scarcity	Opinion about proposed system on biophysical impact
I think that the project is too beneficial and does not have disadvantages but that the economic situation in the country does	I think that the main problem of the proposed project is that people	Opinion about proposed system on cost

not help in its implementation. Everything is getting too expensive nowadays and people are not able to afford the smallest of their needs. No matter how much the amount to be paid for this system is, I expect that most residents will not pay for it because they have more important things to buy or pay for.	will not pay for it due to the difficult economic situation in the country	
I am not willing to pay for this AC water system currently because I believe that I need to save some money as the situation is really bad in the country and is getting worse with time. If the situation gets better one day, I would pay if at least half of my neighbors do.	I am not willing to pay for the AC water system unless the situation in the country gets better and at least half of my neighbors pay	Opinion about proposed system on cost
I think that if these AC water systems were financed by private companies or government, and if adequate awareness campaigns were undertaken, this could become a widespread practice in the city and the country, but I do not think that anyone would finance the project in these harsh days unless they seek external grants dedicated only for this project.	I think that retrofitting AC water systems could become widespread if financing and awareness campaigns were provided, but I doubt that anyone would finance it due to the bad economic situation in the country unless external grants were received	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
If financial assistance was granted for AC water systems, the responsible entity should monitor and make sure that the grants were used solely for the installation of external AC water systems and not for anything else.	I think that monitoring is needed to ensure that the grants are used only for system installation and maintenance	Opinion about proposed system on stakeholders involvement
The retrofitting of buildings with external AC water systems would not only provide water for irrigation, but the municipality could also reuse some of this water to fill the reservoirs of the households that do not receive water due to poverty, water scarcity or water mismanagement.	I think that retrofitting AC water systems provides water for both irrigation and filling reservoirs of households that lack water	Opinion about proposed system on biophysical impact
We should keep in mind that this kind of projects (AC water systems retrofitting) needs equal commitment by both residents and the municipality, and that it would fail if one of these parties lag behind in their responsibilities, especially for example, if the municipality does not	I believe that proposed project needs equal commitment by residents and municipality to happen	Opinion about proposed system on stakeholders involvement

abide by water collection or does not use the water for its intended purposes.		

II. Focus Group discussions

Sentence	Idea	Theme
When we installed the AC units in our household, we directly branched them to built-in interior pipes directed into the sewage system	We do not use AC water; it goes to the sewage network	Use of AC water
In the reception of our building, there are AC units for the first floor and for the shops. The concierge collects the water from these ACs and sometimes he uses them for the irrigation of the small garden that we have in front of our building. However, most of the times he does not use this water and he throws it on the floor only. Sometimes also, residents from the building take some of these gallons to fill their car engines, or for the wipers.	Concierge collects AC water from first floor shops in gallons and throws it or occasionally uses it for building garden irrigation; residents use some of these gallons for car battery and wipers sometimes	Use of AC water - Collection of AC water
Nobody in relatively new buildings reuses this water. All the buildings now have a built-in drainage system for this water that directs it into the sewage system. Nobody collects this water like in old days.	Residents of new buildings do not reuse AC water because they have internal drainage systems for it to sewage network	Use of AC water
In this house, for example, this AC unit, if you can notice, has an interior pipe that goes into the sewage system.	AC unit in my house drains to the sewage network	Use of AC water
In the house, we do not have any AC units not branched to sewage network drains. But in the building, we do, but only in households located on the first floor as we told you because the water drains to the sewage system from there. They do not need interior piping system.	All AC units in our house are connected to internal sewage network drains; only first floor of building has unbranched AC units	Use of AC water
The people who constructed this building did this internal system from the start. But if we were to give a simple example, our neighbor on the 8th floor installed his AC units recently. His water spills into the street. In summer, when we enter the car parking, our cars get wet from the water of this AC units.	Internal system for AC units installed during building construction, but our neighbor has his recently installed AC unit unbranched and leaking to street	Use of AC water

We cannot reuse this water because we do not have a visible pipe that we can remove and put in a gallon due to the built-in piping system already available in our building. The idea that this water could be reused is not present in our mindset.	We do not have the option to use AC water because of internal system and lack of awareness	Challenges for use
Unfortunately, we cannot reuse it. However, there are so many people that use it. Some of them use it for irrigation, others, for the car engine and wipers.	I know that many people use AC water for irrigation and car battery/wipers	Use of AC water
I used to collect this water and reuse it for the irrigation of my household plants in my old house. Sometimes, I also used to put a huge bucket and my baby grandson used to play and swim in this water. It is very clean water.	I used to use this water for plants in my old house or let my grandson play swim and play with it because it is clean	Use of AC water - Knowledge of AC water quality / quantity
If we did not have a piping system in the building, I would honestly put the pipe in water gallons, and I would reuse it for plants and for the car.	I would collect this water in gallons and reuse it for plants and car if no piping system	Knowledge of AC water quality / quantity - Challenges for use
I previously resided in Beirut for a small period of time. If you asked me about that when I was there, I would recommend another idea. In Beirut, there is no water. You can come from the gym to take shower; you will not find water. And if you want water, you will have to pay around 100$ for them to come and fill the reservoir with dirty water. If one would think about the recycling of this water, it is a good idea to collect it and reuse it for personal hygiene and for other household practices.	I previously lived in Beirut where water is scarce and too expensive; if I was in Beirut, I recommend using this water for personal hygiene and other domestic purposes to mitigate water scarcity	Suggestion for use – Drivers for use
I guess that this water does not need recycling, or treatment, I mean. Am I right?	I think that AC water does not need treatment	Knowledge of AC water quality / quantity
It is actually clean water.	I believe that AC water is clean	Knowledge of AC water quality / quantity
But we cannot drink it.	I believe that AC water is not potable	Knowledge of AC water quality / quantity

No, as far as I know, it is not potable because it does not contain minerals. It does not contain potassium, sodium calcium; it is water that comes from the humidity in the air.	I know that AC water is not potable because it is free of minerals as it comes from humidity	Knowledge of AC water quality / quantity
Yes, definitely. I know that this water is not healthy for our bodies if we drink it, and maybe it is not harmful. It is just not beneficial to drink. However, it is healthy and safe to use it for any other purposes like irrigation, car engine, wipers.	I believe that AC water is not beneficial to drink but is safe to use for irrigation, car battery and wipers	Knowledge of AC water quality / quantity
Also, if sometimes or someday you did not receive water at home, you can wash the dishes with it because it is clean. You can use it for anything, except drinking or cooking.	AC water can be used for dishwashing if no water at home but not for drinking or cooking	Knowledge of AC water quality / quantity
The only problem of this water is that it does not contain minerals; not more than that.	I believe that the only problem of AC water is that it is free of minerals	Knowledge of AC water quality / quantity
It is water, at the end of the day. It can be used to water plants, but it does not contain minerals. It could be supplemented with minerals for plants maybe.	I believe that AC water is not good for plants because it is free of minerals/ needs to be supplemented for irrigation	Knowledge of AC water quality / quantity
From my experience when I used to use it for plants, it did not cause any problems. On the contrary, I used to feel that plants are growing faster and healthier.	I used to feel that plants are growing faster and healthier when I used it on plants before	Use of AC water - Knowledge of AC water quality / quantity
I do not know honestly; it may be beneficial for plants if you are saying that it did not cause you any problems. I hear from people that they usually and mostly use it for the car wipers, for the engine, for ironing.	I do not know if AC water is good for plants/ I know that it is good for ironing and car battery/wipers	Knowledge of AC water quality / quantity
Yes, it can be used for ironing and car battery/wipers because it does not contain any lime residues that could cause us problems like the tap water we receive. It does not contain calcium, sodium, potassium, etc. It could be used for things that does not cause any chemical reactions like the ones my neighbor stated.	I believe that AC water can be used for machines (iron and car) because it is free of lime residues	Knowledge of AC water quality / quantity

Definitely, it is a very clean source of water. In Lebanon, we are known that our water is too calcareous, and 90% of the problems that happen in our house appliances are usually caused by these problems. This is why the iron lasts no longer than one year. Sometimes also when ironing, it spills a white residue on clothes, which is the lime present in the water. For this purpose, for example, today in the morning, I asked the concierge to get me a water gallon from the ones he usually collects every day, and I filled the car engine and the wipers. I also asked him to fill a bottle for me to put it in the ironing machine to prevent its damage with time. Therefore, I think it can be used for all purposes, except drinking and cooking. I have no idea, actually, if this water is potable.	I use AC water from gallons collected by concierge for car battery/wipers and iron, but I do not know if it is potable	Use of AC water - Collection of AC water - Knowledge of AC water quality / quantity
For the amount of AC water that could be generated per day, I think that we should consider two factors: humidity and temperature.	I believe that the daily quantity of AC water depends on humidity and temperature	Knowledge of AC water quality / quantity
Yes, it is the humidity that affects the generation of this water. I think that the higher the humidity, the higher the amount of water that could be generated.	I believe that the quantity of AC water increases with rise in humidity	Knowledge of AC water quality / quantity
From my observations of the gallons that the concierge collects, I perceive that every day, if AC units operate around 10-12 hours, given the electricity cuts in the city, it generates around 8-9 liters of water (one gallon). For example, one day I asked the concierge to give me a gallon of condensate water, he told me that he already threw them. I told him to fill a new gallon. The next day, he gave me a full 10 liters gallon.	I believe that an AC unit generates around 8-10 liters of water when operated for 10-12 hours daily	Knowledge of AC water quality / quantity
As I used to collect this water and use it for irrigation, I observed that a huge bucket of about 30-40 liters becomes full within two days, if operated around 10 hours per day.	I observed that an AC unit generates 30-40 liters in two days if operated around 10 hours per day	Knowledge of AC water quality / quantity
Yes, I think that every hour it generates one liter or a bit less.	I think that an AC generates one liter or a bit less every hour	Knowledge of AC water quality / quantity

if all buildings do a built-in system whereby this water is collected and directed to a reservoir separate than the one we use in the building, it would be a great idea actually. It just came into my mind. Outside Lebanon, I think that people think about that. If such an idea gets promoted, governments should mandate every person who wants to construct a building to install such a system.	I think that installing a system that directs AC water into a separate reservoir in building is a good idea and should be mandated for buildings to be constructed	Suggestion for use
If AC water directed to separate reservoir in building, it could also be considered as gray water. It can be used for washing dishes, toilet flushing, washing clothes, showering, personal hygiene, etc.	I think that AC water could be used as gray water for washing dishes, toilet flushing, washing clothes, showering, personal hygiene, etc if put in separate reservoir	Suggestion for use - Knowledge of AC water quality / quantity
I think there are some people that do not psychologically accept to use this water for washing dishes or for showering, for example.	I think that some people do not psychologically accept to use AC water for dishwashing or showering	Knowledge of AC water quality / quantity
Why not accept to use it for dishwashing or showering? It is very clean water.	I think that AC water is safe to use for showering and dishwashing	Knowledge of AC water quality / quantity
I do not know. I hear some people say that its color is grey, and therefore has a lot of dust and dirt in it.	I hear people say that AC water has a grey color and dust and dirt in it	Knowledge of AC water quality / quantity
It is not true that AC water contains dust and dirt. It is very clean and pure.	I believe that AC water is clean and pure	Knowledge of AC water quality / quantity
The problem is that people do not know and are not aware. They put a worn out gallon that itself is so dirty and has a grey color, and they collect the water with it, and then they say that the water is polluted. You know, it is actually an idea to reuse this water also for showering. Nobody knows the value of water except for the people who lived in Beirut for a certain period.	I believe that people are not aware of AC water quality and that its grey color comes from worn out and dirty gallons that they use for its collection	Knowledge of AC water quality / quantity
In Beirut, new buildings have the system that we have in our building, but all the water is directed to the sewage system. In relatively old buildings that cover most of	New buildings in Beirut have internal system for AC water to sewage network but old buildings	Use of AC water

Beirut, however, the water spills into the street.	have random AC pipes spilling to street	
Yes, in Tripoli also water pipes leak to streets. Actually, here automatically the worker who installs the AC because he is so smart, he branches the AC into a pipe directed to the sewage system.	In buildings of Tripoli ACs are branched to sewage network by worker or leak to streets	Use of AC water
In 2006, I guess, I went to Kuwait. We were sports teams from various countries, each team was assigned a particular compound to stay in. I remember that in the compound we stayed in, each room had a window and had a pot containing plants in front of it. I noticed that they branched the water from the AC on the window into a pipe that leads the water into the plants of each window. They consider that they do not have enough water. They also consider that it is maybe not practical to irrigate plants manually.	I noticed that in Kuwait compounds, they branch the water from the AC on the window into a pipe that empties the water on the plants of each window because they are aware of water scarcity and difficulty of manual irrigation	Use of AC water
Yes, I think that there are many countries that are starting to implement such practices, especially those of the gulf because they do not have enough water I believe.	I think that many countries, especially in the gulf, are doing strategies for AC water reuse	Use of AC water
If I were to reuse AC water, I would do a separate reservoir for my own in my house where all the water from ACs is collected. I would reuse this water for purposes like toilet flushing, showering, personal hygiene, washing dishes, washing machine, cleaning, etc. The only problem of this technique is that the AC is located on a level that is high and the water is going down. The water needs to be collected on a high level too.	I propose installing a system that directs AC water into separate reservoir to reuse it in my house for domestic purposes, but this is not possible because AC water should be collected on a high level too	Suggestion for use - Challenges for use
It is not impossible, but the main problem of this idea is that the civil engineer needs to design and find a way to collect all the pipes of ACs in the house to one reservoir. If this is to happen, I would cost an additional sum for the constructor, therefore, he would not do it. I am saying that because usually, if you request the smallest of things from constructors, they will take ages to respond. Therefore, to do a system that collects all the pipes in one place and	I think that internal system directing water back to households is possible, but constructors will not install it because its costly	Suggestion for use - Challenges for use

direct the water into a reservoir and use this water in the building, it would cost, therefore, nobody will do it.		
Actually, if we had the option, we would collect the water in gallons. It is not that hard. I used to do it. It is not hard to empty the gallon once per day.	I am willing to collect AC water in gallons if I had the option because it is not hard to empty gallon once per day	Use of AC water - Drivers for use
I would not collect gallons manually honestly. It is difficult and I do not like the view of the gallon on the balcony. I feel that its aesthetics are not nice. Also, for example, I might forget to empty the gallon, or I might not have time for that. I do not want to put myself at a risk that my AC will spill water into the inside of the room if the gallon becomes full.	I am not willing to collect AC water in gallons because it is not aesthetic, it is time-consuming, and difficult/ I am afraid of balcony flooding or AC spilling to the inside if I forgot to empty gallon	Challenges for use
we get our water from a well dedicated mainly to our building. Sometimes, we suffer from the problem of water scarcity because the wells become dry when the weather is too hot. During this summer, we suffered from this problem for several days.	We suffer from well water scarcity several days in summer as wells become dry when it is too hot	Drivers for use
I think that if AC water was available to us, it would have definitely solved the issue of well water scarcity in summer. Actually, when I see the concierge holding the water pipe and irrigating our building's garden randomly or wasting huge amounts of water when cleaning the floor, I get really annoyed.	I think that AC water reuse solves well water scarcity in summer and wasting water by concierge is not acceptable	Drivers for use
Definitely. Wasting water cannot be done in Lebanon nowadays. Today we have water, but tomorrow we might not have it.	I think that wasting water is not acceptable	Drivers for use
something even worse happens. When he is cleaning the floor, it seems that residents call him, so he leaves the pipe open and the water draining on the sidewalk. He goes for about 30 mins to one hour without closing the water. This is unacceptable. I always warn him about this issue.	I always warn the concierge of wasting water while cleaning because it is not acceptable	Drivers for use
The idea is that we need a system and a reservoir. You know, I used to leave Beirut at midnight and come to Tripoli just to take a shower. There is no water.	We need a system and a reservoir to use AC water in household	Suggestion for use

I guess that water scarcity is now starting to happen and spread in Tripoli. I was also shocked last time as I knew that there are some people who pay huge amounts money for water.	I think that water scarcity is beginning in Tripoli and I was surprised that some people pay a lot for water	Drivers for use
Yes, of course. Many people pay for water because they do not have groundwater wells. They pay the same sum, regardless of the amount they consume. I believe that this is what demotivates residents to use AC water.	I know that many people pay for water because they do not have wells, but they pay same sum no matter how much they consume, and this demotivates them to save water	Challenges for use
If we were obliged to pay for the amount of water we consume, then we would definitely collect the water from ACs, no matter how difficult the practice is.	We would reuse AC water manually if metered system imposed	Suggestion for use
The problem in Lebanon is that people take water for granted. Nobody cares. They think that Lebanon is the country of water. However, you need to go to Beirut and see how much the water is expensive. In Beirut, even if you buy the most expensive apartment, you still suffer from water shortage. I think that now they are starting to consider water recycling as a promising way to get more water. Many of my friends built villas in their towns and villages, they installed recycling systems to reuse the water as graywater. For example, they collected the water from AC units and also they installed rainwater harvesting corridors on the roof that all drain the water into a reservoir for collection and redirects it back to their households to use it as gray water. They took into account that there will come a time in Lebanon where we will not have water, so why not make use of the water that is usually wasted?	I believe that people in Lebanon take water for granted, but water scarcity is happening in Beirut and my engineer friends started to recycle AC water; they installed internal systems with reservoirs on roof for AC water reuse as gray water in villas they built in their towns and villages	Drivers for use - Suggestion for use
True. I heard that even in our neighborhood, water will be very scarce in the coming years. Also, I remember really well, when we bought this house, people used to tell us why did you buy a house in this area? There are a lot of water scarcity problems there. They told me that the water available in this area is not sufficient for the amount of people	I hear that water will be scarce in our neighborhood in the future and that the water in this area is not sufficient for the amount of people residing here and we are starting to feel that now	Drivers for use

residing here. We are starting to feel that now. There are a lot of new buildings being constructed near us now, and there is a huge consumption of water resources.		
Sometimes the water we receive is too salty.	We receive well water that is too salty sometimes	Drivers for use
Two days ago, the water was too salty. I noticed that when we washed our hands, you can see small white dust on them after they are dry. You can also feel that while showering. We are close to the sea.	I noticed that water was too salty two days ago while washing hands and showering because we are close to the sea	Drivers for use
Even sometimes, when we are showering, our eyes get irritated from the salt in the water.	Our eyes get irritated from salty water sometimes	Drivers for use
Look at my eyes today, they are too red because the water turned out salty when I showered. The water is too salty sometimes.	My eyes today are red because I showered with salty water	Drivers for use
benefiting from AC water at the level of the building, neighborhood, and city is a project in itself, which calls for raising awareness, especially that of the concierges of buildings. The first thing that must be done is to educate them on the importance of not wasting water, and of collecting the water from the AC units of households and use it for the irrigation of green spaces near the building. But for a Lebanese citizen to put a new system in his household to collect the water, I think that this is too far from reality and could even be impossible.	I think that raising awareness on the importance of saving water and reusing AC water for irrigation is essential at the level of city but citizens will not implement systems in their houses to collect AC water	Opinion about proposed system on stakeholders involvement
I think that collecting and reusing this water requires new buildings. The problem is actually the mentality of the people in our city as well as in the entire country. When a person removes his trash and puts it in front of the house of his neighbor, and then tells you my home is clean, you actually know how unaware and negligent the residents of our city are. How can we tell someone who thinks this way to participate in collecting this water?	I think that reusing AC water requires systems to be already present in new buildings because people are not environmentally aware	Opinion about proposed system on stakeholders involvement
A project of AC water recycling and reuse, like the one proposed, is extremely important, but it obviously needs to start from a new mentality and new	I think that the proposed project is important but needs awareness campaigns to change the	Opinion about proposed system on

perspectives. It is important to raise awareness among the people that rather than wasting this water, it could be reused for many purposes.	mentality of people and inform them that AC water can be reused	stakeholders involvement
Residents could give it to the concierge, and he irrigates with it or empty it in a reservoir dedicated solely for this purpose.	I think that residents can give AC water to concierge for irrigation or for being emptied in a dedicated reservoir	Suggestion for use
Another idea is that the concierge can take water gallons from the households and empty them in the reservoirs present on the roof of the building, for example. However, this requires training the concierge on the benefits of such practice and its importance for the building, the gardens, and the entire city. Rather than throwing the water on the floor, why not throwing it in the reservoir for later reuse? He could fill up to 30% of the reservoir from water that is neither coming from the government, nor from the groundwater well. Or, you could tell the concierge, instead of wasting this water, use it for the irrigation of our building's garden, or the median in front of our building. It is unfortunate that he usually throws the water of the ACs and uses the tap water pipe to irrigate the plants.	I think that the concierge can also empty this water in the reservoirs of households or use it for irrigation instead of throwing it on the floor	Suggestion for use
Another important idea is that there should be a law in urban planning that mandates new buildings to do interior built-in piping systems for condensate water and collect it in a reservoir for future use. In existing buildings, I think that the prototype is possible but not feasible because it costs money. Who would pay for that?	I propose imposing a law mandating new buildings to do built-in pipes for AC water/ prototype possible in buildings but not feasible because it is costly	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
Personally, I really wish that we could do a system like the prototype in our building to be able of benefiting from this water.	I wish that we have a system like the prototype to benefit from AC water	Opinion about proposed system on biophysical impact

Residents should understand the importance of this proposed project to be able to implement it.	I think that residents should be aware of importance of project for it to happen	Opinion about proposed system on stakeholders involvement
The main problem of the proposed project is that we are living in Lebanon, and every Lebanese does not accept that anyone instructs him on what he should do.	I think that the main problem of project is the mentality of Lebanese people	Opinion about proposed system on stakeholders involvement
The one and only obstacle is the proposed project is the cost of the system. There are a lot of people that will not pay for that. For example, in our building, we have a big problem that the entrance of our building needs to be fixed from about two years, as it does not close, and we have many households that are refusing to pay. Until now, we were not able to fix that door. This is an example of what happens with the simplest things that need to be done.	I think that the proposed system is costly, and neighbors will refuse to pay as usual	Opinion about proposed system on cost
We have two to three households in our buildings that usually do not accept paying for anything. You will also find that in every building in Tripoli.	We have 2-3 households that do not pay for anything and this is the case in all buildings in Tripoli	Opinion about proposed system on cost
Adding to that, many residents will perceive that such a project is useless and that it is a waste of money and time. They need to be convinced about its benefits, and that it is worth paying for, or else we will not get anywhere with this idea.	I think that residents need to be convinced about the benefits of system and that it is worth paying for because they might find it useless	Opinion about proposed system on stakeholders involvement
There is another problem which is that people here are convinced that central AC systems are not beneficial, although the entire world lives on central cooling and heating systems. If you had central AC units, you will have only one pipe that should be directed to a reservoir per household. If you want to do that with the current split AC units, you have to enter into the design phase of the buildings and coordinate with engineers. Moreover, the municipality should mandate the new	I think that the installation of this system is easier if central AC was available; it should be mandated on new buildings in case of split units	Opinion about proposed system on biophysical impact

buildings to incorporate a system for AC condensate collection.		
Actually, I think this system does not have problems other than financing and lack of awareness among residents. It does not harm the aesthetics of the building, especially that AC units are usually installed on the invisible façade of the building. In this façade, there are a lot of electrical cables, sewage system facilities, satellite installations, and all these essential things. It does not affect the aesthetic of the buildings at all.	I believe that the only problems of the proposed system are financing and lack of awareness; it does not affect building appearance because installed on inferior façade of building	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement - Opinion about proposed system on biophysical impact
Design-wise, I think that the proposed system is very practical. It actually fixes the appearance of AC units on the building and prevents the appearance of unbranched water pipes and water spilling on the walls of buildings.	I think that the proposed system fixes building appearance and water leakage on walls	Opinion about proposed system on biophysical impact
I will give you an example. In front of our house, there is a building that was built two years ago. Its owner dedicated a part of the roof especially for AC units, whereby all the water is collected into pipes and also directed into the sewage system.	I know that a building near us installed all AC units on roof and directed their water to the sewage network	Suggestion for use
But I think this is not effective because, first of all, the resident of the last floor will object having all the ACs on the roof, and second, because If the AC is too far away from the room to be cooled, its cooling capacity will be significantly reduced.	I think that it is not feasible to put all AC units on roof because last floor residents will object and ACs will not cool well if far from rooms	Challenges for use
The locations of the AC units in households could be fixed in a way that allows them to be all concentrated on one or two façades; it is not a problem.	I think that AC units of households could be concentrated on 1 or 2 building facades	Opinion about proposed system on biophysical impact
In my opinion, there should be an incentive to motivate people to install such a system. For example, buildings	I think that residents should be provided with monetary incentives such	Opinion about proposed

who volunteer to install an AC condensate recovery system could be awarded with a 20% reduction on the municipality tax that they usually collect for the sidewalks and sewage system. In this case, residents of buildings could be motivated to do it. It is a win-win situation. I will be reducing the sum that I need to pay for the municipality and made something in my building that will ameliorate its aesthetics and the aesthetics of the city through more and better green spaces. We have a major problem which is the irresponsibility of the municipality and the residents, which means that if the municipality mandated that without providing anything in return, it can never happen.	as a municipality tax reduction to motivate them to install proposed system/ if municipality mandated system without incentives it cannot happen	system on cost - Opinion about proposed system on stakeholders involvement
However, we should not forget that most people, including us, I believe, do not have trust in the municipality. A very simple example of their negligence is the irrigation system made for the medians in Dam w Farez streets. It is a total mess.	We do not trust the municipality; it is irresponsible	Opinion about proposed system on stakeholders involvement
The idea is feasible; but the logistics of it are a bit annoying. If the municipality puts a weekly schedule for the collection of water from reservoirs, we cannot trust that it will do that effectively. What if the reservoir was full and the municipality did not come to empty it? It can cause serious problems.	We believe that the idea is possible but we do not trust that the municipality will abide by schedule of water collection	Opinion about proposed system on stakeholders involvement
I also think that such a project cannot be done in a big city. It requires a lot of effort. A good idea, however, is to implement it on a small area. This area could be a sample or a pilot project that all citizens can see and learn from. Let us assume that we took our street, and that this system was implemented in all the buildings here, people will become more aware of the benefits that such a system procured on the level of the neighborhood. This would encourage other areas to start mimicking these projects. But I believe that the municipality will not be effective in this regard. The municipality does not have	I think that this project should be implemented on a small area as a pilot project to encourage citizens to see, learn and start mimicking the project, but not by the municipality because it lacks expertise regarding this topic	Opinion about proposed system on stakeholders involvement

any employee that is knowledgeable about this topic to explain it to people. It lacks a lot of expertise.		
In this project, there are two separate tasks. The collection of the water by the residents, and the recuperation. If residents were told to collect this water in reservoirs and the municipality will come once or twice per week for recuperation, and it actually abides by the schedule, there is no problem. But, I doubt that the municipality abides by that.	I think that the strategy is possible if municipality abides by water collection, but this is unlikely	Opinion about proposed system on stakeholders involvement
For me, I think that in this case, it is more beneficial that I collect the water and I use it for my house. Why would I bother collecting it for the municipality if I do not trust that they will recuperate it? If there was trust in the municipality, I definitely would have given them the water. On the other hand, if an NGO comes and tells me that they want to implement that system and collect this water for irrigation, I will give them the water because I trust NGOs. The water would go for the amelioration of the public gardens, and will allow me to go to these spaces and enjoy their beauty.	I prefer directing the water back to my household or that an NGO be responsible of water collection because I trust that NGOs will collect water in a timely manner and use it for the amelioration of gardens in the city	Opinion about proposed system on stakeholders involvement
I think that if in one building, 50% of people do it only, it is a success rate in Lebanon. This is because the major problem in Lebanon is that the municipality does not want to work, and people are too busy, and people do not have trust in the municipality, and people are negligent, and people are mean, and people do not care, and people want to nag. The problem in Lebanon is mainly our mentality. Nobody wants to make an effort. Neither the people, nor the government.	I think that it is good if only half of each building residents do it because the problem is that both residents and municipality blame each other always, and both two parties do not want to make any effort for the environment	Opinion about proposed system on stakeholders involvement
I will tell you a very small example. I am the president of the building's council. I made a schedule for waste collection for the concierge. I told him to pick up the waste from households at 9:30 am, 4:30 pm, and 11 pm. The shifts are assigned in a way that does not allow keeping any waste bags in the building. Some	In our building, residents are negligent, and they do not abide by the waste collection schedule set for the concierge and then blame him for not collecting the waste properly	Opinion about proposed system on stakeholders involvement

residents, for example, do not abide by this timing, and put their waste outside at 12 for example. They call me and say that the concierge did not pick up the waste. It is not true; he passed by but did not find anything. It the residents who do not abide not the concierge. This is a simple example of the irresponsibility of residents.		
Our main problem in Lebanon is our culture. There are a lot of sustainable solutions to our problems, but people have a history of negligence and irresponsibility that impede every effort aiming at sustainability. You know if this project was done in Syria, it would have succeeded. In Jordan, they would die for a project like that. They would even give you money to design it and help them in its implementation. But here in Lebanon, I doubt that it could happen.	I doubt that project could happen because I believe that the irresponsibility of Lebanese people impede sustainability efforts/ project too successful in other countries like Syria and Jordan	Opinion about proposed system on stakeholders involvement
Project can happen in new buildings. Even in existing buildings, it could be done while they are renovating the building, for example. If you go to Azmi street. There are a lot of people there who are undertaking renovation work for their buildings. They could install this system very easily.	I think that the proposed system can be easily installed while renovating buildings	Opinion about proposed system on biophysical impact
There is a renowned engineer in Tripoli who is building a super deluxe building in our street. Someone needs to talk to him and tell him install this system in your building and then when you want to sell the houses, mention that you are an eco-friendly, sustainable building, and Green. He will not be convinced because he will perceive that this is only a waste of money.	Engineer of new buildings will not accept to install this system to make his building eco-friendly because he will believe that it is a waste of money	Opinion about proposed system on cost
The problem is that we do not have certification programs for green buildings in Lebanon, as far as I know.	I know that there are no certification programs for green buildings in Lebanon	Opinion about proposed system on stakeholders involvement
Actually, there are certification programs for new buildings, but they are not widely implemented on the ground. It is not a	I know that there are certification programs for	Opinion about proposed

policy, but, I know from my engineer friends who are green engineers. They always try to incorporate green technologies into their buildings.	green buildings but are not implemented adequately	system on stakeholders involvement
I believe that it could actually be done in the buildings being constructed nowadays. Building owners are selling houses at very expensive prices, it would not matter for them if they increased the price of each house 100-200$. However, it needs the acceptance and willingness of the constructor to implement this system.	I believe that interior piping system for AC water can be done in new buildings and engineers could minimally increase price of houses for this purpose	Opinion about proposed system on biophysical impact - Opinion about proposed system on cost
I think that now, in new buildings, they are all doing the interior piping system for ACs, but unfortunately, they are directing the water into the sewage system, not a reservoir for collection.	I think that interior piping system is being implemented in all new buildings nowadays but direct water to sewage network	Opinion about proposed system on biophysical impact
Even when they are renovating buildings, they are installing these piping systems to ameliorate the aesthetics of the building and prevent water from spilling on the walls. This is because the renovation works are already underway, it would not matter for residents if they installed piping as an additional feature.	I think that interior systems are being implemented in some buildings' renovation	Opinion about proposed system on biophysical impact
The only problem of the proposed system is its cost, as we told you previously. Here comes the role of the municipality to provide incentives for residents. For example, in my building, I pay 390,000L.L for the municipality per year. If they come and tell me, do this system, and we will charge you 340,000L.L rather than 390,000L.L, I would definitely do it. It is true that this 50,000L.L is nothing for the municipality, but when, as a resident, I find that they have reduced my bills, I will be encouraged and motivated.	I think that the only problem of proposed system is its cost and the municipality needs to provide monetary incentives for residents such as tax reduction	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
We should also bear in mind that this is a once in a lifetime project, meaning that it will not cost you anything except the initial cost paid at the beginning. It might	I think that the proposed project will not cost much; need for residents to pay only for installation and minor maintenance	Opinion about proposed system on cost

need some maintenance later on but this is minor.		
I am actually curious to know how much water could be generated from our building. Let us do a simple calculation. In this building, we have 20 apartments. If we say that every apartment has at least 3 AC units, and each AC generates, as we said, around 8-9 liters every 12 hours, then it would generate around 480 liters of water per day. WAW! This is a huge amount, I did not expect that, honestly. The reservoirs installed on the roof of the building are actually 2000 liters and 4000 liters, meaning that if this system was installed, and if we did not have water in the entire city in summer, you will still have water.	I am surprised that AC units in one building could generate a lot of water; it can mitigate potential water scarcity in summer	Knowledge of AC water quality / quantity
In our street, also, the municipality has put water reservoirs in the middle of the median to irrigate the plants there, but it did not fill them with water. for example, every building could take its water and empty it in these reservoirs, to have water that is ready for irrigation, rather than going to the water authority to fill the cistern with water that is meant to go to households instead. It is a smart solution, but for people to do it, the government needs to give them an incentive. Or it should be part of the design in new buildings. But, as I told, if it is to be done on existing buildings, it definitely needs a financial incentive, rewards, or tax cutbacks from the municipality.	It is also a good idea to empty the collected AC water of the building in empty median reservoirs or branching external pipes directly to median after giving financial incentive to residents	Opinion about proposed system on biophysical impact - Opinion about proposed system on cost
I am actually still shocked that it could generate that much water. I think that most people do not know that too.	I am still chocked that AC units generate too much water and most people do not know that	Knowledge of AC water quality / quantity
Yes, it can generate at least 400 liters of water. It could cover all the practices undertaken by the concierge as well as some of the practices undertaken by residents. It is an excellent supplemental source when water is scarce, and to save water for the future. It could fill around 20% of our reservoir!	I believe that AC units generate too much water and could cover all practices undertaken by concierge and some practices of residents when water is scarce	Knowledge of AC water quality / quantity

it is actually a very nice and important idea. I thought of it once, but instead of collecting the water in reservoir, why not branch the pipes directly to the green area? This allows the gardens to self-maintain themselves, rather than waiting for the municipality to come and irrigate them, which they do not do very often.	I thought of the idea of external piping system once but of branching it too green spaces directly rather than waiting for municipality to collect the water	Opinion about proposed system on stakeholders involvement
It is not very practical to branch the system to greenery directly because you will need to pave the entire street to put piping systems. It is too costly and requires a lot of work from the part of the municipality.	I think that it is difficult to branch external system to greenery directly because its costly and requires a lot of work from municipality	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
I actually meant the small gardens of buildings, although they are small. Maybe the water is a lot for these two gardens, therefore we can put a pump in the reservoir also to pump water into the entire building. We can use it for both irrigation and household practices.	I think that system can be branched to building garden and if water was too much, a pump could be put in reservoir to pump water to households	Opinion about proposed system on biophysical impact
We should also keep in mind that the reservoir will take some space from the parking. It is important to see whether residents are willing to sacrifice such a space. It has to be an integrated design that the municipality approves and try to implement it as a law on buildings with incentives, as we told you. It should be a part of urban planning laws.	I think that it is important to know if residents are willing to sacrifice place in parking for reservoir/ municipality should mandate this system and provide incentives	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
However, I do not know how effective making system mandatory will be because people do not abide by the smallest specification of buildings, such	I think that making external system mandatory might not be effective because people do not	Opinion about proposed system on

as the location of AC units on the façades, and so on	usually abide by building laws	stakeholders involvement
When there is no money in the municipality, they actually go and monitor these things to get people to pay penalties and fines.	Municipalities monitor law implementation only if they need money	Opinion about proposed system on stakeholders involvement
The proposed system ameliorates the aesthetics of building façades because it relocates ACs in an organized way and minimizes spilling.	I believe that the proposed system improves building aesthetics	Opinion about proposed system on biophysical impact
For me, after I knew how much water could ACs in my building generate, I would encourage reusing this water in the building because there is a problem of water scarcity that is coming very soon. I would not give it to the municipality because I do not trust that even if they take this water, they will use it for irrigation. I cannot guarantee that the employee will not go and throw it. I would give this water only if an NGO is tasked with the collection and irrigation.	I prefer pumping this water back to households instead of municipality because I do not trust that it will employ water correctly/ I would give the water only if NGO is tasked with collection and irrigation	Opinion about proposed system on stakeholders involvement
The head of the municipality does not trust himself; how can we trust him?	I think that we cannot trust the municipality because they do not trust themselves	Opinion about proposed system on stakeholders involvement
I would give the water to the NGO that deserves it and that I trust. I even do not have a problem giving the water for the irrigation of a garden that is too far away from my house, if I trust that the water will really go to the irrigation of this garden.	I prefer giving the water to a trusted NGO for the irrigation of any garden, even if far from my house	Opinion about proposed system on stakeholders involvement
Overall, this practice I think will ameliorate the city in terms of greenery and aesthetics, and will maybe solve the coming water scarcity problem, if we started saving from now. However, it definitely needs awareness campaigns and incentives for it to be a widely accepted and implemented practice.	The project will ameliorate greenery in city and prevent water scarcity but needs awareness campaigns and incentives	Opinion about proposed system on biophysical impact - Opinion about proposed

		system on stakeholders involvement - Opinion about proposed system on cost

Honestly, AC water drains into the sewage network.	We do not use AC water; it drains to sewage network	Use of AC water
Yes, we do the same. It is wasted, we do not use it for anything therefore we do not collect it.	We do not use AC water; it drains to sewage network	Use of AC water
We throw it, but we are supposed to use it for many purposes. We can use it for the iron, for example.	We do not use AC water although it can be used for many purposes like iron	Use of AC water
True, we used to use it for the iron.	We used to use AC water for the iron	Use of AC water
Yes, because it does not contain lime residues.	AC water good for iron because it does not contain lime residues	Knowledge of AC water quality / quantity
AC water does not contain lime residues. There was a time when my mom used to collect AC water for the hair of my sister. My sister has a hereditary disease that makes her hair fall. The doctor told her to either boil tap water to shower with it, or to use AC water instead. She used AC water, and her hair got really better, but she stopped because she found it really impractical to gather the water in gallons and take them for bathing. It is our laziness that prevents us from doing such things.	I believe that AC water is free of lime residues/ My sister used to use AC water to shower her hair because her hair falls and the doctor told her it is good for it but she stopped due to the difficulty of manual collection and reuse	Knowledge of AC water quality / quantity - Use of AC water - Challenges for use
I think that the doctor told her to use AC water because the tap water that we receive contains a lot of lime residues that are known to damage the hair.	AC water does not contain lime residues that damage the hair	Knowledge of AC water quality / quantity
All the components of our tap water, especially the minerals and lime residues, are damaging to our hair.	Lime residues and minerals in tap water damage our hair	Knowledge of AC water quality / quantity
Honestly, it is our laziness that prevents us from using this water	We are too lazy to collect and reuse AC water manually	Challenges for use

We do not use AC water maybe because it needs a lot of time to collect a considerable amount for us to use. It is not present whenever we need it.	We do not use AC water because it is not always present	Challenges for use
Yes, it is actually impractical to use it because we do not have a system that enables us to do so	We do not use AC water because we do not have a system for its reuse	Challenges for use
I once read that there was an Indian researcher doing a project in the Gulf, whereby he started collecting AC water, as in their region, they operate ACs all the time and they never put them off, and he started planting vegetation in his backyard, a thing which he could not do before because their weather is too hot and dry and no vegetation could possibly live without adequate watering. Due to AC water, his garden flourished significantly. People in his neighborhood were astonished by the idea.	I once read about an Indian researcher who irrigated his garden with AC water and his garden flourished which led all his neighbors to be astonished by the idea	Use of AC water
But isn't this water considered distilled? Isn't it free of minerals and nutrients essential for plants?	I think that AC water is distilled; it is free of minerals essential for plants	Knowledge of AC water quality / quantity
No, it does not contain minerals and nutrients. And most importantly, it does not contain salt. Therefore, it helps the soil rejuvenate and the plants flourish. People in his neighborhood were fascinated by the idea and they started replicating that in their own houses	I believe that AC water does not contain minerals, nutrients and salt, therefore, it is good for plants	Knowledge of AC water quality / quantity
I hear that some people also use it for washing their face, as well as hair with it, as I told you previously, but we honestly used to use it only for the iron and for the hair of my sister, not more.	We used to use AC water only for the iron and my sister's hair	Use of AC water
AC water is actually beneficial for the car engine and for the glass wipers because it is devoid of lime residues and consequently does not damage the interior constituents of the car, especially the small and narrow pipes that conduct water, but we actually do not use it in our house, although it is usable.	I believe that AC water is good for car battery/wipers as it is free of lime residues that damage pipes and machines, but we do not use it	Knowledge of AC water quality / quantity - Use of AC water

I used to collect this water in my office because honestly, and ironically, the pipes responsible for conducting water in the building were clogged. We used to collect it only to prevent it from spilling into the neighbor's house, not more than that. Every time the gallon is full, we used to empty it by throwing the water. There was a possibility to collect it, but we used to throw it because it is really difficult to transfer it for whatever purpose we want to use it for. It needs someone who is free to take care of this issue and collect the water every time he notices that the gallon is full, and so on.	I used to collect AC water in gallons in my office and then throw it because its manual collection and time-consuming	Use of AC water - Collection of AC water - Challenges for use
I agree. I do not use it too, although I know that I am supposed to use it for the iron, for example. Previously, I used to use it for the iron, now I stopped because I found that it is too difficult to collect it given the lack of an installed system in place. I am too lazy to do that.	I do not use AC water for the iron because we have no system for its reuse	Challenges for use
Actually, before we had less responsibilities, less work to do at home and less tasks, therefore we had some free time to devote to such issues. We had time, but now we do not. AC water reuse is an additional task; we are definitely better without it.	We had free time before to devote to similar issues but now we do not	Challenges for use
I do have time to collect AC water and reuse it, but I do not know, I am lazy.	I have time to collect AC water and reuse it but I am lazy	Challenges for use
I just remembered that my mom also used to use this water for the gardenia planted on her balcony. She used to water this plant with AC water and the plant used to flourish tremendously. It was so beautiful.	My mother used to use AC water for the irrigation of the gardenia on her balcony and it used to flourish well	Knowledge of AC water quality / quantity - Use of AC water
In case AC water is to be reused at home, we are only capable of collecting it in gallons or empty water bottles. However, in the case of a building, for example, building residents could agree within each other to install piping system for example that directs the water back into homes	I believe that building residents can benefit from this water through a piping system that directs water back to households or to a reservoir for collection	Suggestion for use

or collects it in a reservoir at the bottom of the building. They can then benefit from this water.		
I know that 15 hours of operation could generate around 8-10 liters of water per day. I used to have an AC unit that does not have a drainage system to connect to, therefore I was obliged to collect the water with either a bucket or a gallon. But I really used to worry a lot about it because I cannot forget the gallon and forget to empty it because it would spill water into the inside of the room if so. Every now and then I used to empty the gallon. It also depends on the humidity in the air. If there is a lot of humidity and the temperature is really high, the AC generates even more water	I believe that AC units generate around 8-10 liters per day and even more depending on humidity/ I used to worry about emptying the gallon and water spilling into the inside of rooms	Knowledge of AC water quality / quantity - Challenges for use
In my office, for example, I have noticed that the amount of water generated from AC units differs from one month to the other. In July and august, the humidity was really high, therefore the amount of water generated was high too. In one day, and as the AC operates for around 6 hours, it used to generate around 8-9 liters of water	I believe that the quantity of AC water varies between months as it increases with humidity; it generates around 8-9 liters per 6 hours of operation	Knowledge of AC water quality / quantity
Yes, exactly, it the humidity that helps in the generation of a larger amount of water.	I think that quantity of AC water depends on humidity	Knowledge of AC water quality / quantity
I know that we cannot drink AC water. It will not harm us if we drink it, but it will not benefit us as well. It is devoid of the minerals essential for us.	I believe that AC water is not potable because it does not contain minerals	Knowledge of AC water quality / quantity
I also hear that upon settling, and if this water stays for several days in the same container, it produces some kind of molds and mushrooms. I am not sure about that.	I hear that AC water produces molds and mushrooms if it stays a long time in the container	Knowledge of AC water quality / quantity
As I told you, we tried this water for the hair of my sister, for the gardenia, for the iron, and also we used to use it for cleaning the glass windows. This is because when we use tap water, the lime residues in it prevent the glass	We used to use AC water for the hair of my sister, iron, gardenia and window glass cleaning because it is free of lime residues	Knowledge of AC water quality / quantity

from shining perfectly. Therefore, we used to use this water instead.		
I know that we cannot drink this water because it affects the kidneys.	I believe that AC water is not potable because it affects kidneys	Knowledge of AC water quality / quantity
How is that? It is actually devoid in calcium, therefore, I think that its is good for the kidneys, no?	I believe that AC water is good for kidneys because it is free of calcium	Knowledge of AC water quality / quantity
It does not contain minerals. It is actually clean water.	I believe that AC water is clean because free of minerals	Knowledge of AC water quality / quantity
Kidneys usually function in such a manner as to purify the water that enters into our bodies. As we drink this water, and is it is devoid in the minerals that the kidney is meant to throw away, it leaves the kidney functionless.	I believe that AC water leaves kidneys functionless because they cannot filter the water as it is free of minerals	Knowledge of AC water quality / quantity
It is distilled water. It does not contain lime residues. It is hydrogenated water.	I believe that AC water is distilled and free of minerals	Knowledge of AC water quality / quantity
It is supposed to be clean water, however, I think that it is not because the pipes that it circulates in are not clean.	I believe that AC water is not clean due to the dirty pipes it passes through	Knowledge of AC water quality / quantity
Yes, definitely. This water contains the dust, microbes and cooking smell that is present in the house.	I believe that AC water has dust, microbes and cooking smell from the house	Knowledge of AC water quality / quantity
Scientifically speaking, I have no idea whether it is clean or not, but I suppose that it is, if and only if the piping system is clean.	I believe that AC water is clean if piping system is clean	Knowledge of AC water quality / quantity
This water is supposedly clean. However, we are saying that it might not be because the dust that enters into the AC units and penetrate into the pipes is also present in this water. As we notice, sometimes the pipe of an AC gets clogged with accumulated dust and it starts to spill from the inside. We do not use it or drink it because it is circulating into pipes that contain a lot of particles and dust. We	I believe that AC water is not clean and not potable because it passes through dirty pipes that have a lot of particles and dust	Knowledge of AC water quality / quantity

are also putting the tip of the pipe in a place that is dirty (i.e. the drain), therefore you will be disgusted to drink it.		
If we talk about the quality of this water, I would definitely wash my hands with it for example.	I would use AC water for washing my hands	Knowledge of AC water quality / quantity
Of course, if I see that AC water is not clean, I cannot bathe with it. I need to make sure that it is clean first.	I cannot bathe with AC water unless assured that it is clean	Knowledge of AC water quality / quantity
I cannot let it enter into my body without treatment. I am afraid.	I am afraid to ingest AC water before treatment	Knowledge of AC water quality / quantity
I honestly never heard of AC water until I started noticing my mom using it for the iron. Other than that, I did not know that it could be used for anything.	I did not hear about AC water until my mom started using it for the iron	Knowledge of AC water quality / quantity
I do not use it for the iron anymore because they told me that I can put vinegar with the water in the iron as it kills lime residues	I stopped using AC water for the iron as I am putting vinegar inside tap water	Use of AC water
All in all, we do not use this water not because it is not clean but because it is difficult to collect it and transport gallons every time we need water.	We know that AC water is clean, but we do not use it as its manual reuse is difficult	Knowledge of AC water quality / quantity - Challenges for use
If an expert tells us that the water is good for plants and other purposes, we would use it, why not?	We would use AC water for plants if assured of its safety	Knowledge of AC water quality / quantity - Suggestion for use
I would use it if an expert tells me that the water is good for plants and other purposes, but only if this expert proposes to me a way to collect this water, something similar to a system, because other than that, I will honestly not collect it. It is really difficult and time consuming.	I would use AC water for plants only if assured of its safety and if given an idea of a system for its reuse	Knowledge of AC water quality / quantity - Suggestion for use
It is actually not difficult to collect AC water and reuse it manually, but we are lazy.	I think that it is not difficult to reuse AC water manually but we are lazy	Challenges for use

If we had a system through which this water is gathered in a container and then recirculated back into our households, we would definitely use it	We would use AC water in the presence of a system directing it back to households	Suggestion for use
I have previously read that the water coming to households nowadays in Lebanon is becoming more and more salty. If this is the case, I prefer collecting this water, and even install a system, to reuse this water in an easy and accessible way.	I prefer reusing this water if I receive salty water in my house like many other houses in Lebanon now	Drivers for use
True. There is a problem in Lebanon that the water reaching households is turning out to be salty. It is still not the case in our building. Although this is still not the case here, we can install a system and reuse this water to prevent, or mitigate, the impacts of such a water.	Water reaching households in Lebanon is salty/ we can install a system for AC water reuse to prevent using damaging salty water	Suggestion for use- Drivers for use
In my house, I have three AC units that are branched to internal pipes inside the building that drain the water into the sewage system. This is because we want to prevent them from spilling into our neighbors, as there is no system in the building that allows us to collect this water in an acceptable way.	We have three AC units in our house that are branched to internal pipes to sewage network because we do not want them to spill into neighbors	Use of AC water
I would definitely reuse this water for irrigation because it is clean.	I would use AC water for irrigation because it is clean	Knowledge of AC water quality / quantity
I would reuse AC water for irrigation, why not? First of all, I am saving water and this is so beneficial for the environment, therefore, if someone puts a system for me for the collection of this water, yes I am willing to collect and reuse it for irrigation, as well as all the other purposes we stated earlier.	I am willing to use AC water for irrigation and other purposes to save water if a system was installed for its collection	Suggestion for use
If an expert tells me that the water is clean and could be used for irrigation, and that the lack of minerals in the water does not affect plants in a harmful way, I would use it for irrigation.	I am willing to use AC water for irrigation if assured about its safety for this purpose	Knowledge of AC water quality / quantity - Suggestion for use
I might do a mini-experiment in my house on a particular plant, and water	I might try AC water on one plant and if it was good for it,	Knowledge of AC water

it with AC water for a certain period of time and see what happens. If it contributed to the flourishing of the plant, I would therefore use it for all other plants on my balcony.	I will be willing to use it for irrigation	quality / quantity - Suggestion for use
I believe that reusing AC water for household purposes or irrigation this depends on the presence of a system for the collection of this water. If it was available, we will use it for many purposes, excluding drinking and cooking. But I would use it for dishwashing, for example.	I would use AC water for many purposes, except drinking and cooking, if a system for AC water collection was available	Knowledge of AC water quality / quantity - Suggestion for use
You will use it for washing dishes if you only consider the quality of the water, but not the dirty piping system in which it is circulating.	AC water is not clean for dishwashing due to dirty pipes	Knowledge of AC water quality / quantity
I would also use it for the washing machine	I would use AC water for the washing machine	Knowledge of AC water quality / quantity
Yes, definitely. It is useful to use it for the washing machine because it prevents its damage. But, I think that the quantity is not enough for this purpose.	I believe that AC water prevents the damage of the washing machine, but it is not enough for it	Knowledge of AC water quality / quantity
I think that the quantity of AC water is enough for the washing machine. As my neighbor said, if there was a system that collects this water in a container, the accumulated water from several ACs will be collected in one container, and we will have enough water for the washing machine. It is even a solution for the damage of washing machine that needs to be changed every 4-5 years because of the water that contains lime residues.	I believe that AC water is enough for the washing machine if there was a system that collects it in one container and directs it to this machine	Suggestion for use - Knowledge of AC water quality / quantity
The collection of this water is something hard in our households if the building is not already equipped with a system for the collection of AC water. To collect this water, you need to be at a level that is lower than that of the compressor of the washing machine or any other machine. So, how would you collect this water and then use it in something at a higher	I believe that it is hard to reuse AC water if buildings are not already equipped with AC water collection system	Challenges for use

level? This is a problem; it needs a huge installation system. You can definitely use this water for the washing machine, but practically you cannot if the building was not already equipped with such a system during the construction phase. It would definitely be feasible in new buildings, however.		
Reusing AC water for the washing machine is an idea if we are talking about the construction of new buildings. An installation system will be applied from the beginning and directed towards a container and a system that pushes the water back into households. Currently, we can use it to wash the floor or irrigate the household plants.	I think that it is an idea to branch AC water to washing machines during the construction phase of new buildings/ in existing buildings, we can use AC water for floor cleaning and household plants only	Suggestion for use
we can use AC water to clean the floor and irrigate household plants, but we will be prompted to collect this water and transfer it in gallons. You will be always worrying to check the gallon and to prevent spilling, and so on. It is difficult practically.	I believe that AC water reuse for floor cleaning and household plants is difficult	Challenges for use
I agree with you. You also need a place to put the full gallons.	No space for collected gallons	Challenges for use
Overall, if these is an easy way to collect this water and use it for irrigation, all of us would use it because we know that it is distilled water. It is clean and beneficial, and it is devoid from harmful components.	We are willing to use AC water for irrigation in the presence of a system because it is clean	Knowledge of AC water quality / quantity - Suggestion for use
AC water solves problems of toilet damage. I am sorry to say that, but lime residues with human waste in the toilet are two factors that interact and lead toilets to become yellow on the inside. If there was no lime residues in the water, this would not happen.	I believe that AC water prevents toilet damage as it is free of lime residues	Knowledge of AC water quality / quantity
when we have a new building being constructed, we would do a system for the collection of this water. For example, all washing machines within the same building could be placed in the same location and a piping system would be installed to collect this water.	I believe that collecting AC water in gallons is difficult and time-consuming and that it is better to install systems for AC water during the construction of buildings with a reservoir at the bottom	Challenges for use - Suggestion for use

A container would be placed at the bottom of the building which is connected to a tap. It could be redirected back to homes or could be used for other purposes. For example, if my car does not contain enough water, I would open the tap and get water from there for it. However, collecting this water in gallons is really difficult and time consuming.	of each building that allows us to reuse it	
It is undeniable that this additional source of water brings enough water and that it could be a partial solution for water scarcity in the future. It might reduce tap water consumption by 20-25%.	I believe that AC water reuse is a partial solution for water scarcity in city and might reduce tap water use by 25%	Drivers for use
I really prefer to use this water if most of the water we receive is polluted nowadays.	I prefer using AC water if water received is polluted	Drivers for use
ACs do not produce the quantity that can fulfill all your demands. There are many buildings in Tripoli that get their water from underground aquifers. Sometimes, these aquifers get dry for several days. This water, if present, cannot fulfill all the demands of these residents, but can help them do their essential tasks that require water.	I know that many people suffer from well dryness several days in summer but the quantity of AC water can only help them fulfill their essential water needs	Knowledge of AC water quality / quantity
I agree. It cannot fulfill all the demands of these residents but can help them do their essential tasks that require water. it could cover 20% of their water needs.	I agree that the quantity of AC water can only help residents fulfill their essential water needs	Knowledge of AC water quality / quantity
If each day, every household generates around 32 L of water per day, and if the water of all households was collected, the amount would be significant. The accumulated amount could fulfill the needs of the residents in the two to three days in which they do not receive water. Of course, they cannot bathe with it because this requires a lot of water, but they can wash their hands, and use it in the toilet for example.	I believe that the amount AC water from several households is significant and can fulfill the needs of residents for 2-3 days	Knowledge of AC water quality / quantity
If we had a metered system and we are paying for the amount of water we consume, we would definitely consider	We are willing to use AC water if metered water systems were adopted	Suggestion for use

using this water to lower our water consumption, and consequently the amount of money we are required to pay.		
Having a metered system motivates us to use AC water. However, if we are paying the same amount of money for whatever amount of water we consume, why would we even care?	We are willing to use AC water if metered water systems were adopted	Suggestion for use
This reminds me of other countries, like Europe. In France, for example, they are so careful about the amount of water they use and about not wasting water because they have a metered system that charges them for the amount of water they consume.	I know that in Europe, especially France, they do not waste water because they have metered systems	Suggestion for use
In my office, for example, I have a metered system on the generator and the electricity. I always check and make sure that there are no lights turned on in empty rooms and so on. This is exactly the same in the case of water.	I have a metered system in my office for electricity which motivates me to turn off lights	Suggestion for use
I think that the idea of installing an external system is very idealistic and needs someone who has the personal will to do it and someone who really cares about the environment.	I think that the proposed prototype is idealistic, and no one will do it because they do not care of the environment	Opinion about proposed system on stakeholders involvement
If we consider the neighborhood we live in, most of the buildings are constructed from around 20 years. They do not contain a system for AC water collection. You need to install one. It should either be a personal initiative, whereby each person collects gallons and use them for the watering of greenery, or you need an external piping system if all building residents are willing to install it, because it costs money. It is not an easy task to convince residents with that. But if they all agree, why not?	I think that it is not easy to convince building residents to pay for the system, but we are willing to do it if they pay	Opinion about proposed system on cost
I think that the municipality should be responsible for system installation. They should ask who wants, for example, to install such a system on their buildings. It could also be an	I think that the municipality or NGO should install these systems but until then it could be a personal/building initiative	Opinion about proposed system on stakeholders

initiative undertaken by NGOs, but I think that, at this level, it should be a personal or building initiative.		involvement - Opinion about proposed system on cost
In our building for example, if we take the invisible façade, we have around 8 AC units that could be branched to pipes and connected to a container. You would collect the water there and then contact the municipality and tell them, for example, that every four to five days we would have a full container of 1000-2000 liters that needs to be emptied. We can do that, it is not hard.	I believe that the proposed prototype could be done in our building; it is not technically hard	Opinion about proposed system on biophysical impact
I think that the proposed idea is not possible in our building because many residents will not pay, I guess.	I believe that the proposed system is not feasible in our building because most residents will not pay for it	Opinion about proposed system on cost
I guess you can say that this project could rather be implemented in new buildings. Like people take permits for car parking and other things in the building, this should be something mandated on new buildings by the municipality in order for it to be successful.	I think that the government needs to mandate AC water systems on new buildings rather than existing ones	Opinion about proposed system on stakeholders involvement
Yes, it should be mandatory. The government should mandate it for it to happen.	I think that the government should mandate AC water systems on buildings	Opinion about proposed system on stakeholders involvement
If this system is installed from the construction phase of the building, why would I care? But if I want to come, pay money to install it, and convince all the neighbors with it, I doubt it could be feasible.	I believe that proposed system might not be feasible in our building because nobody will pay	Opinion about proposed system on cost
By the way, such a system does not cost too much. All the idea is that you have to install a piping system and a container.	I believe that proposed system is not costly	Opinion about proposed system on cost

The system makes us get rid of all the water spilling happening on streets, as well as the annoying noise of water droplets.	I believe that proposed system solves the problem of AC water leakage	Opinion about proposed system on biophysical impact
If we want to do the proposed system in our building, it could be implemented, but maybe its external appearance is not so favorable.	I believe that the external appearance of pipes is not favorable	Opinion about proposed system on biophysical impact
I have heard or read somewhere that molds and mushroom could grow inside the piping system or the container in which this water is available if it were not regularly emptied.	I believe that molds and mushrooms could grow in AC water pipes and reservoir	Opinion about proposed system on biophysical impact
I think that the implementation of the proposed system is unlikely because the municipality will not come and collect the water weekly.	I believe that the proposed strategy is not feasible as the municipality will not collect the water	Opinion about proposed system on stakeholders involvement
The problems of such a system are the following. First of all, if we want to do it, its external appearance on the building will not be nice.	I believe that the proposed system is not aesthetic	Opinion about proposed system on biophysical impact
I think it is the opposite way round. If it was installed in a good way, it will even ameliorate the appearance.	I believe that the proposed system ameliorates aesthetics of building	Opinion about proposed system on biophysical impact
I think that it is still not nice. Imagine now that you have a piping system outside of the building. The case might be better if all the AC units were placed parallel to each other and were rearranged in a way as to maintain adequate aesthetics of the building. I think that such a system is not costly, but aesthetically speaking, I think that it is not really nice to have it on the exterior of buildings. We are trying to find how to get rid from electricity	I believe that the proposed system is not costly, but might ruin the external appearance of the building	Opinion about proposed system on cost- Opinion about proposed system on biophysical impact

installations put in a random and unorganized way.		
The project is not costly. Although not all households in our building pay for everything, and although we do not expect them to pay for that too, but we, the 5-6 households that usually pay, could pay for that system too. If this strategy is really helpful and really generates a considerable amount of water, yes, we would pay for it, why not?	We are willing to pay for the proposed system even if not all households in the building	Opinion about proposed system on cost
I guess that this should be a personal or building initiative, whereby each person/building participates if he desires to.	I think that the proposed system should be a personal/building initiative	Opinion about proposed system on stakeholders involvement
our experience with the municipality of our city is not good.	We have a bad experience with the municipality	Opinion about proposed system on stakeholders involvement
We do not trust them in anything. They do not do even the smallest of their tasks.	We do not trust the municipality as they are irresponsible	Opinion about proposed system on stakeholders involvement
We did not, until now, see any eco-friendly project undertaken by the municipality for us to have trust in it. Whether we funded the system or they did, we do not know whether the municipality will abide by a schedule of water collection or no.	We do not trust the municipality; we are not sure that it would abide by water collection	Opinion about proposed system on stakeholders involvement
There is a whole in the road in our street that has been there for many years and they did not close it until now, how will I trust them to come empty the container and take it for irrigation. I have never seen them irrigate in my entire life.	I cannot trust the municipality with water collection as they do not do their basic tasks such as road maintenance and irrigation	Opinion about proposed system on stakeholders involvement
We do not have a problem with the installation of the system if it is beneficial, but on a condition that the	We are willing to install the proposed system if the entity responsible for water collection was trusted	Opinion about proposed system on

people in the municipality, or any other organization, are trusted people.		stakeholders involvement
its advantages is that it is eco-friendly, it solves the problem of lime residues and the damage that they cause to many machines and to us and it could also be very beneficial for plants, because we did not yet see any research or experiment conducted on such thing in Lebanon	I believe that the proposed system is eco-friendly, prevents damage from lime residues and is beneficial for plants	Opinion about proposed system on biophysical impact
Its disadvantage might be the problems that we will face with the municipality and with the neighbors. But, I do not see that there are major disadvantages for that project. Concerning what my neighbor said about the appearance of a building, I would not care about it, to be honest. This is something that you can even cover with special material.	I believe that the proposed system does not affect building aesthetics as it can be covered with special material, but my neighbors might not pay and we do not trust the municipality	Opinion about proposed system on biophysical impact - Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
Actually, this is not a big problem, because if one really wills to do it, it could be solved in one way or another.	I believe that the appearance of the building could be organized if one is willing to install the system	Opinion about proposed system on biophysical impact
There are a lot of electrical wires on the building's exterior, I do not think that their appearance is better than water pipes.	I believe that the proposed system does not affect building aesthetics	Opinion about proposed system on biophysical impact
the advantages of this method is that you get rid from lime residues. Maybe, if the water that we will be receiving in the future is saline, like what is happening in many households in Tripoli, then of course it will be beneficial for plants.	I believe that the proposed system prevents damage from lime residues and is good for plants if it provides non-salty water	Opinion about proposed system on biophysical impact
I honestly thought that if we want to install such a system, why not redirect	If a system was installed, my priority is to redirect the	Opinion about

the water into households? But, I think it is impossible to do it in old buildings. If the building was new, and this was done during construction, I think that my priority is to use it in my house rather than giving it to the municipality.	water to my house as I do not trust the municipality	proposed system on stakeholders involvement
However, as we told you, we are not willing to pay if we do not have trust in the people undertaking the project. For example, why would we pay, and install the system if the municipality does not come and collect the water regularly? The strategy is divided into two parts. The collection of the water and it reuse afterwards. The two steps should work together, and in the same effectiveness, for it to operate correctly. We cannot install the system and then have flooding at the bottom of the building because the municipality does not come to collect the water. when we have trust in the municipality, and in the city council, we would give it to the municipality, no problem.	We are not willing to pay for the installation of the proposed system as we do not trust that the municipality will collect AC water regularly	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
The municipality should before give us something in return to the huge amount of money that we pay, and then we would think about pricing or not pricing the water. if we are in an adequately civilized country, we would price the water. In our city, I would never ask for money in return, not because we do not want to, but because we will never get anything, so why ask in the first place? (x2)	I believe that pricing the water we collect is not realistic because we will not receive the money anyway	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
You could take money, but I do not think it could be feasible because they are already paying for the entire system.	I believe that the municipality will not pay for the water if they were funding the system	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement

Personally, to install the proposed system, I would request that they reduce the municipal taxes that are really very high. They could do that for every building that installs such a system, because we will be participating in the flourishing of gardens.	I believe that the installation of the proposed system could be possible if they provide us with monetary incentives such as tax reduction	Opinion about proposed system on cost
The proposed system is not something hard to do, but our municipality is wealthy because they collect taxes and they never give any benefits or services in return.	I believe that the proposed system is feasible but the municipality will not help in installation and water collection	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
We can say that we are actually not willing to install such a system because we do not have trust in the municipality.	We are not willing to do system as we do not trust the municipality	Opinion about proposed system on stakeholders involvement
True. But if we want to pay to install a system to use it for our building, then why not	We are willing to install system if we can use the water only in our building	Opinion about proposed system on stakeholders involvement
Yes, exactly. If it is really beneficial, we would do it for our building given the lack of trust with the municipality.	We are willing to install system if we can use the water only in our building	Opinion about proposed system on stakeholders involvement
I honestly like to be in a building in which this system is already present and invisible, maybe because I am very tidy and organized person. But if I trust that the municipality will really collect the water, yes, I would install it.	I prefer already having internal system in buildings, but I would install an external one if the municipality was trusted	Opinion about proposed system on stakeholders involvement
We will not pay for the system if the municipality is negligent and irresponsible.	We are not willing to pay for the system as we do not trust municipality	Opinion about proposed system on

		cost - Opinion about proposed system on stakeholders involvement
the municipality could even take this water and throw it rather than irrigating gardens with it. How can we be sure?	We are not willing to pay for the system as we do not trust municipality	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
For us to have more trust in the municipality, they should be able to fund the project to show people that they are serious and that they are willing to invest in such issues.	We think that the municipality should fund the project to enhance our trust in it	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
If the municipality funds the installation of the system and the water collection, then why not install it?	We are willing to install system if the municipality funds it	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
When they fund, and the project has serious and good consultants, and good contractors, then yes, we would trust them. When all the system works in an organized way, we will not have a problem.	We are willing the install the system if the municipality is trusted and the project has good consultants and contractors	Opinion about proposed system on stakeholders involvement

The municipality should show more effort concerning eco-friendly practices, and all other practices, for us to trust them.	We think that the municipality should do more projects for us to trust them	Opinion about proposed system on stakeholders involvement
Not only effort, the municipality should show that they are an entity that the citizens could trust. They need to do a project that is very transparent, and that is very clear from the beginning to the end. They should also raise people's awareness regarding this issue and request them to cooperate with them.	We think that the municipality should show transparency in project and raise people's awareness on proposed system	Opinion about proposed system on stakeholders involvement
You can do a pilot project, but I am honestly against that. Let us say that the municipality wants to do a lighting project. They take a street from which all people pass. People come and get amazed by this street. But, when you take a pilot project on building, the building is not seen by anyone. The residents of the building, the neighborhood, and the municipality only see it. Not all people notice it.	I believe that pilot projects on buildings are not effective as they are not seen by all people	Opinion about proposed system on stakeholders involvement
It is not hard to make people aware of pilot projects. They can use social media and digital marketing strategies.	I believe that pilot projects are effective as social media can be used to make people aware of them	Opinion about proposed system on stakeholders involvement
The municipality can do many things, but the most important is that they should gain the trust of residents with ways that I told you previously. They should also very importantly raise awareness on the importance of this water for public gardens and the environment, and what do public gardens benefit the city with.	I believe that the municipality can do many projects but it should gain residents trust and raise awareness	Opinion about proposed system on stakeholders involvement
I agree that residents need awareness campaigns concerning AC water for the strategy to happen. There is a huge proportion of people that are clueless on all these issues. They do not understand what you will be talking to	I believe that residents need awareness campaigns on AC water because most of them do not know about it	Opinion about proposed system on stakeholders involvement

them if you just tell them “ac water” or “distilled water”.		
There is also one thing: what am I benefiting from the greenery near my building? I remember in the past, the floor in this huge median was dedicated for both walking and for planting. Then, they demolished the walking area and made it only for plants that are not even present because they do not maintain it adequately. However, when there is a walking area, it would be a getaway for people and for them to come and enjoy walking there. This would be a motivation for people to participate in such a strategy. Why would I care about collecting this water if the municipality comes and takes the water for other gardens that are not in my neighborhood?	I am not willing to give collected AC water if the municipality uses it for the irrigation of other gardens that are not in my neighborhood	Opinion about proposed system on biophysical impact
Why would I care about collecting this water if it will be used for other gardens that are not in my neighborhood? This is not the case of our building. We have greenery around us. But what about other buildings who do not? For example, in Azmi street, sakafeh street, and so on. I doubt that these buildings could contribute to such a practice because they do not have any type of greenery in their neighborhoods. If we want also to contribute to the flourishing of gardens and consider it a public asset, they should first of all remove the contractors from there because they are closing such gardens, and imposing entry fees on them. Why would we do something for the amelioration of the gardens that we cannot enter to? These are public gardens; we have the right to go there whenever we want.	I believe that there are many buildings in the city that will not be willing to install these systems because they do not have green spaces near them that they can benefit from and most green spaces are no more public because contractors there impose entry fees	Opinion about proposed system on biophysical impact
We prefer if NGOs undertake the project but depending on what is the NGO. Who are the persons in these NGOs, for example? Are they trusted by residents? Etc.	We prefer that NGOs undertake the project if they were trusted	Opinion about proposed system on

		stakeholders involvement
Yes, I agree. The problem in Tripoli is that everything is related to persons. There is either persons that you trust, and you can easily conduct projects with, or people that you cannot trust.	We prefer that NGOs undertake the project if they were trusted	Opinion about proposed system on stakeholders involvement
As an example, someone, with some political affiliation, volunteered to replant the medians near our house, but they never did anything.	I believe that there are only few trusted stakeholders in Tripoli to do projects	Opinion about proposed system on stakeholders involvement
We trusted the municipality in doing traffic lights, they did them and nobody abides by them. There are no fines and no penalties. We trusted the municipality in doing good roads, but you can never see any appropriate road in Tripoli. Is this the municipality that we are supposed to trust? If we had a different mentality in the municipality, we would definitely work in a different way.	We do not trust the municipality due to previous failed projects and unfulfilled promises	Opinion about proposed system on stakeholders involvement
Strategy feasibility depends on people's understanding of the topic. If they liked the idea, and see it as beneficial for them, and that it saves them money, of course they would contribute and cooperate with the party undertaking the project. This could also contribute to the expansion of such a project to several parts of Lebanon. But, if people were not aware, and if they were not involved in the early phases of the project, it would be ineffective, and it could not even happen. There should be an awareness campaign; this is the most important thing.	We believe that the feasibility of the proposed project depends on people's awareness and involvement during the early phases of the project (need for awareness and cooperation)	Opinion about proposed system on stakeholders involvement
As buildings usually take permits for many things in the building, and for the construction of the building all-in-all, the municipality should impose that all new buildings have a condensate harvesting system for a building to be able to be constructed.	We believe that built-in systems should be mandated on new buildings/ in existing buildings, awareness should be raised and residents should have trust in	Opinion about proposed system on stakeholders involvement

In old buildings, you need to raise people's awareness about this system and convince people with it. They need to have trust in the municipality or the party undertaking the project.	municipality to impose proposed system	
Yes, I think the same way. You need awareness, trust and also funding for the implementation of the project. We, as a building, are willing to pay. But I am sure that 90% of all buildings in Tripoli are not.	We believe that awareness, trust and funding are important for system installation	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
We should also bare in mind that we cannot propose such a system to old buildings, unless they really benefit from the presence of greenery in their neighborhood. The problem is also that even if you have additional water for the implementation of new gardens, there are areas that are overcrowded and there is no place for such gardens. In these areas, the maximum you can do is irrigate the few trees in the streets there.	We believe that system installation also depends on the availability of nearby greenery that people can benefit from and enter to	Opinion about proposed system on biophysical impact
If the municipality funds the project, everybody will be willing to participate. We wish that the municipality becomes a bit responsible. They would even do it in specifications that are better than the ones we would do on our own because the municipality would do it as standard for all the buildings. We wish that the municipality does that, then we will be willing to give the water, regardless of where it goes. But if we will be paying for it without the municipality, we would if we are really in a place where there is greenery, like near our building.	We are willing to implement the proposed system if the municipality funds its installation and be responsible for its technical aspects/ if the municipality does not fund it, we are willing to install it if there is greenery near our building	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
I think that if this water is beneficial for greenery, of course, it will contribute to the amelioration of the	I think that the proposed strategy will ameliorate green spaces in the city, as well as its aesthetics	Opinion about proposed system on

aesthetics in the city through the proposed project.		biophysical impact
I honestly cannot imagine that this project could happen in our city, and I even think that it would not happen in 20-40 or even 60 years.	I believe that this project will not happen in the city anytime soon	Opinion about proposed system on stakeholders involvement
You are right. Before they start with the issue of water, they have million things to think of. They should fix the roads first.	I believe that this project will not happen in the city anytime soon because there are many other things that need to be done	Opinion about proposed system on stakeholders involvement
The proposed project might actually be feasible. If for example, the donations that come from outside are not provided to the government, but rather to NGOs, this would definitely be feasible. If the donor gives money to the municipality, they will take it to their own and nobody trusts them. But when there is trusted NGOs that receive donations and are tasked with the implementation, it could definitely happen. They can; they do not need the government, neither the municipality. It would be an independent project. If you give any trusted person money, he would be able to do it. I personally would go do meetings with each building's residents and tell them that we will install such a system and you will not be prompted to pay anything. They would directly accept.	We believe that the proposed project is more feasible if done through external funds provided to NGOs for systems' implementation and water collection	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
True. Granting funds for NGOs by external sources might be better for such a project in particular.	We believe that the proposed project is more feasible if done through external funds provided to NGOs	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
There are some areas in which the municipality could be effective, and	We believe that the proposed project is more feasible if	Opinion about

others in which it is not and will never be. NGOs could definitely contribute to this project and even implement it if the adequate funding is available.	done through external funds provided to NGOs as the municipality will never be effective in eco-friendly projects	proposed system on stakeholders involvement - Opinion about proposed system on cost

I actually collect some of this water to use it for my iron.	I partially use AC water for the iron	Use of AC water
Yes, we use it also for the wipers of the car and also for the car engine sometimes.	We use AC water for iron and car battery/wipers	Use of AC water
Definitely, I also use it for the wipers and for the car engine. It is very good for these purposes because it does not contain lime residues, unlike tap water that we receive from groundwater or from the water authority.	I use AC water for iron and car battery/wipers because it does not contain lime residues that damage machines	Use of AC water - Knowledge of AC water quality / quantity
I do not do anything with AC water, it circulates in a pipe that drains into the sewage network. I do not use it. (x2)	I do not use AC water; it goes to the sewage network	Use of AC water
I do not do anything with it too. However, I know that there are some buildings in my vicinity that put pipes in the building that drain AC water from all the AC units in the building into the sewage network. Unfortunately, they do not do anything about it. They actually have the potential to collect it and reuse it, but they do not.	I do not use AC water but I know that some nearby buildings have built-in piping systems for the drainage of this water into the sewage network; these buildings can use this water but they do not	Use of AC water
Although I do not make use of this water a lot, but I keep a small amount to use in the iron and sometimes for cleaning the floor. In fact, I take the water from the AC unit located in my bedrooms, that is, in rooms where the air is always clean and pure so that the water is also pure and has a favorable odor. In the living room, for example, sometimes we smoke, so the water will have a smoke odor and will have some residues in it.	I keep only a small amount of AC water for ironing and floor cleaning but only from the AC unit of rooms to prevent the water from carrying the smell of smoke from the living room	Use of AC water - Knowledge of AC water quality / quantity
I collect this water in gallons and use it only for cleaning the floor of the balcony of rooms because it is too difficult for me to move the gallons from one place to	I only clean balconies with AC water because it is already present there	Use of AC water - Collection of AC water

another and use the water for cleaning the flour of my house. And sometimes, I direct the water into the sewage system if the floor is already clean and if I do not have anything to do with this water.	and I do not have to transport gallons to use it	
I know that AC water is clean, but that it is not good for plants as it does not contain minerals.	I believe that AC water is clean but not good for plants as it is free of minerals	Knowledge of AC water quality / quantity
It does not contain minerals, or any other essential materials for the plants to grow and flourish. You cannot use it for any purposes that are beneficial to you. You can merely use it for cleaning purposes or for the car wipers and engine, as they told you previously.	I believe that AC water does not contain minerals essential for plant growth	Knowledge of AC water quality / quantity
I have a really bad experience with the condensate generated from ACs. Once the pipe of my living room's AC got broken and the water started to spill down the floor. The floor got damaged from this water; it actually made holes on the floor.	AC water made holes on the floor of my living room when the pipe got damaged	Knowledge of AC water quality / quantity
AC water also does some type of a green layer on the floor, maybe algae or something similar to that. Our neighbors experienced that on their balcony. (x2)	I know that AC water produces a green layer on the floor	Knowledge of AC water quality / quantity
Maybe this water is acidic, that is why it did that?	I think that AC water might be acidic	Knowledge of AC water quality / quantity
I used it for cleaning the floor, maybe once or twice, it is not bad. It could be used for cleaning.	I believe that AC water could be used for cleaning	Knowledge of AC water quality / quantity
We would definitely not use it for personal hygiene, like bathing, for example. We also will not use it for drinking, cooking, or even cleaning vegetables. That is my opinion.	We are not willing to use AC water for personal hygiene, drinking, cooking or even cleaning fruits and vegetables	Knowledge of AC water quality / quantity
Even if we thought of using AC water for bathing or toilet flushing, there is no system that directs the water into the bathroom. We cannot collect the water in gallons and transport them every time we need to use it, it is so difficult and time consuming.	We cannot use AC water for toilet flushing or personal hygiene due to the absence of a system; manual reuse is difficult and time consuming	Challenges for use
As quality, I think that it is good for iron, car, cleaning and personal hygiene, but as	I believe that AC water is good for iron, car,	Knowledge of AC water

my neighbors said, it needs to be directed to a system to be able to be used effectively. Nobody will do that much effort to collect this water, and nobody has time for this too. It also does not make stains on the glass, or any other furniture. But, nobody will find it practical to transport gallons to use it.	cleaning, and personal hygiene but needs a system to facilitate its use	quality / quantity - Suggestion for use
If we actually had a piping system in our house, whereby there is a tap that provides us with AC water, we could actually make use of it	We could make use of AC water if we had a system for it in our house	Suggestion for use
Okay, but you cannot use it for everything and for all purposes because the air is not clean, therefore the water is not water that is clean enough. It contains a lot of dust particles due to the pollutants present in the air.	I believe that AC water cannot be used for all purposes because it traps the dust and pollutants from the air of the room	Knowledge of AC water quality / quantity
We could maybe use it for all purposes normally except for drinking and cooking.	I believe that AC water is good for all purposes except drinking and cooking	Knowledge of AC water quality / quantity
I even think that it can only be used for toilet flushing, and maybe for bathing if it did not contain dust particles. But of course, I would not use it for cleaning the dishes or any other applications that enables us to ingest some of it. It could be used for toilet flushing, cleaning clothes, ironing, car wipers and engine, etc.	I would never use AC water for dishwashing or other applications through which this water could be ingested	Knowledge of AC water quality / quantity
Yes, I do not think we can bathe with it. When I put it for the iron, I see that it is not too clean. It contains residues, or maybe dust particles. I do not know honestly if this is from the pipe, or from the water itself. It does some kind of dust. I actually try to filter this water with a small filter or even with a cotton to reuse it for the iron.	I believe that we cannot bathe with AC water because it contains some particles that I usually filter with a cotton before using it for the iron	Knowledge of AC water quality / quantity - Use of AC water
AC water is not beneficial for plants. It does not contain the minerals that are present in normal tap water. It might lead to the death of plants. (x2)	I believe that AC water might kill plants because it does not contain minerals	Knowledge of AC water quality / quantity
The brother of my husband, in his house, has a filter for this water and has a reservoir, whereby this water gets filtered and then they drink it. It does not contain beneficial salts or minerals.	The brother of my husband filters AC water and drinks it, but it is not beneficial because it is free of minerals	Use of AC water - Knowledge of AC water

		quality / quantity
There are some people who say that if this water comes from a smoking-free room, it could be used for plants and the plants actually live and grow.	I hear that AC water is good for plants if it is collected from a smoke-free room	Knowledge of AC water quality / quantity
I once used it for my plant and it died immediately.	My plant once died from AC water	Knowledge of AC water quality / quantity
I think that there are two factors that play a role in our ability to reuse this water. The first factor is the amount of pollution in the air, and the second is cleanliness of the pipes.	I think that reusing AC water depends on the pollutants in the air and the cleanliness of the pipes	Knowledge of AC water quality / quantity
When there is a lot of dust in the air, AC water ends up containing black residues.	I believe that AC water has black residues when air is too polluted	Knowledge of AC water quality / quantity
Yes, even the pipe plays an essential role in the cleanliness of the water because the water sometimes might contain a lot of dust particles, the inside of the pipe is black due to the residues that accumulate in it.	I believe that AC water contains particles sometimes when its pipes are dirty	Knowledge of AC water quality / quantity
I once read that, in Australia, the government mandates residents to reuse this water instead of draining it into the sewage system, by proposing a solution and a way to guide them on how to reuse this water. They take this water, put it in huge reservoirs, and add to it the residues of potato, apples, bananas, or any other type of vegetable or fruit residues, store it for about one week in the sun, and then they use it for the irrigation of plants, greenery, and public gardens. They consider that these food residues are like compost and fertilizers that help plants grow, and their addition to this water prevents wasting it. In these countries, they do not allow for the wastage of any source of water, no matter how minimal it is, because they actually know its value really well due water scarcity problems that they face. Even the water that they use for cleaning fruits and vegetables, they reuse it for the irrigation of their household plants	I read that in Australia, residents are mandated to reuse AC water by putting it in reservoirs, supplementing it with food residues and using it for irrigation/ no source of water wasted in other countries because they know its value/ I believe that AC water needs minerals to be use on plants	Use of AC water - Knowledge of AC water quality / quantity

and gardens. I think that this implies that this water needs minerals to be used for plants. It cannot be used alone for plants.		
I think it could also be used to clean fruits and vegetables because it is distilled water, therefore, it is clean. I do not know actually, but this what I think.	I believe that AC water can be used for fruit and vegetable cleaning because it is distilled	Knowledge of AC water quality / quantity
We know that this water is clean. In our store, for example, we get this water and put it for the iron because we have a huge one. I know that it is beneficial for that, but for other purposes, I do not know.	We use AC water for the iron in our store because it is good for it	Use of AC water - Knowledge of AC water quality / quantity
If it is actually good for plants, we would use it for plants, why not? But the problem with reusing this water inside the household is the difficulty of its collection and transport. If I had a system to collect this water and that enables me to reuse it easily, I would reuse it of course. (x3)	I am willing to use AC water for irrigation if I have a system that enables me to reuse it easily	Suggestion for use
If the AC is on for 24 hours, it produces around 20 liters of water per day. I know that because I usually collect it in a 20 liters gallon.	I believe that one AC generates around 20 liters of water per day	Knowledge of AC water quality / quantity
I do not think that AC units generate much water.	I believe that AC water quantity is small	Knowledge of AC water quality / quantity
It actually generates a lot of water per day. I honestly do not use all of it, as I told you previously, but I take as much as I need for ironing and for cleaning the floor. At least I am not wasting all of it like most people do.	I believe that AC units generate a lot of water per day; I partially use it for ironing and floor cleaning	Knowledge of AC water quality / quantity - Use of AC water
If AC water is to be used at the level of the city, I think that every building could install a system that directs the water back into reservoirs and into households for it to be reused for household applications. (x3)	I think that AC water can be reused in all the city through installing systems in buildings that redirect the water back to households	Suggestion for use
AC water could be pumped again to household reservoirs for us to reuse it in our homes because manually it is really impractical and difficult to collect it and reuse it.	I think that we need a system for AC water reuse in our homes because its manual reuse is difficult	Suggestion for use

If we want to use it for the amelioration of public gardens, the government should be the entity responsible for such a project.	I believe that the government should be responsible for AC water reuse for irrigation of public gardens	Suggestion for use
Private companies should do a system for every building in which the water is collected and then they come to collect the water and use it for irrigation.	I think that private companies should install systems for AC water in buildings and then collect the water for irrigation	Suggestion for use
Every building should be equipped with an exte piping system through which the water from AC units is collected, stored in reservoirs, and then collected weekly, for example, by the municipality to be reused on public gardens. The duty of the municipality is actually to irrigate public gardens in the city. Therefore, it is its duty to collect this water too. But if on the personal level, nobody has the time to do that, and nobody is willing to invest an effort in collecting this water and transporting it.	I think that external piping system could be installed on buildings with reservoirs emptied by the municipality weekly and used for greenery irrigation	Suggestion for use
Also, you should not forget that AC units are not installed in an appropriate and aesthetically pleasing way on buildings. Therefore, this system might be difficult to install, unless it is implemented in new buildings, or buildings under construction.	I think that the proposed prototype might be difficult because AC units are not installed in unified locations on buildings	Opinion about proposed system on biophysical impact
In new buildings, you cannot put AC units wherever you want. They actually specify the places where the AC units should be installed. Therefore, this system might be easier in buildings that were constructed only 5-10 years ago, for example. If the place of AC units is unified and agreed upon by engineers, we could then put the system, and the municipality could come, collect the water, and use it for irrigation.	I think that the proposed system is easier in new buildings who have a unified place for AC units	Opinion about proposed system on biophysical impact
But honestly, I think that in Lebanon, the proposed project could never happen. In Lebanon, we have a lot of water. We are not from the countries that suffer from water scarcity problems like Australia or countries of the gulf who charge you for the amount of water you consume and	I think that the proposed project cannot happen in Lebanon because we do not have water scarcity and water meters or limits for water consumption	Opinion about proposed system on stakeholders involvement - Opinion about

limit this amount to avoid wasting water. (x2)		proposed system on biophysical impact
Our building is equipped with a well from which we pump water and the water that comes from it is fairly clean enough for our daily purposes. Now, however, new buildings are not permitted to dig a well. Therefore, these buildings, I think, should find a solution like AC water harvesting to get water because the water that comes from the water authority has a really bad quality.	We use well water that is clean in our building/ new buildings need AC water harvesting because they cannot dig wells and governmental water is too polluted	Opinion about proposed system on biophysical impact
In new areas, where new buildings are to be constructed, I think that such studies, like the one you are conducting, are really important to provide additional sources of water for residents.	I think that the proposed strategy is suitable for new planned areas	Opinion about proposed system on biophysical impact
If we also configured a way to install this system in our building, although it is not a new one, we can even use this water for the building, for example, for cleaning cars, cleaning the floor, stairs and entrance. This water would be beneficial for us if a system is present to collect it.	I think that, if the proposed system was put in our building, we can use the water for cleaning cars, cleaning the floor, stairs and entrance	Opinion about proposed system on biophysical impact
We actually face some problems with water sometimes in summer. Few days have passed where the well got dry due to the extremely high temperature especially in august. (x2)	We face well dryness several days in summer due to high temperatures	Drivers for use
In new buildings, as I said, this is a necessity. The government must mandate engineers to design a system within the building to collect this water and use it for several purposes in households for toilet flushing and other applications except ingestion, in the building, and even for the irrigation of their household and building plants, or for the irrigation of their nearby gardens. It could be considered as a form of recycling.	I believe that built-in AC water harvesting systems that redirect the water back to households should be mandated on new buildings	Opinion about proposed system on stakeholders involvement
Reusing AC water in new buildings might even allow them to install a green roof, because there would be a source of water to irrigate it automatically.	I believe that AC water reuse in new buildings could motivate them to install green roofs	Opinion about proposed system on

		biophysical impact
Green roofs it would leak water on the neighbors residing on the last floor.	I believe that green roofs leak water on last floor residents	Opinion about proposed system on biophysical impact
No, it should be equipped and adequately designed. There are private companies that are specialized in that, I think. I once read that in many developing countries, there are specialized private companies that are emerging in the field of building greening. It is not hard to do that if it is well-designed and maintained.	I believe that green roofs do not leak water if well-designed and maintained	Opinion about proposed system on biophysical impact
But do you think neighbors would accept even if you tell them that is designed adequately?	I think that neighbors will not accept installing green roofs	Opinion about proposed system on biophysical impact
I think that they will not because in Lebanon you cannot trust anyone. They might also be not willing to sacrifice that much space on the roof to plant.	I think that neighbors will not accept installing green roofs because no trust and no willingness to sacrifice space	Opinion about proposed system on biophysical impact
It is true that our government is corrupt, and there is no responsive government at all, but we should begin, as residents and academics, to think about ways to make use of water instead of wasting it. This is what we should do.	I believe that we should think about ways of reusing water, even though our government is corrupt and irresponsive	Opinion about proposed system on stakeholders involvement
In other countries, they have governments that actually work for the welfare of the people. We do not have that in our country. In the gulf, for example, you do not see a paper on the streets. They do not allow any piece of trash to go, they recycle everything. They have the correct mindset, and they work adequately. In our country, we do not have even the minimum of that, we do not have companies for waste.	I believe that the government in Lebanon does not care about public or environmental welfare	Opinion about proposed system on stakeholders involvement
The proposed strategy could happen through putting a reservoir on the invisible façade of the buildings or in the parking, for example.	I think that the proposed strategy is feasible	Opinion about proposed system on

		biophysical impact
I do not think that the proposed system could happen in our city.	I think that the proposed strategy is not feasible in Tripoli	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
The project could happen. Just like some buildings nowadays are doing some renovation work, they could install these systems for the collection of the water. It is not a difficult task. As I told you previously, there are a lot of buildings I our vicinity that have a piping system that directs this water into the sewage system. This would be an easy task for them, as they would only need to direct these pipes into a reservoir instead.	I think that the proposed system could be installed during renovation or in new buildings that already have built-in pipes that only need to be connected to reservoirs	Opinion about proposed system on biophysical impact
There is something that we should also consider, which is the financing of such a project. Who will pay for it? Therefore, I think that this might be possible in buildings where homeowners or renters are of the high -income class. In these harsh days that we are living in Lebanon, nobody will tell you that he will be willing to pay money in order to save water and benefit the environment. In my house, for example, I needed to change the pipes recently. I changed them and I paid 2,000,000 L.L. I paid for them, however, maybe someone else would say I am not actually willing, or I am not even capable to pay that much for that, especially in the harsh circumstances we currently live in. People have more important and essential things in mind. If we come and tell them this is a project for the future, they would tell us let us live today first.	I think that the proposed system might only be possible in high-income neighborhoods because people have a lot of priorities to pay for during these harsh days in Lebanon	Opinion about proposed system on cost
Even if all houses have a good economic status, some people do not pay. This is the case in this building where we live.	I believe that some residents in our building and other buildings will	Opinion about proposed

	not pay even if they are wealthy	system on cost
The proposed system could happen in buildings were people are actually aware of environmentally friendly behavior, and they have enough knowledge and culture about similar projects. Knowledge and money are key for the implementation of these systems. If these two are available, the building council would mandate building residents to pay a certain sum for that project, and it will not be a big one, because all houses would have participated. But for example, in the building of my mother in law, which is very new and all residents have a really high income, they still suffer from a lot of problems in their building, although they are all capable to pay but some of them do not. This project, if proposed on people in this building, might be appealing to these residents, for example. They might find it as something secondary. They might even tell you that they have a groundwater well that is functioning adequately and that they do not need additional water.	I believe that the proposed system can be implemented in buildings where residents are environmentally aware / sometimes in high income neighborhoods, people might not be willing to pay as they are not aware	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
The implementation of the proposed project does not need wealthy or poor. It needs someone who is aware and willing to work for the environment. Money is of course a pre-requisite for that, but knowledge is also extremely important.	I believe that environmental awareness is more important than money in the implementation of this project	Opinion about proposed system on stakeholders involvement
Sometimes the water from wells comes salty also, it might not be of good quality to be used for all purposes. This should also be kept in mind.	Water we receive from wells is sometimes salty and cannot be used for all purposes	Opinion about proposed system on biophysical impact
Salty well water is happening a lot in dam w farez, which is close to the coast, and in our building too. In one of the restaurants of dam w farez, if you go to the toilets, you notice that you are cleaning your hands with water that is too salty. I once asked the owner of this restaurant about how they solve this problem, and what do they do for cooking. He told me that they bring a water cistern every week for cooking	I believe that the proposed system can solve the problem of salty well water received in our building and in many areas of dam w farez because it is near the coast	Opinion about proposed system on biophysical impact

because they cannot use this salty water that they get from the well. Therefore, if AC water was available in the buildings, or in this restaurant, and if it was really proven that it could be used for drinking and cooking, it could definitely solve this problem.		
Buildings and restaurants get a lot of water from ACs. The ACs are on all day, and each household has a minimum of 3 AC units. In restaurants, they also have central AC systems, and they are on all day, therefore they would get a huge amount too, and I am sure that it will fulfill their daily needs.	I believe that AC units generate a lot of water in buildings and restaurants and could fulfill daily needs	Knowledge of AC water quality / quantity
In our building, I think that the implementation of the system is a bit difficult because not all households pay. You have around 8 who do and 4 who do not. But, when the circumstances in the country become a bit better, 8 households could pay for it and the sum of money would not be too large. However, we need the other houses who do not pay to accept the idea.	I think that the implementation of the proposed system in our building is not possible because there are houses who do not pay; when the situation is better it could be possible even if they do not	Opinion about proposed system on cost
First of all, this system ameliorates the overall aesthetics of the building. (x2)	I believe that the proposed system ameliorates building aesthetics	Opinion about proposed system on biophysical impact
The system would also minimize disturbance caused by water leakage in the building. For example, we have one neighbor that has AC units that are not located on a balcony, therefore they spill water into the walls of the building. Because I live directly below her, the walls of my rooms are now damaged from this water. We told her several times to fix this issue, she tells us that she will do that, and she does not. This damages our households, therefore, if there was a system to collect this water, it would greatly reduce this damage. I think that it could also save us money.	I believe that the proposed system prevents damage caused by water leakage from AC units placed on windows in buildings	Opinion about proposed system on biophysical impact
If we were obliged to pay for the amount of water we consume through a metered	I believe that metered systems for water	Suggestion for use -

system, we would definitely reuse this water to minimize our water consumption, even if we had to collect it in gallons. (x2)	motivates us to reuse AC water, even manually, to reduce our water consumption	Opinion about proposed system on stakeholders involvement
Having a metered system might also incentivize the houses in our building to pay for the installation of the AC water harvesting system.	I believe that metered systems for water motivates residents to pay for proposed system installation	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
In the presence of a metered system, we will not waste water anymore. However, because unlike other countries, we do not have these laws, we always open the water and waste it on a daily basis. People do not know the value of water. They think that we have a lot of water in Lebanon, and therefore we can waste it, and throw as much as we like. I heard you saying before that in Lebanon we do not have water scarcity problems, I think that this is not true because in Beirut people are suffering a lot from these problems in summer. And also, in our city, these problems are beginning to occur in many areas and we are not far away from having serious water scarcity problems. It is not true that Lebanon has a lot of water.	I believe that people in Lebanon do not know the value of water and are not aware that we are starting to have serious water scarcity problems in many areas	Opinion about proposed system on stakeholders involvement
I think that there is a problem with the location of AC units on buildings to be able to install the piping system in an adequate way. AC units are not installed in a unified location in all houses. (x2)	I believe that the random installation of AC units on buildings is one of the problems of the proposed system	Opinion about proposed system on biophysical impact
If we had a central AC system, we would not have any problem with the locations of AC units.	I believe that central AC systems are better for the proposed prototype	Opinion about proposed system on biophysical impact

In new buildings, the locations of AC units is not a problem, because they specify the places of ACs even before buying the homes. They put them in a unified place on the exterior façade of the building.	I believe that the proposed system is better in new buildings where AC are placed in unified locations	Opinion about proposed system on biophysical impact
In our building, we were supposed to have a central AC system, and its piping systems are installed, but nobody is able to put it on, due to the electricity problems in our country. It costs a lot.	We are not able to operate central AC systems due to electricity problems	Opinion about proposed system on biophysical impact
I think that the maintenance of this system might also be a problem.	I believe that the proposed system needs a lot of maintenance	Opinion about proposed system on biophysical impact
But it is only a system of pipes and a reservoir, therefore, it will need only little maintenance work, mainly consisting of cleaning the pipes, for example. It might need to be replaced every 10-15 years or so, and this is not a major issue to consider.	I believe that the proposed system does not need much maintenance or replacement	Opinion about proposed system on biophysical impact
The financing of all this project is the major problem honestly. It costs money, therefore, it is not easy.	I think that the main problem of proposed system is its cost	Opinion about proposed system on cost
If, from the start, the buildings are made in a way that allows the installation of such a system, and building residents are obliged to do it, it is better. Also in old buildings, if the municipality mandates residents to put AC units in a unified place, it would also work. There is such laws, however, the municipality are not holding people accountable and are not charging them fees or penalties for not abiding by the rules. There are laws, but there is no enforcement.	I believe that the proposed system is better implemented if residents of existing buildings put are mandated to put AC units in a unified location among households / these laws are available but there is no enforcement	Opinion about proposed system on stakeholders involvement
Building laws that specify the locations of AC units are actually present and adopted by the municipality when giving permissions to buildings, but the municipality is not enforcing them. If they did, you would not see those messy	I know that building laws specifying AC locations are available but not enforced by municipality	Opinion about proposed system on stakeholders involvement

building façades that we see every day in the city.		
The culture of our entire society needs to be changed. Awareness campaigns need to be done in order to make people more aware about this water and its potential uses, as well as the benefits of installing these systems. An old woman, for example, who does not know about this water, cannot be convinced about this system without extensive awareness campaigns. This takes time, exactly like the recycling of garbage, which needs a lot of awareness. (x2)	I think that the implementation of the proposed project takes time as it needs awareness campaigns about AC water, its uses and the benefits of the system	Opinion about proposed system on stakeholders involvement
Even without awareness, when there is a law that mandates installing such a system and puts penalties and fines for the buildings who do not abide, it would become an effective and widespread practice. In Australia, for example, people are charged penalties and fines for the violation of rules and regulations. If people are not held accountable for violation, they will not care. This is the nature of human beings actually.	I think that the proposed project can happen through a law that mandates installing such a system and puts penalties and fines for the buildings who do not abide by it	Opinion about proposed system on stakeholders involvement
In order to implement this system, the municipality could maybe assist in its financing, as our municipality is not poor and has a lot of financial resources that they do not employ.	I think that the proposed project can happen if the municipality finances it	Opinion about proposed system on cost
It cannot happen if its voluntary. The municipality could financially assist residents in its implementation, but there still should be a law that mandates people to do it and that imposes penalties for violation, or else, it will never be done.	I believe that the proposed system will not be installed voluntarily; it needs financing and legal enforcement	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
This is true, but maybe if its voluntary and we have people that are actually aware of the value of this water, it could also happen.	I believe that the project might happen if people are aware of the value of water	Opinion about proposed system on stakeholders involvement

Yes, I even think that all people would do it if it is free of charge, why not?	I think that all residents would install the system if financed by municipality	Opinion about proposed system on cost
The municipality will not finance the project, I am sure. This is not realistic. But let us assume it did, then yes why not? (x2)	I believe that the municipality will not finance the project	Opinion about proposed system on cost
Maybe if there are people that are actually environmentally aware, they would do it. But as we told you, financing is the major and the first problem that we should think of. The other problem, as we told you, is the place of AC units in homes, and whether residents accept to change their locations. (x2)	We believe that the main problems of the system are financing and AC unit locations	Opinion about proposed system on cost - Opinion about proposed system on biophysical impact
I do not think that the locations of AC units is a major problem, honestly. They can install the pipes and direct them to whatever AC units they want.	I do not think that the location of AC units hinders project implementation	Opinion about proposed system on biophysical impact
First of all, to ameliorate the proposed project, I think that the collection of the water should not be done by the municipality because we do not trust that it will actually abide by the schedule given to us (x3)	I think that the proposed project can be done if water collection is not done by municipality as we do not trust it	Opinion about proposed system on stakeholders involvement
We do not trust the municipality with water collection as they never did a project and continued it until the end. They begin with random projects and then they abandon them after one month or two. Our municipality is a huge mess. (x2)	I think that the proposed project can be done if water collection is not done by municipality as we do not trust it	Opinion about proposed system on stakeholders involvement
The municipality does not even provide any services for the residents of the city.	I believe that the municipality does not provide any services for residents	Opinion about proposed system on stakeholders involvement
Definitely, if you are talking about the municipality of Tripoli, it is impossible that the project happens. Municipalities of	I believe that the proposed project is not possible if our	Opinion about proposed

other cities that really work for the amelioration of the city could do it.	municipality is responsible of it	system on stakeholders involvement
Our municipality does not even provide us with the most basic and simple services. If a private company proposes this project and bares its finances, people will trust it more than the municipality. (x2)	I believe that the proposed project is feasible if a private company finances it and does the water collection	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
In our city, if the garbage is not collected by a private company, you would see us now drowning in our own waste. (x3)	Garbage in the city would not have been collected if private companies did not do that	Opinion about proposed system on stakeholders involvement
NGOs could also be responsible for the system rather than private companies or municipalities.	I believe that the proposed system can happen if NGOs are responsible of it	Opinion about proposed system on stakeholders involvement
It is a good idea that an NGO initiates the project, but it should be a trusted NGO, not an NGO who begins with the project and then neglects it after one or two years or gets overwhelmed with internal conflicts that leads to its demise. It should be a trusted NGO, for example, that is affiliated with a particular worldwide organization. It should also abide by certain worldwide laws. Or else, nothing will be implemented. Our municipality, if they did any maintenance works on the streets, they dig the holes and then they do not close them. They remain for about two to three months, and sometimes even years.	I believe that the proposed system can happen only if a trusted NGO affiliated to international organizations implements it because the municipality is careless and irresponsible	Opinion about proposed system on stakeholders involvement
In Lebanon, anything without an income does not work. If the municipality generates any kind of income from initiating this project or baring its expenses, we could trust it because they only work if they gain money in return. If they come and tell us that they will bear	I think that the proposed strategy can happen only if the municipality generates an income or saves money from it because we do not trust that they would do it	Opinion about proposed system on stakeholders involvement

the expenses of this system, or even that they only want to come and collect the water, for free, and because they care about the environment, nobody will trust them. There should be an income generated in return for the municipality. Such project might, for example, reduce their payment to the water authority because they are collecting free water. But nobody thinks that way in our city, they need actual income. The environment is not given attention by the government.	only because they care about the environment	
Municipal stakeholders could maybe lower the fees of the municipality for buildings who voluntarily install this system.	I believe that the proposed system is feasible if municipality lowers its fees for those who voluntarily install it	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
the municipality could give financial incentives on a condition that water collection is done in an adequate and timely manner or else the reservoirs will become full and start leaking and this will cause major problems. We need to be able to trust that the municipality will actually come and collect this water on time.	I believe that the proposed system is possible if the municipality gives financial incentives and if we were able to trust that it will abide by water collection	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
The municipality always has the mentality that if it puts money from its own pocket, it abides by the project. But if people pay for the systems, it will not abide. This is derived from previous experiences.	I believe that the project can only happen if the municipality pays for it	Opinion about proposed system on cost
Every year, we pay a certain sum for the municipality for the variety of services that we do not even get. If they tell us, for example, that they would reduce half of this yearly sum for us to implement the AC water collection system, we definitely will implement it. Instead of paying this money for the municipality, we would pay it for the system. Why not?	We are willing to implement the proposed system if we are provided with financial incentives	Opinion about proposed system on cost

Extensive awareness campaigns on AC water and the proposed strategy should be conducted to increase its chances of happening. (x2)	I believe that the implementation of the project needs extensive awareness campaigns	Opinion about proposed system on stakeholders involvement
The problem is that here, in Lebanon, no matter how much you try to make people aware, if they do not want to listen to you, they do not. It is as simple as that.	I believe that awareness campaigns might not be effective if residents do not have the will to participate	Opinion about proposed system on stakeholders involvement
That is why I was saying that awareness campaigns are not sufficient to change the behavior of people. There should be a law that mandates us to install this system.	I believe that awareness campaigns are not sufficient, and installation of systems should be mandated by law	Opinion about proposed system on stakeholders involvement
There should be a law that mandates us to install this system. There should also be penalties and fines for violations, this is very important.	I believe that there should be a law that mandates system installation on buildings and penalties for violations	Opinion about proposed system on stakeholders involvement
The most important thing is the availability and enforcement of laws and regulations. This is essential. If we had a government that is able to mandate, and most importantly, enforce the laws, everything would have been different.	I believe that there should be a law that mandates system installation on buildings and adequate enforcement	Opinion about proposed system on stakeholders involvement
There is a lot of laws for buildings in the building code, but nobody enforces them. It needs monitoring and enforcement from the part of municipalities and governments.	I believe that building laws need to be adequately enforced by municipalities	Opinion about proposed system on stakeholders involvement
This is not only in Lebanon, by the way. Even in the middle of Norway, which is an extremely developed country, people do not abide by laws if there was not a government who monitors and enforces the rules and regulations, and most importantly imposes penalties on violators.	People all around the world do not abide by laws unless there is adequate enforcement and fines and penalties	Opinion about proposed system on stakeholders involvement
There should be a law before any awareness campaigns are done, I believe.	I believe that there should be a law mandating these systems on buildings before awareness campaigns	Opinion about proposed system on

		stakeholders involvement
The government could put a law and inform people that this law will be effective 3 months later, for example. This will give time for NGOs or any other advocates of this idea to raise awareness among residents.	I believe that the government could put the draft of the law so that NGOs start their awareness campaigns	Opinion about proposed system on stakeholders involvement
The government could also do awareness campaigns and tell residents that this idea, after a certain period of time, will become a law that will be imposed on all of them, of course, excluding low-income residents or assisting them financially in installing these systems.	I think that the government could undertake awareness campaigns about the project and inform them that it will become mandatory soon	Opinion about proposed system on stakeholders involvement
Even if people are not aware, they will implement these systems only because they are afraid of fines and penalties.	I believe that if the project was mandated by law, people will implement it because they will be afraid from fines and penalties	Opinion about proposed system on stakeholders involvement
We can say that overall, awareness campaigns alone are not effective. You need a law to enforce that, and penalties for people to be encouraged to do it.	We believe that the proposed projects needs awareness campaigns and enforcement by law	Opinion about proposed system on stakeholders involvement
Yes, they should start with high-income neighborhoods for people to see the projects and start mimicking them. anyone would like to see a prototype of the thing he wants to install to ensure whether it is effective or not. It is part of awareness raising and encouragement. (x3)	I believe that the proposed project can start in middle/high income neighborhoods as a pilot project for other areas	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
It is also important to note that the media has an essential role in disseminating knowledge about this issue and making these pilot projects famous and well-known, and showing their benefits to people, for them to be encouraged to install these systems	I believe that the media should make pilot projects known and disseminate their findings for them to be effective	Opinion about proposed system on stakeholders involvement
we should keep in mind that the proposed project will need a lot of time to become a reality.	I believe that the proposed project will	Opinion about proposed

	need a lot of time to happen	system on stakeholders involvement
There is nothing as important as our health. Because until now there is no fines for people if they walk on the streets without a face mask, people are not abiding by that. People are careless, although this is related to their health, which should be the most precious thing for them.	I believe that the proposed project needs a law and fines for violations	Opinion about proposed system on stakeholders involvement
The funny thing is that they did plenty of awareness campaigns on the risks of being infected with COVID-19 and how many people could die due to serious or unprecedented conditions and complications, however, people are careless about that.	I believe that the proposed project needs a law and fines for violations	Opinion about proposed system on stakeholders involvement
In countries of the gulf, they have cameras everywhere. If, for example, someone throws a paper on the floor, he gets penalized because he was seen on the camera doing this violation. However, in these countries, if this monitoring and penalizing system is not available, people will not abide.	I believe that people will not install the system unless they are mandated, monitored and penalized by the government	Opinion about proposed system on stakeholders involvement
Our government tells us that there is a penalty, but they do not monitor, and they do not enforce. For example, when they first told us to put seatbelts in the car, we put them for about one to two months, and then the government itself stopped monitoring these practices, therefore, the people became careless. There are also disparities between the cities. If the government who has a duty to enforce the laws is not doing that, why would people do it?	I believe that people will not install the system unless they are mandated, monitored and penalized by the government	Opinion about proposed system on stakeholders involvement
Our problem in Tripoli is that we have a lot of gardens but not all of them are adequately maintained and managed, and the ones that are, are usually given to a contractor who makes them private and restricts access to them. Therefore, the public ones are not numerous. We see that the municipality comes and takes care of these spaces and of the medians and all greenery but depending on the neighborhood. They only do that in visible	We believe that the proposed strategy improves green spaces in the city and reduces disparities in their maintenance between areas	Opinion about proposed system on biophysical impact

neighborhoods, but not in deprived ones. But the availability of this water could improve the green spaces in all the city.		
The proposed strategy could maybe hopefully increase the willingness of the municipality and increase their water resources to take care of the entire green spaces in the city rather than picking only the important streets and neighborhoods. (x2)	We hope that the proposed strategy increases the willingness of the municipality to adequately maintain green spaces in all the city	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement
Yes, it might provide them more water, and this is a good thing and would definitely increase greenery in the city, but they also need to be willing to work and irrigate these spaces and take care of them. Their employees to not work effectively. They should also figure out ways to monitor these employees.	We believe that the proposed strategy would improve green spaces in the city only if the municipality is willing to work effectively and monitor its employees	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement
We wish that the municipality makes use of additional water to maintain the greenery that we have in the city and even plant new areas.	We wish that the municipality implements more greenery in the city	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement
Overall, I think that the proposed system is a very important idea and that, if implemented, it will definitely reduce our water consumption and provide an additional source of water for the flourishing of greenery. However, as we told you previously, we need awareness campaigns, laws that are adequately enforced, penalties, financial incentives,	I believe that the proposed strategy will reduce water consumption and improve green spaces but needs laws, penalties, monetary incentives and building trust with the municipality	Opinion about proposed system on biophysical impact - Opinion about proposed

and we need to trust that the municipality is willing to take this water for the benefit of the city, and is willing to take care about green spaces more and to improve their conditions for us to be able to enjoy them.		system on stakeholders involvement - Opinion about proposed system on cost

I mostly use AC water for ironing because I do not want my iron to become damaged due to lime residues. Other than that, I do not use it for anything.	I partially use AC water for the iron because it is free of lime residues that damage machines	Use of AC water - Knowledge of AC water quality / quantity
We mostly do not use AC water. I am afraid of irrigating my plants with it, for example, I do not know why.	I mostly do not use AC water and I am afraid of using it for irrigation	Use of AC water - Knowledge of AC water quality / quantity
Sometimes I also clean the floor of the balcony with it if the pipe is spilling water into the floor.	I use AC water for balcony floor cleaning sometimes	Use of AC water
Of course, it is possible to clean the floor of the balcony with it. However, I do not know why I am afraid to water my plants with it.	I do not know why I am afraid to water my plants with AC water	Knowledge of AC water quality / quantity
They say that AC water is distilled water. As such, I know that the water is clean, but it may not be beneficial for plants, I have no idea. (x2)	I believe that AC water is clean as it is distilled but I do not know why it may not be beneficial for plants	Knowledge of AC water quality / quantity
The water goes through a pipe into the sewage network (x3)	I do not use AC water	Use of AC water
If I want to use AC water, I usually collect it in water bottles. When I am in need, I remove the pipe from the sewage network outlet, fill water bottles, and use them for ironing. However, in general, most ACs in this building, or at least in my house, have their water pipe directed into the sewage network. There are also some AC units that are installed on windows, and thus leak water on the walls of the building. In this case, I cannot use the water or benefit from it because I cannot collect it. As you know, most of the people nowadays close their	I collect some AC water in plastic bottles for the iron/ I collect water from the ACs on balconies because others drain on the walls of the building	Use of AC water - Collection of AC water

balconies with glass facades, therefore, the AC units are installed towards the outside without a possibility to direct the water into the sewage network or to even collect the water.		
In my house, for example, I have two AC units that drain on the wall of the building. They are installed on a window, not on a balcony. They do not have any place for collection or any piping system to go through. The other AC units are connected to a pipe and drain to the sewage network.(x2)	I have two AC units that drain on the wall of the building and others drain to the sewage network	Use of AC water - Collection of AC water
This, I think, is the case of most buildings in Tripoli and in all Lebanon. Some houses might have all their AC units installed without a possibility of water collection, the others might have all their AC units installed on a balcony and most people, I guess, have a combination of these two options.	I believe that most households in Tripoli have a combination of AC units on balconies and windows	Use of AC water
I use this water for ironing because I know that it does not contain lime residues that damage the iron. I do not know anything about this water other than that. I do not know for what purposes I can use it safely. I do not have any experience in this field, and I have never asked about this water. I did not have the curiosity to know.	I use AC water for the iron as it does not contain lime residues that damage machines; I do not know anything other than that about it	Use of AC water - Knowledge of AC water quality / quantity
Sometimes, when the water spills on the balcony's floor, I feel like the floor becomes dry and creates a white layer, but I do not know what it is or why it forms. Therefore, I am afraid to use it for any other purposes. I feel that it contains some hard material, therefore I do not use it for anything. I do not know whether I am right or wrong, but this is what I feel.	I am afraid to use AC water for purposes other than the iron as I believe that it renders the floor dry and creates a white layer on the floor	Knowledge of AC water quality / quantity
AC water might not be beneficial. We cannot use it without knowing whether it is safe or not.	We cannot use AC water without being assured of its safety	Knowledge of AC water quality / quantity
The quantity of AC water depends on the humidity level in the air. Depending on humidity, it might sometimes fill a 7-8L gallon in several hours, I guess.	I believe that the quantity of AC water depends on humidity; it produces 7-8L in several hours	Knowledge of AC water quality / quantity

If the humidity is very high, it fills a 7-8L gallon each day within several hours of operation. I noticed that because I used to use this water to clean the balcony's floor, but I stopped after noticing a white layer that was formed that let the floor really dry.	I believe that the quantity of AC water depends on humidity; it produces 7-8L in several hours	Knowledge of AC water quality / quantity
I have not really counted that in terms of gallons. Depending on my need, I usually fill several 2 to 3 water bottles to use them for ironing, and then I put the pipe back into the sewage network. It takes me around 10 to 15 minutes to fill one bottle. It does not take time because there is a lot of humidity in the air nowadays. While putting my laundry on the balcony, I always hear a sound "tik tik" indicating that there is always water coming out from this unit, as humidity is very high, and it is too hot.	I believe that AC units generate a lot of water when the humidity is high and the weather is too hot but I have never counted that in terms of gallons	Knowledge of AC water quality / quantity
I once read that in some countries, they sometimes take this water or even let it drain in pipes where they filter it, and subject it to basic treatment technologies, and then use it for the irrigation of household plants. Surprisingly, some people also drink it.	I read that in many countries, they filter AC water, treat it, and then use it for household plants irrigation	Knowledge of AC water quality / quantity - Use of AC water
In other countries, they create some channels for the purification and treatment of this water.	I know that in other countries, they have strategies for AC water reuse	Use of AC water
I think that maybe if this water was collected, it could be used in the bathroom. I would bathe with it as it does not contain lime residues. It is distilled water; therefore, it is clean.	I think that AC water can be used for personal hygiene because it is clean	Knowledge of AC water quality / quantity
Some people might not use it for personal hygiene because sometimes you feel that when the water comes out of the unit, it contains the smell of the pollutants present inside the room being cooled. For example, when I used to smoke " arguile", and when I used to collect it in gallons, I always noticed that the water had the smell of smoke coming from inside the room when I used to spill it on the floor to clean with it. (x2)	I believe that some people might not accept to use AC water for personal hygiene as it might trap the smell of smoke inside rooms	Knowledge of AC water quality / quantity
I also think that you cannot say that we can bathe with this water. This is because, I do not know if you notice that, but after a	I believe that AC water cannot be used for personal hygiene or	Knowledge of AC water

certain period of time, the pipe starts to have residues on its inner surface. You see all these residues I inside the pipe. The water, when it goes down the pipe, will pass through these residues. Currently, my pipe has residues inside it. I sometimes blow in it for the residues to go away, therefore, I do not think that you can bathe with it at all! It is really difficult. If it is not treated or purified, I do not think that we can use it for any purpose, except for ironing and car engine. However, we can never use it for drinking or personal hygiene without treatment.	drinking unless treated because of residues inside its pipes (dirty pipes)	quality / quantity
Of course, we will not use it for drinking.	I believe that AC water is not potable	Knowledge of AC water quality / quantity
I think that this water is clean, however, when it runs through a pipe that is polluted with residues, it becomes also polluted.	I believe that AC water is clean but gets polluted due to dirty pipes	Knowledge of AC water quality / quantity
I have plants in my house, but, as I told you, I have never tried to water the plant with it. I noticed, several times, that as the water spills into the balcony's ground, the floor becomes dry and forms a white layer. After seeing this, I thought that I do not have to use this water for irrigation because it might harm the plant, make it dry and lead to its death.	I have never tried to irrigate my plants with AC water as I think that it might lead to plant death	Use of AC water - Knowledge of AC water quality / quantity
I also have one plant, but I never irrigated it with this water. I am afraid it dies.	I am afraid my plant dies if I irrigated it with AC water	Knowledge of AC water quality / quantity
Yes, AC water might damage the plant and lead to its death because this water contains all the elements that were present in the room. The AC unit absorbs all the elements in the room such as smoke and dust.	I believe that AC water might damage plants as it traps dust particles and pollutants in rooms	Knowledge of AC water quality / quantity
Don't you notice how polluted and dusty are the AC filters when we clean them? Especially now, they are also claiming that the air coming from ACs might infect with COVID-19. (x2)	I believe that AC water traps dust from rooms and might infect with COVID-19	Knowledge of AC water quality / quantity
I do not think that air from ACs infects with COVID-19, because it cleans the air before spreading it into the inside of the room.	I believe that AC units do not infect with COVID-19	Knowledge of AC water

		quality / quantity
Overall, I think that this water, with the absence of any treatment technology, could be used for ironing, car washing and car engine. At the end of the day, the car will not be damaged from a bit of dust in the water or from the smell of the smoke in it. (x2)	I believe that AC water can only be used for iron, car cleaning and car battery/wipers if not treated	Knowledge of AC water quality / quantity
We never used AC water for the car battery, neither for washing the car. But these could be considered ways to prevent wasting this water. We can consider these uses in the future, I guess.	We never used AC water but we can start using it for iron and car to prevent its wastage	Use of AC water
In my house, we usually operate ACs only in summer. We never put them on in winter. I store several AC water bottles for winter to use them for the iron. This is because my iron is too sensitive, and the worker told me not to fill it with water that has lime residues.	I store AC water bottles for winter to use it for my iron because it is too sensitive	Collection of AC water - Use of AC water
If experts tell me that AC water is clean, I am willing to use it for washing clothes, irrigation and cleaning. It is not wrong to use it.	I am willing to use AC water for cleaning, washing clothes and irrigation if I am assured about its safety	Suggestion for use- Knowledge of AC water quality / quantity
It might be used for dishwashing, for cleaning, for irrigating, for ironing and for the car if assured about its safety. However, I would not use it for drinking or for personal hygiene.	I believe that AC water can only be used for dishwashing, cleaning, car, ironing if assured about its safety	Suggestion for use- Knowledge of AC water quality / quantity
No way. I would not use it for personal hygiene. I will not be psychologically relaxed to use it for bathing. It is not satisfying, and I might not find myself clean enough. (x2)	I am not willing to use AC water for personal hygiene because it is not psychologically relaxing	Knowledge of AC water quality / quantity
If someone with expertise tells me that it is really clean for personal hygiene in particular, I might use it.	I am willing to use AC water for personal hygiene if experts assure me that it is good for this purpose	Suggestion for use- Knowledge of AC water quality / quantity
I think that I am willing to use it for personal hygiene, if and only if it was purified and treated.	I am willing to use AC water for personal hygiene if treated	Suggestion for use- Knowledge of AC water

		quality / quantity
You should all also not forget that it is very hard to bathe with it, even if it was really clean. How would you do that? It is not practical at all to fill it in buckets and take it for bathing. (x2)	I believe that it is difficult to shower with AC water due to the difficulty of its manual collection and reuse	Challenges for use
If AC water was clean and safe for personal hygiene, it should have a piping system for it in particular, whereby the water could come from the tap for showering. Other than that, it would be a waste of time and would definitely be impractical.	I believe that AC water should have a system in building to be used for personal hygiene if good for this purpose	Suggestion for use- Knowledge of AC water quality / quantity
If there was a way, a method or an installation system that treats and purifies this water on site, and it goes towards our water reservoir, it will definitely be possible to use for personal hygiene purposes.	I believe that AC water can be used for personal hygiene if there was a system that purifies this water and directs it to households	Suggestion for use
Yes, in case a system was present, AC water might even be cleaner than the water we are currently bathing in. But without a method, it would be difficult and impractical	I believe that it is difficult to use AC water for personal hygiene without a system	Challenges for use
I think that it might be possible to direct the water pipe from the AC unit into the washing machine. I do not know how feasible this suggestion is though.	I believe that AC water can be used for washing machine if a system was present	Suggestion for use- Knowledge of AC water quality / quantity
I do not think that AC water could be directed to the washing machine as it needs a strong pressure of water and a big amount.	I believe that AC water cannot be used in washing machine due to poor water pressure	Challenges for use
I think that, without treatment, it could maximumly be used for irrigating the plants and for the car.	I believe that AC water can only be used for car and irrigation if not treated	Knowledge of AC water quality / quantity
You can also clean the house with it, as we said earlier.	I believe that AC water is good for cleaning	Knowledge of AC water quality / quantity
You do not have to forget that AC units might not provide a huge amount of water, especially because we are in Lebanon, and the electricity is too bad nowadays. It is becoming harder to operate the AC units due to these electricity constraints and	I believe that the quantity of AC water might not be enough for reuse because ACs are not operating much due	Knowledge of AC water quality / quantity - Challenges for use

therefore harder to have a big amount of water each day. There are some things in our country that can never happen. Seriously, it is really annoying. If two gallons were filled per day, what would you do with them? It is not a big amount.	to electricity problems in the country	
You should think of it in a way that the AC is operating several hours per day. This water that is collected is useful. Sometimes, in two hours, a 7L gallon could be filled. It could be used for irrigation and for cleaning.	I believe that the quantity of AC water generated could be sufficient for irrigation and cleaning	Knowledge of AC water quality / quantity
Yes, we can clean the house with AC water. We save water from the tap, why not? We can collect it in gallons and use it for cleaning. In my mother's house, she usually collects this water in gallons, and I see her, at the end of the day, spilling the water into the ground of the balcony and cleaning it with it. we stopped using it for balcony cleaning because we noticed that every time the gallon is full, it starts spilling on the floor and the AC starts to spill water towards the inside of the room and damages the furniture.	I believe that AC water can be used for cleaning to save water/ I used to clean balconies with AC water but stopped after ACs started to spill water to inside of rooms when gallons were full	Use of AC water - Challenges for use
I feel that with time, AC water forms a white layer on the floor, I do not know what it is. When I see the gallons in my mother's house, I notice that there is a layer on the top that contains something like smooth white powder.	I believe that AC water produces a white layer in gallons and on floors with time	Knowledge of AC water quality / quantity
Reusing AC water does not save us money. At the end of the day, we have a well for the building and we take the water from it. We have a specified and fixed monthly amount that we have to pay. It is not a metered system, we do not have to pay as much as we consume. It is a fixed amount because we have a water well. I also take water from a company for cooking, whereby I pay monthly depending on the amount I consume. However, as I told you, every person could collect the water from ACs and use it for irrigation and cleaning.	I think that reusing AC water will not save us money because we use well water and there is no metered system, but we can use it for cleaning and irrigation to save water	Challenges for use
Yes, if clean or not, we could use it only for irrigation, cleaning, and for the car. We will not use it for personal hygiene honestly.	I believe that AC water can only be reused for irrigation, cleaning and	Knowledge of AC water

Also, not to forget that most of the water of our ACs cannot be collected because they are on the façade. The amount is too small, I guess.	car and that the amount generated is too small	quality / quantity
if the electricity comes in a normal way, and we operate the AC units all day, it is really beneficial. It saves a lot of water if we collect gallons or if it has any other collection strategy. But the electricity does not come much to benefit us as much as we need.	I believe that the amount of AC water could have been significant if no electricity problems	Knowledge of AC water quality / quantity - Challenges for use
Yes, the water generated might not be enough to fulfill all our household cleaning needs, for example, due to electricity constraints.	I believe that the amount of AC water might not be enough for all household needs due to electricity problems	Knowledge of AC water quality / quantity - Challenges for use
if there was a metered system for water in buildings, we would use AC water for all the cleaning purposes in the house. If I find that this would save me money, I will close the tap and use AC water instead. Only for irrigation and cleaning.	I believe that having a metered system for water motivates us to use AC water for cleaning and irrigation	Suggestion for use
I agree. We would definitely use only this water for cleaning and irrigation if it was clean, of good amount and if it saves us money. But for drinking and cooking, or even cleaning fruits and vegetables, it is too hard. (x2)	We are not willing to use AC water for drinking, cooking or cleaning fruits and vegetables	Knowledge of AC water quality / quantity
It is not hard to use AC water for neighborhood or city irrigation, but you should be in a building that is already equipped with piping systems whereby all the water is directed and collected in a particular reservoir dedicated only for this water.	I think that AC water can be used for neighborhood or city irrigation if building has piping system connected to reservoir for AC water collection	Suggestion for use
There needs to be ACs within the building that have their own reservoir for water collection. It should be done on all households in the building, not every person installs his AC depending on his preference: one on the balcony, the other on the window, the other drains it, etc. the strategy should be unified and installed in the entire building. I think that it is even better that the building has a piping system installed on the inside of the building and planned by an engineer, or even in the	I believe that the reuse of AC water for neighborhood and city irrigation needs external piping system connected to reservoir from which we could irrigate or use the water in our households but this will never happen in our country	Suggestion for use

entire neighborhood, however, of course, we are not in Europe. This will never happen in our country. But as a suggestion, as my friend previously said, there should be a reservoir located at the bottom of the building to collect the water from pipes. Residents of the building would then benefit from this water for the house.		
Through external piping systems, AC water can be reused for the house or for the garden of the building for example. They could even use it to water the greenery in front of their house. For example, in our building, if implemented, it could be used to water the median in front of our building.	I believe that the external system can benefit us in household practices and to irrigate the median facing our building	Opinion about proposed system on biophysical impact
Ironically, however, on the other side of the building we have a waste dump. We cannot benefit from this water there.	We cannot benefit from AC water on backwards of building due to waste dump	Opinion about proposed system on biophysical impact
If built-in systems are not already available, it is possible to change the places of the external units of ACs and rearrange them in a way so that they can all branch to a piping system and go into a larger pipe that drains into a reservoir specified for this water. It is possible that an engineer comes and plan an outdoor piping system if the building is not already equipped.	I believe that an engineer should plan an external piping system if the building is not already equipped.	Suggestion for use
Also, if not possible to direct all the AC units into one reservoir. This could be done on both sides of the building. Each side will have its own piping system and its own drainage reservoir.	I believe that the external system can be done on both building façades if not possible to arrange all AC units on one façade	Opinion about proposed system on biophysical impact
Yes, hundred percent. All the water will then be stored in the same place and no water will be wasted. This will also collect a significant amount of water.	I believe that external system prevents water wastage and produces a lot of water	Opinion about proposed system on biophysical impact
But I think that the installation of the proposed system is very unlikely. Nobody would come and think that I want to install a piping system to collect AC water. We almost never thought about it in our entire life.	I believe that the proposed system is unlikely due to residents 'mentality	Opinion about proposed system on stakeholders involvement

We can rather say that we are in Lebanon, and nobody would think about the proposed AC water system because there are too many things that are more important and that we need to provide for ourselves and our children.	I believe that nobody will think about the system in Lebanon due to more important things that need to be provided	Opinion about proposed system on stakeholders involvement
It might be that, because we are in Lebanon, we might end up using this water and becoming interested in it. This is because what do we have left in our lives to think about? I am serious. A time might come where we will be obliged to use it, even for personal hygiene, because we are in Lebanon. Everything is getting worse. We have a huge mismanagement in our resources.	I believe that we might be obliged to use AC water in the future because there is a mismanagement of water resources in Lebanon	Opinion about proposed system on biophysical impact - Drivers for use
In the future, we might be obliged to use AC water because on one hand we have a mismanagement in our resources and on the other hand, many regions in Lebanon are beginning to face water scarcity issues and this might be our only way to proceed and to have water.	I believe that we might be obliged to use AC water in the future because there is a mismanagement of water resources in Lebanon and some water scarcity problems in some areas	Opinion about proposed system on biophysical impact - Drivers for use
You reminded me of war days. I was too small, even smaller than my daughter, I used to go with my parents and neighbors with empty gallons and search for water. when we used to fill water, we used to get very happy, we did not have enough water. Similar days might come soon, and we might be obliged to make use of every water source and every opportunity to get water. Before, there were no AC. After a certain period, they started installing these units, they were too rare. Therefore, in conclusion, a time might come where we would be obliged to use this water because we are in Lebanon. If water resources in this country become depleted, the government does not have any willingness or even capacity to adopt alternative water recovery strategies like other countries, especially in the gulf region. You would ask me why don't you think of it from now instead of facing problems in the future? I would tell you I cannot, what is happening	I believe that we might be obliged to use AC water in the future because if water resources become depleted, the government does not have any willingness or even capacity to adopt alternative water recovery strategies like other countries, but we are not able to think of this water now due to other priorities	Drivers for use- Opinion about proposed system on stakeholders involvement

to us in this country is enough. There are already a million things that we need to think about.		
We might think of reusing AC water, why not? But even if we did, we are not capable of solving this problem, or of benefiting from this water, only on our own. This cannot only be implemented on one individual, household or even building level. There must be an initiative, whereby not only building residents participate, but also the municipality and the responsible parties in the government.	I believe that AC water reuse at the level of neighborhood or city cannot happen without the help of municipalities and other governmental entities	Opinion about proposed system on stakeholders involvement
It should be the responsibility of the municipality and the government to initiate and contribute to the proposed project.	I believe that the municipality and the government should contribute to the proposed project	Opinion about proposed system on stakeholders involvement
Definitely, it could also be the responsibility of the ministry of environment, I guess.	I believe that the MoE should be engaged in the project	Opinion about proposed system on stakeholders involvement
I guess that the municipality should plan collectively with the residents of the buildings whereby they install the piping system we previously talked about and the water gets collected in a reservoir. The municipality collects this water and use it for the city.	I believe that the municipality should cooperate with building residents in the installation of system and water collection	Opinion about proposed system on stakeholders involvement
I think that the municipality should be the entity thinking about this project. They should talk with people and do compromises to be capable to make use of this water. People cannot do that by their own, especially in our country.	I believe that the municipality should initiate the proposed project and communicate and assist residents	Opinion about proposed system on stakeholders involvement
I honestly never imagined someone proposing the system you showed us before. We have a government that is really so bad and governmental institutions that do not assume the smallest of their responsibilities. There is a lot of projects and initiatives that we can do to embellish and ameliorate our country, but we need a government to act. We need the money to be spent in the right places and not to be	I have never imagined talking about this project as our government is not ready to cooperate as it is irresponsible and does not have the willingness to act	Opinion about proposed system on stakeholders involvement

stolen. (x2) The smallest detail in your house, you can fix it. However, there are some things that cannot be done only at the individual or building level.		
The proposed project cannot be done at the personal level, you need subsidies and support, especially financial support during these harsh times.	I believe that the proposed project cannot be done only by residents and needs financial support	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
Such a project needs a combination between adequate planning, financing, government and municipality participation, as well as residents' collaboration and contribution. All of these elements should be present for it to work effectively.	I believe that the proposed project needs equal commitment from residents and government	Opinion about proposed system on stakeholders involvement
There are a lot of things we can do in life that can save a lot of resources and are environmentally friendly, but we definitely need an entity to support and assist us. This is especially in a topic like the one related to AC water, it never comes to the mind of anyone. Nobody thinks of it.	I believe that we can do a lot of eco-friendly projects but we need an entity to support us	Opinion about proposed system on stakeholders involvement
We have suggested that this water could be collected through external pipes and directed into a reservoir for water collection. We suggest that they use this water for the irrigation and for cleaning the sidewalk in front of the building, or even the building itself. We would love it if they use this water for the amelioration of our building's and the city's aesthetics.	We believe that the proposed system enables us to use AC water for irrigation and cleaning sidewalks and buildings and ameliorates buildings and city aesthetics	Opinion about proposed system on biophysical impact
In dam w farez, for example, all new buildings are equipped with a parking at the bottom of the building, as well as some plants and greenery or a small garden. Instead of taking water for the building from a well for example, through the proposed system, they would save water and benefit from the water of ACs. They would irrigate with it, clean the building's floor and stairs. If AC water reuse is to be extended to the neighborhood or the entire	I believe that in dam w farez, people can make use of AC water for building cleaning and building garden irrigation to save water but this needs collective effort of both residents and municipality if its is to be implemented in entire city	Opinion about proposed system on biophysical impact - Opinion about proposed system on

city, it needs to be a collective effort between the government and municipality, where they would plan to get the water from the buildings in a particular time.		stakeholders involvement
Yes, as my neighbor said, at the level of the building, we can only irrigate the greenery in front of our house, or we can use it for the building and for our households. If there really was an effort from the municipality or the government in the implementation of such a project, and if there was a financial support or monetary incentive to do that, we would definitely give the water in our building for the irrigation of green spaces as it would benefit the city and ameliorate its aesthetics.	I believe that we can only use AC water for greenery facing our building or for building and house cleaning if not supported by government/ if supported by government, we would implement the system	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
Harvesting AC water through external pipes connected to a collection tank which would be emptied by the municipality weekly and used for watering public gardens the city is the only solution to collect this water. It could be implemented, and especially on the inferior façade of the building.	I believe that the proposed project is the only solution for reusing this water in the city	Opinion about proposed system on biophysical impact
I guess this prototype that you showed us is highly feasible in our building in terms of installations.	I believe that the proposed prototype can be installed in our building	Opinion about proposed system on biophysical impact
Will we be implementing this system on our own expenses? If this is the case, then barely three houses in this building would pay.	I think that most neighbors will not pay for the installation of the system	Opinion about proposed system on cost
Of all the houses in the building, we are the only three houses that pay for everything in this building.	Only three houses in our building usually pay	Opinion about proposed system on cost
Residents of our building do not even pay for the elevator, although most of them are old and cannot climb stairs very often.	Our neighbors do not pay for elevator although they cannot climb stairs	Opinion about proposed system on cost
It is not to forget that not all people are interested in environmental matters, especially in these harsh times and days.	I believe that not all residents will pay as not all of them are	Opinion about proposed

There is no building that you go to where you find that all the houses pay. Every building that you go to, and every neighborhood, even in the high-class ones, you will find that there are some houses that do not pay for the basic needs of the building. You might find 3-5 houses that are interested to install such a system and the rest will not be interested and will find it a waste of money and useless.	environmentally aware and there are some houses who do not pay in every building in Tripoli	system on cost
The proposed project can only be implemented if the municipality finances it. If you tell residents you should pay, no one would answer and this will never happen.	I believe that the proposed project cannot happen unless financed by the municipality	Opinion about proposed system on cost
The proposed project can happen only in one situation: if it is mandated by the government and if there was a punishment for not abiding by the laws and policies. The best way to let people implement such a project is to make it mandatory, whereby you will be fined for not doing that. If this was the case, and the government and municipality really imposed fines and punishments, it could definitely be implemented. However, if only the person responsible would go and collect money from every house for this, it would never happen.	I believe that the proposed project can happen only if it is mandated by the government and if fines and penalties are imposed on building residents who do not install it	Opinion about proposed system on stakeholders involvement
It is not possible to do the proposed project on our own. There should be fines and taxes for people who do not install such things.	I believe that the government should mandate the system for us to do it; it will not happen voluntarily	Opinion about proposed system on stakeholders involvement
Lebanese people are used to not abiding by laws because there are no penalties for violations. They should be obliged with something by law to do it. Nothing comes voluntarily in this country. It would never happen voluntarily.	I believe that the project can happen only if mandated by the government and if penalties are imposed on residents who do not install it	Opinion about proposed system on stakeholders involvement
The proposed project might happen if there was a council for the building that is really aware and convinced with such a project and such a system, that might take money from the already available money in the bank of the building to do it. This, however,	I believe that the proposed project can happen if building council was environmentally aware, collected a fixed sum of	Opinion about proposed system on stakeholders involvement

is not possible in our building because we do not save money in advance. We pay for whatever is there to pay for. We also do not have a council for the building. We do not even have a concierge. It is true that you need only to pay once for the installation of this system, but not all people get convinced to pay for something that is not considered within their basic needs.	money monthly for all building purposes and were able to convince residents with system	
In our building, the neighbors do not pay unless they get really obliged to do that.	Residents in our building do not pay unless obliged to do it	Opinion about proposed system on cost
In our building, residents will think that such a project is not essential, it is a secondary thing. They will not perceive it as something that is really important. (x2)	I believe that residents in our building will not be interested in the system	Opinion about proposed system on stakeholders involvement
We will pay for the proposed system if all residents in the building do. It is something beneficial for us and for the city.	We are willing to pay for the system if all building residents do as it is beneficial for the city	Opinion about proposed system on cost
We would pay if all residents do, especially if this reservoir is not only dedicated for use by the municipality. Sometimes, days pass where we do not have water in the building, especially during the dry days now. Therefore, the presence of an alternative source of water like this one is really beneficial for us.	We are willing to pay for the proposed system if all building residents do especially if we are able to use the collected water when well dryness problems occur	Opinion about proposed system on cost - Opinion about proposed system on biophysical impact
The harvesting of AC water could really be helpful for us because as a building, we take our water from a well, and this well has many times been so dry during some days in the summer. Sometimes we receive too little water and other times we receive no water at all, depending on the weather.	I believe that AC water could be an alternative source for us when water is scarce in summer	Drivers for use-Opinion about proposed system on biophysical impact
We have experienced water scarcity many times in summer, whereby we spent days without water.	We spent days without water in summer	Drivers for use

it really makes a difference if we had more water or another source to rely on in case of emergencies. It really helps us.	I believe that AC water could be an alternative source for us when water is scarce in summer	Opinion about proposed system on biophysical impact
We have a problem that sometimes the circuit breaker of the water stops and it does not let the water reach the roof. Moreover, the well gets dry, as we stated, they would need to dig it again. The year before the last one, we were obliged to over pump water and dig the well as it became dry. We used to stay around 2 to 3 days without water every now and then in summer. Therefore, the presence of this water could help not only the greenery in the city, but could also help us as a building.	I believe that AC water collected through the system could be an alternative source for us when water is scarce in summer due to electricity problems or weather conditions	Opinion about proposed system on biophysical impact
I believe that, because the electricity cuts a lot, you cannot rely on this water for all the needs of a building. Not all people can operate all their ACs on the generator, because most of the times, electricity is not available. It might not generate as much water as it usually generates if the electricity was available on a longer period of time.	I believe that AC units do not generate a big amount that could be relied upon in building due to electricity problems	Knowledge of AC water quality / quantity - Challenges for use
This water and this strategy might be beneficial in several ways. The availability of AC water could really ameliorate the aesthetics in the city through so much greenery. Our street is one of the streets that you enter from to Tripoli and it is really nice that it be nicely irrigated and maintained to give a good image about our city. However, unfortunately, we always have it dry and very poorly maintained. Another thing is that such a project could maybe encourage the installation of resistant layers on roofs and would contribute to the greening of roofs with time. The roof would become like a small where building residents can go and relax.	I believe that the proposed project ameliorates city aesthetics by enhancing green spaces beauty and encouraging the installation of green roofs in buildings	Opinion about proposed system on biophysical impact
I really love greenery in the building. It gives me a feeling of satisfaction and relaxation. I wish we were in new buildings where AC water systems could be readily	I wish we were in a building where AC water systems are already implemented to	Opinion about proposed system on

implemented in advance. This is because all this system needs someone to be responsible of it, to monitor and maintain it, and even to pay for it as we said previously. You need people to interact with us and approve to do it. In our building, they do not even pay for a lamp. If the lamp is broken, or we need a new one, no one pays except for us, the three houses. Everything is interrelated. We would really love it if this was done in our building, but we cannot ignore all the aspects that we need to take into consideration. You cannot do a project if there is no collaboration and collective action. There is a lot of things that all of us wish that it be implemented in Lebanon, however, you cannot stand alone and do everything if people are not willing to do it and if the government does not help with that.	put a green roof/ proposed system needs technical and financial assistance from government	stakeholders involvement - Opinion about proposed system on cost
Tripoli is considered the city of the poor, and not all people are cultured and educated. There is also some people that do not even have time to think of these matters. It is also not to forget that our current situation has worsened the economic status of many people and that there are some people that have even removed their motor subscription because they became unable to pay for it.	I believe that the proposed system needs financing as most people in Tripoli have many financial obligations and their economic situation is getting bad with time	Opinion about proposed system on cost
I think that this project would work for countries of the gulf more because it is too hot there, and ACs need to be on 24/7. They have a central AC system. They would generate a lot of water because it is really too hot there and they have a lot of humidity in the air. I think this is better implemented in these countries. In our country, I think that it is too difficult. It is undeniable that in our country, the weather is getting very hot too and it might even reach their weather, but in our country, we do not have the electricity and the money to operate ACs 24/7. We are not capable of that.	I believe that the proposed project should be implemented in the gulf, not in Lebanon, as in our country we do not have enough money for that and no electricity to operate AC units continuously	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
There is no financial capability in our country for people even to buy ACs for each room in their house, and this is if they	I believe that residents do not have the financial capability to install the	Opinion about proposed

have the capability to buy one at all. This is getting even worse with the current economic crisis. If an AC gets ruined, we will never buy a new one. It would cost us its price times seven.	proposed system on their own	system on cost
the situation is getting hard. The electricity cuts sometimes also oblige us to sit all in a same room so that we can put one AC on. Sometimes the electricity and the motor are not on, so we cannot put anything on.	I believe that electricity problems might hinder the implementation of the proposed system	Opinion about proposed system on stakeholders involvement
the project is so nice and so beneficial, but maybe the situation in the country and the mentality of the people are the two factors that might hinder its implementation.	I believe that the proposed project is good but might be hindered by financial problems and unawareness	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
I think that the proposed project would be much more possible if before the revolution and economic crisis and if it was really worked on.	I think that the proposed system could have been financially possible before the revolution and economic crisis	Opinion about proposed system on cost
I would give you a percentage of 50% that the proposed project might happen before the revolution and economic crisis.	I think that the proposed system could have been financially possible before the revolution and economic crisis	Opinion about proposed system on cost
You need a willingness from the municipality to be involved in the project. For your information, our municipality is highly capable of doing such things as it really contains a lot of money. (x2)	I believe that the municipality is capable to finance systems but should be willing to do that for project to happen	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
But the municipality never assume their responsibilities, not even the basic ones, such as cleaning and maintaining the greenery. (x2)	The municipality is irresponsible and does not work adequately	Opinion about proposed system on

		stakeholders involvement
If the task of the municipality is only to collect AC water, then the probability of the proposed project to happen on the building level is too low.	I believe that the project might not be possible if the municipality only collects the water from buildings	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
if the proposed project is to be implemented, we would definitely pay and invest in it. At the personal level, we are definitely willing.	We are willing to pay for the proposed project	Opinion about proposed system on cost
At the personal level, we will pay, but I think that our neighbors that would participate are very few.	We are willing to pay for the project but most of our neighbors might not be	Opinion about proposed system on cost
You can also think of this project in rural areas. Many villages have started having their homes equipped with air conditioning systems such as ehden, Beqaa safrene, and others. They also have a lot of greenery and they need a lot of water for the irrigation of these huge areas. You need to move this project further away from the city. I guess that it more beneficial in rural areas because they have much more greenery than in the city.	I believe that the proposed project can be implemented in rural areas due to the availability of much more greenery	Opinion about proposed system on biophysical impact
But rural areas have water even more than the city. They mostly do not face the same issues that we face with water during summer.	I believe that the project is better in cities because villages have much more water than the city	Opinion about proposed system on biophysical impact
Implementing the proposed project in villages might not be as feasible as you think because in rural areas there are not much humidity as in on the coast.	I believe that the proposed project is not effective in villages due to low humidity in summer	Opinion about proposed system on biophysical impact
Wait, an idea has just came to my mind. If, as you stated, this project was implemented	I believe that if the collected water through	Opinion about

and AC water was collected, buildings could sell the collected water to plant nurseries. The money that we get from the water comes back for the building to cover maintenance expenses and any other bills. If any entity, for example, buys this water, we would be more encouraged to implemented that. Maybe also, if not all the houses agreed to participate, the revenue generated from water could come only for the houses who paid for that system.	the proposed project is sold to plant nurseries, NGOs or municipality, and generates revenues for households who paid, it will motivate us to install the systems	proposed system on cost
I think that gaining money from the amount of water collected makes the implementation of the project even more possible	I believe that gaining a revenue from AC water increases our willingness to install proposed system	Opinion about proposed system on cost
In our building, for example, there is a lot of houses, and the ones who pay are only five. Most of our projects or the things that we need or want to do get cancelled because we are not willing to pay on the behalf of others. It is unfair. Therefore, if we pay, and the revenue of the water is divided upon the houses who paid, we would definitely do it.	I believe that gaining a revenue from AC water increases our willingness to install proposed system	Opinion about proposed system on cost
If we are to pay on the behalf of the entire building, we honestly need to check our financial capability. We would need to check whether the amount that we need to pay for such a system could be divided upon five houses and be an affordable amount. If the amount was huge, I might tell you that I cannot afford it, honestly, especially in the harsh economic conditions we are experiencing lately. (x2)	I believe that we, the houses who usually pay, cannot install the system on our own unless the amount is affordable, especially nowadays	Opinion about proposed system on cost
Every time a particular and specified amount gets collected, for example, we would sell it to the municipality, plant nurseries, NGOs, or any other concerned entity.	I believe that collected AC water can be sold to municipality, NGOs or plant nurseries for motivation	Opinion about proposed system on cost
Yes, I think mostly for plant nurseries. If there are plants that could tolerate this water, and that this water is good for, so why not? I am saying that because I sometimes hear that there are some plants to which AC water is highly suitable. I honestly do not know why. I once heard	I believe that collected AC water could mostly be sold to plant nurseries as it is suitable for some plants but I do not know why	Opinion about proposed system on cost - Knowledge of AC water

that on TV, but I was not really focused on it.		quality / quantity
If the municipality and the government put this project in mind, they would find a million ways to benefit from this water, even for other purposes than the ones we already discussed maybe.	I believe that the proposed project can be done in million ways if the government and municipality have the will to do it	Opinion about proposed system on stakeholders involvement
I think that this system should be taken into consideration in any buildings that are to be implemented, whereby the engineer would include the price of the installed system in the price of the home or its rental. It might be hard to implement that in our old buildings. It might also be better to implement central AC systems instead of that. (x2)	I believe that AC water harvesting systems could be implemented in new buildings but are hard in our building	Opinion about proposed system on biophysical impact
The proposed project might definitely be feasible if there is an involvement and contribution from the municipality or any other governmental or non-governmental agency not only in water collection, but also in helping residents finance and pay for such system.	I believe that the proposed project is possible if municipality or NGOs assist in its financing	Opinion about proposed system on cost
Well water received in our building is of good quality; we cannot talk anything about it honestly. (x3)	I believe that the well water we receive in the building is clean	Challenges for use
Well water is okay. It does not have any unpleasant odors and does not contain any visible material such as suspended solids for example. I usually cook with this water.	I cook with well water as it is clean, odorless and does not contain pollutants	Challenges for use
True, well water does not contain white particles or elements such as lime residues. With time, the water dispenser forms lime residues but water from the well of our building does not. It is clean, we cannot say anything about it.	I believe that well water is clean and free of pollutants	Challenges for use
It is also not to forget that here, in our area or neighborhood, the water from the wells is not turning out to be salty. In dam w farez, however, it is salty.	Well water in our building is not salty but is salty in areas near the coast such as dam w farez	Challenges for use
Yes, true, it is not salty at all. Sometimes, we even use it to make coffee. It is acceptable.	Well water in our building is not salty	Challenges for use
We honestly do not face problems with the quality of well water, but we often face	We face well water dryness sometimes in	Drivers for use

issues regarding its quantity. Many times the electricity and generator of the building do not get turned on, and therefore the motor of the well does not operate and we do not receive water for several hours, and sometimes for several days. Moreover, when it is too hot and dry, we sometimes face problems with little amounts of water or no water at all, as we told you previously. These are our main problems with water.	summer due to electricity problems and too hot and dry weather	
therefore, we think that the system you proposed is helpful for us as it might supplement us with additional water for the building. As such, we could maybe use half of the generated water in times of emergency and give the other half to the municipality for the irrigation of greenery and public gardens in the city. It is not wrong. However, as we said we need financial support to do that.	We believe that the proposed system is beneficial as it could enable us to use half of the water for the building and give the other half to the municipality but we need financial support to do it	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement
This water could also be useful for firefighting. The municipality could dedicate some water reservoirs from the ones collected to firefighters. They need a lot of water. Recently, when the fires occurred in the south, people could have died, and everything was burning but the firefighters were not able to cover all land because water was not available. They started asking people to get them water as much as possible. In Lebanon, we need to have a huge reservoir dedicated only for the storage of water from ACs or any other water source that would only be dedicated for firefighting. There is a lot of natural fires that are occurring; we need that. It is actually a bright and very good idea. However, as I told you, the installation of a system for the harvesting of AC water should be mandated by law. People should be fined and punished for not abiding by it. This is similar to what you have stated concerning the policies and guidelines adopted in Dubai. It should also be implemented in all countries. For example,	I believe that part of the collected AC water can also be dedicated to firefighting as there is no enough water when fires occur/ I believe that the installation of proposed system should be mandated by law with fines and penalties, and needs financing and technical support from municipality and government	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost

in Australia, there is a huge amount of natural fires. Why don't they collect this water? they have a lot of ACs; there is no country that does not have ACs. Such a project is highly beneficial and could be done, but you need a government and a municipality that could provide the adequate support, whether financially or even technically. If there is no financing for this issue, I would put this project aside and think of things that are more beneficial for me personally. For example, paying for my old age guarantee is more important for me than that project.		
Definitely, there are some things that are more important than the proposed system that we need to pay for to guarantee a decent life, not only for us, but also for our children in the future. Life in Lebanon is not that easy.	I believe that there are many things that are more important than the proposed system that we need to pay for	Opinion about proposed system on cost
You should know that if the government undertakes such initiatives, Lebanon would become a heaven on earth, and this is very unlikely.	I believe that the proposed project is beneficial but the government will not finance it	Opinion about proposed system on cost
At the end of the day, it is water; the most important thing for life. Any project that might bring more water is welcomed, especially for the amelioration of greenery in the city. We have a lot of green spaces in the city, but they are mostly neglected as they cannot irrigate due to electricity constraints and due to water constraints.	I believe that any project that brings additional water for gardens irrigation is welcomed by us	Opinion about proposed system on biophysical impact
The proposed project is beneficial and does not harm anyone, but you need it to be applied and you need everyone to be involved in that. This is a wish. It is beneficial because why waste this water?	I believe that the proposed project is beneficial to prevent wasting water but needs the involvement of residents and government	Opinion about proposed system on biophysical impact - Opinion about proposed system on stakeholders involvement
AC water could be used for many purposes. It can be used for irrigation, as proposed. It can also be used for firefighting as	I believe that AC water can be used for	Opinion about proposed

previously mentioned. A lot of fires usually occur at the backyard of our building near the garbage dump, it could be used for the purpose of firefighting.	irrigation and firefighting in the city	system on biophysical impact
The proposed project is really nice, especially for the amelioration of greenery in Tripoli. I do not know if you have noticed that, but most greenery in the city is becoming dry and not adequately maintained. It is highly neglected by the municipality. The summer months are becoming longer, water is becoming scarcer and there is no longer adequate irrigation for greenery. Therefore, because summer months are long, and AC units are used almost every day, collecting this water may fill the irrigation gap and contribute to the flourishing of greenery in the city.	I believe that the proposed project contributes to the amelioration of unirrigated green spaces in the city	Opinion about proposed system on biophysical impact
Definitely. The only problem with it, as we previously stated, is that not all the neighbors will agree to pay for that and that we need someone to finance it. It is true that you need to pay only once for the system to be installed, but it might be a huge amount and we definitely need assistance from any entity willing to help financially.	I believe that the only problem of the proposed system is that it might be costly and not all residents in building will pay for it	Opinion about proposed system on cost
If you have a building in which all households are willing to pay, you will not find any difficulty with implementing the proposed project. But in our building, it is difficult.	I believe that the problem of the proposed system is that not all residents in building will pay for it	Opinion about proposed system on cost
If the amount of money to be paid for the system gets divided among all the households in our building, it would be so negligible, but nobody pays for anything! Sometimes the elevator gets damaged and nobody is willing to pay for its reparation.	I think that the sum that should be paid is minimal if divided on all households but most of them will not pay	Opinion about proposed system on cost
There are some buildings in Tripoli that have a dedicated amount of money that they have to pay each month in the building. They do not even ask for what this money is dedicated. It is possible that this system be implemented as part of this money. It should be done this way. It is better than going and telling residents we want extra money for that, nobody will pay. Our problem in this building is that	I believe that the proposed system can be implemented in buildings where residents pay a fixed sum of money monthly regardless of what is done with it	Opinion about proposed system on cost

everything we want to do, we should take extra money for it because we do not have a dedicated amount to pay monthly and we do not have a bank for the building. We pay a very negligible amount every month.		
Moreover, we do not have a concierge that might be responsible for such issues, and there is no building council. It so chaotic. But in buildings were there is a concierge, and there is a council, it might be highly possible to implement it.	I believe that the system is not possible in our building as we do not have a concierge or a building council	Opinion about proposed system on stakeholders involvement
You will discover, after conducting several focus group discussions, that most building residents will tell you the same thing that we told you. Even in the wealthiest of buildings, and the wealthiest of neighborhoods, not all people are willing to pay for that.	I believe that most residents, even in wealthy neighborhoods, will not be willing to pay for the proposed system	Opinion about proposed system on cost
To make the project more possible, you need to undertake awareness campaigns and educate people around this issue. People should understand why it is nice and beneficial to collect the water from AC units and to reuse it. People are not aware of this water. (x2)	I believe that awareness campaigns around AC water reuse and systems should be done to increase chances of implementing proposed project	Opinion about proposed system on stakeholders involvement
It is not that they are not aware about this water, but they do not give great importance to such a proposal or to such a water source. They think that there are plenty other things that they need to prioritize (x2).	I believe that residents are aware of AC water but do not care about it	Opinion about proposed system on stakeholders involvement
You need to do an awareness campaign about the quality of the water that comes from AC units and the purposes that it could be used for. Then, you can start asking people about the possibility of collecting it or of developing the system you showed us on their buildings. Without being really aware and convinced about this water, they would not be willing to do anything.	I believe that awareness campaigns around AC water reuse and systems should be done to increase chances of implementing proposed project	Opinion about proposed system on stakeholders involvement
In our society, awareness campaigns might not be as effective as in others, but at least, you could have tried. (x3)	I believe that awareness campaigns might not help in project implementation	Opinion about proposed system on stakeholders involvement

I do not agree with you, my friends. I think that awareness might really work. In the boulevard, dam w farez, maarad, and many other areas that have a relatively good socio-economic class, people are bored of the bad situation of our city, and that is getting even worse every day. Therefore, I think that awareness regarding this issue will be most welcomed. Even the poor class of Tripoli are bored of its bad situation and desperately want a change.	I believe that awareness campaigns help in project implementation because all people in Tripoli are bored of its bad situation and desperately need a change	Opinion about proposed system on stakeholders involvement
As we said, we think that the only constraints for the implementation of this project are the lack of awareness of people regarding this water and the inadequate financial resources and lack of residents participation in financing.	We believe that the problems of the project are the lack of awareness of residents and their unwillingness to pay for it	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
Listen, people would agree on anything as long as you do not get close to their pockets. You can propose whatever you want, but do not get close to their pockets. They would tell you it is so nice and feasible, and once you are to apply that, nobody would pay.	We believe that people would agree to implement the system if they are not the ones who will pay for it	Opinion about proposed system on cost
There is no person who does not like to improve and advance at the level of both himself and his surroundings, but the important thing is not to get close to the pocket. The situation is devastating, not only on the poor, or on the middle-class people, but on all people. It might maybe be more feasible to do that in new buildings nowadays.	We believe that people would agree to implement the system if they are not the ones who will pay for it, therefore, we think it is better to implement it during the construction of new buildings	Opinion about proposed system on cost
Definitely, just as some buildings are using solar energy for heating and hot water. Such things should better be done in new buildings. It should be the task of the engineer to design such a system inside the building just as they design for electricity and water.	I believe that this project is better implemented during the construction of new buildings	Opinion about proposed system on biophysical impact
They could also put central AC systems instead of split units, it might also be even better for the proposed project. Central AC	We believe that central AC systems are better for the proposed project,	Opinion about proposed

systems operate in summer and in winter. It is even better. All new buildings should be equipped with built-in central AC systems. This provides you with so many things and also saves you so much money. (x3)	especially in new buildings	system on biophysical impact
For your project, we will not say the municipality, but if NGOs from Tripoli come and be in charge of the financial and technical aspect of the project, it will definitely happen. This is if we do not want to depend on the municipality.	We believe that the project can happen if NGOs were responsible for it because no trust in municipality	Opinion about proposed system on stakeholders involvement
There are no effective NGOs in Tripoli. They do not work much. (x2) We need some entities to support us. Tripoli is really poor. Its situation is bad. Maybe if you proposed this project elsewhere in Lebanon, it might even be more feasible.	We believe that the project cannot happen in Tripoli as there are no trusted NGOs and we need support from government or other entity	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
the financial situation and the environmental awareness of people are very important and really affect the implementation of such projects.	We believe that financing and environmental awareness are key for project implementation	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on cost
I do not feel that the municipality does anything beneficial for the city.	I believe that the municipality does not work for the city	Opinion about proposed system on stakeholders involvement
You cannot understand how they think in the municipality. They work once every 20 years.	I believe that the municipality does not work for the city	Opinion about proposed system on stakeholders involvement
The municipality is not finishing any project it started with. They start with the project and do not continue with it every	I believe that the municipality will not finance project or abide	Opinion about proposed

time. It is difficult for them to abide by financing or water collection, I guess.	by water collection as it does not usually continue projects	system on stakeholders involvement
We barely see the municipality working with any green space in the city, especially in the median in front of our building. They do not spray it nor irrigate it. It is only irrigated naturally in winter. (x3)	We notice that the municipality does not maintain green spaces in the city	Opinion about proposed system on stakeholders involvement
I notice that in front of my sister's building they come and maintain the green space there sometimes.	I notice that the municipality maintains green spaces in the area of my sister	Opinion about proposed system on stakeholders involvement
The municipality maintains green spaces depending on who is residing in this area. If an important and wealthy person resides there, they would ameliorate all the area for him.	I believe that there are disparities in green space maintenance between areas	Opinion about proposed system on stakeholders involvement
I am not only talking about irrigation, but all the tasks that the municipality performs such as cleaning and maintenance works. It is very rare to see them working in our area. It has a lot of irresponsibility and negligence.	I believe that there are disparities in all tasks of municipality between areas and that it is irresponsible and negligent	Opinion about proposed system on stakeholders involvement
I believe that through the proposed project, people would become more aware on other environmentally friendly practices. Tripoli really needs awareness. AC water for example would start being used for plants and would end up being used for many other purposes. It would start from buildings in small neighborhoods and then be implemented on the entire country. This would save us huge amounts of water and prevent water scarcity issues in the future. It would encourage people to adopt more sustainable practices in their buildings. It might lead them to do green roofs also.	I believe that the proposed project could make people more aware of eco-friendly practices, prevents water scarcity and encourage residents to adopt sustainable practices in buildings	Opinion about proposed system on biophysical impact
we believe that the municipality could use the collected water for the irrigation of any area when there is a compromise between buildings and the municipality, and this entity comes collects the water. (x2)	We believe that the municipality could use AC water for any area if it abides by water collection	Opinion about proposed system on stakeholders involvement

I have a problem if AC water goes for the maintenance of greenery in poor areas, and then I know that these spaces do not have any rules and are being damaged by residents.	I believe that AC water can be used for green spaces in poor areas on a condition that they have rules	Opinion about proposed system on biophysical impact- Opinion about proposed system on stakeholders involvement
In my opinion, if I am self-sufficient in terms of water in the area I reside in, I would definitely give the water to the municipality to benefit from in areas where they do not have water for irrigation. However, they should first of all ameliorate the greenery surrounding my house and my neighborhood, and once their situation becomes better, they could take the water for other areas.	I believe that the municipality should ameliorate greenery near our building before using it for other areas	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on biophysical impact
we would really like to have more greenery in our area. It is relaxing, satisfying and provides us with a place to undertake many activities.	We want to have more green spaces in our neighborhood to relax and undertake activities	Opinion about proposed system on biophysical impact
Of course. Our country has become very dry and we need more greenery. They boost our mood. The air becomes purer, the aesthetics become better and the overall image of Tripoli becomes better. This is what we think.	We need more green spaces to boost our mood, purify the air and ameliorate the image and aesthetics of our city	Opinion about proposed system on biophysical impact

III. Stakeholders interviews

Sentence	Idea	Theme
I know that the are some ladies that put AC on their face and wash their face with it, I heard of that once. I tasted it once by mistake and its taste does not sound great	I hear that ladies wash their face with AC water, and I tasted it once but it was not good	Use of AC water

I think it is, well I do not know if it is distilled water or similar to it, it does not contain too many minerals and pollutants, I guess. This is it; I think. It is basically the humidity in the air inside room that is sucked and withdrawn to the outside.	I think that AC water does not contain too many minerals or pollutants	Knowledge of AC water quality / quantity
Well, concerning using it for many purposes, and what are these purposes, I do not know. Honestly, I did not do any research on this topic before. However, I think that it could be used for irrigation, but honestly, I do not know if the lack of minerals in it could affect plants' health. I definitely need to know more about the constituents of this water to know how to answer your question. I have not done any research about its quality and its potential uses before.	I do not know about the quality of AC water as I have not done research on it before/ I do not know if it could be used for irrigation because it lacks minerals	Knowledge of AC water quality / quantity
The quantity of AC water depends on the hours of operation. I think it could generate one gallon of water per day; that is around 10 liters. I do not know; it depends on the hours of operation. For example, in the municipality, during the working hours (from 8am – 3:30 pm), I have noticed that the AC generates around half to a full 10 L gallon of water, I think.	I believe that the quantity of AC water depends on the hours of operation of ACs; AC generates around 10 liters of water during working hours of municipality	Knowledge of AC water quality / quantity
Here in the municipality, most AC water is collected in gallons and they usually forget to empty the gallons regularly, therefore, most of it spills into the floor and is wasted	AC water collected in gallons in municipality, leaks to floor and is consequently wasted	Use of AC water
In households, I know that some people collect AC water in gallons, some others branch it to their balcony plants or use the water collected in the gallons to water the plants manually. Some people also use it for cleaning purposes, for example, cleaning the floor of the balcony or the rooms in the apartment. In general, this is what people do with the water; they either collect it and reuse it for irrigation and/ or cleaning, or their pipe is branched to the sewage network and the water is wasted.	I know that people either collect AC water and reuse it for irrigation and/ or cleaning, or it goes to the sewage network and is therefore wasted	Use of AC water
I heard that people use it for the car battery before, but I did not know that it could be used for ironing. I think that	I heard that AC water can be used for the car battery, but I did not	Use of AC water

people who are knowledgeable about that are very few.	know that it can be used for ironing	
We do not have a problem with using AC water for the irrigation of public gardens in the city. In fact, in Tripoli, public gardens that are equipped with an effective irrigation system are few. The rest are irrigated manually through a truck and a pipe. Most of the street greenery in the city, such as medians, are irrigated manually. The watering trucks usually go to the water authority to fill the reservoirs used for irrigation. Therefore, if we have another source of water, this is something wonderful, especially that sometimes the water authority face some water scarcity challenges, or sometimes there is a lot of demand on water and we cannot fill the reservoir more than one to two times per day.	We do not have a problem with using AC water for irrigation as irrigation systems in most public gardens and medians are not effective and are irrigated manually through water trucks that are sometimes not able to take enough water from water authority in summer	Drivers for use
Water scarcity challenges do not always occur. It usually happens in the summer months when there is a lot of demand on water, and when the weather is too hot and dry. For example, this happened last year, and they told us that there is too much pressure on water, therefore they could not give us much per day.	Water scarcity challenges only occur sometimes in summer and this happened last year due to increased demand on water	Drivers for use
Yes, water scarcity is beginning to happen. But we should note that all the points of water provided by the authority are always filled with water. However, if we have another source of water, the pressure on the available water resources will definitely be less.	We know that water scarcity is beginning and we think the presence of an additional water sources decreases pressure on water resources	Drivers for use
Having an additional source of water motivates us, as a municipality, to plant more green spaces. For example, if the water condensate generated from AC units was recuperated, of course after making sure that it is clean and safe, we could definitely use it for irrigation. We can maybe recuperate this water and put it in the reservoir of a public garden that is equipped with an irrigation system. Therefore, we would have used the water instead of wasting it	We will be motivated to plant more green spaces if we had an additional clean source of water for irrigation/ AC water could be filled in garden reservoir equipped with irrigation system	Drivers for use - Suggestion for use

Well water used for irrigation is sometimes saline, especially if close to coastal areas like in Tripoli and Beirut. The water that comes from the water authority is definitely cleaner than the water of wells.	For irrigation, I believe that water authority water is cleaner than well water which is sometimes saline if near the coast	Drivers for use
Water coming from the water authority is considered potable; people usually drink from it and we also irrigate with it. It is clean and we do not face any problems with its employment. We are currently planning for a new plant nursery that is very close to the coast, therefore, digging a well will not be effective because expectedly, the water will be saline. Therefore, we will use water from the water authority that is definitely cleaner. I do not know honestly if the water authority adds chlorine to the water, but mostly this water is usually potable, and therefore I think that it definitely fits with the standards for drinking water.	I believe that water authority water is clean and safe to use for irrigation; it fits with the standards of drinking water	Drivers for use
The proposed prototype is a good idea if the quantity of condensate generated is significant. If the quantity is limited, and the reservoirs were small, the time constraints and the plenty of tasks to be accomplished will not enable us to do that. It would be a waste of time. But if you tell me 1000L per reservoir, for example, yes it could be possible. If we consider that each AC generates 6 liters. We can say that each building generates around 1000 L per week. And if we multiply that by the number of buildings, it turns out really significant.	I think that the proposed prototype is a good idea only if the amount of AC water is big due to time constraints and responsibilities	Knowledge of AC water quality / quantity- Opinion about proposed system on stakeholders involvement - Opinion about proposed system on biophysical impact
You should know that there is always a gap between planning and implementation in the municipality. We are always impressed in certain ideas, but if we come to do it, it turns out challenging and difficult in most of the cases	I think that there is always a gap between planning and implementation in the municipality	Opinion about proposed system on stakeholders involvement
We have a lack of employees in the municipality in all the departments, especially in the gardens department. Sometimes, we are obliged to let the	I believe that AC water collection from building reservoirs is not possible currently because there	Opinion about proposed system on

employee do several things, even if it is not in his domain. For example, the employee that drives the watering trucks for irrigation is the one who irrigates too. This same employee is not originally assigned for irrigation, his original task is to cut and maintain the leaves of trees. However, I placed him in this position because we do not have enough employees and because I need someone that is knowledgeable about the water requirements of plants and their maintenance needs. If for the collection and recuperation of the AC condensate we would need around two additional employees, currently, it is not possible. It is also not to forget that we need to profit from every second in the day, and the city is big compared to the number of employees and trucks we have to irrigate the huge amount of greenery. We already have a very packed schedule for irrigation in the morning, and another one in the evening, and even with that we are only able to cover the most important parts of the city each day. If there were more employees in the future, it would be possible.	is a significant lack of employees in the municipality and we already have a packed schedule for irrigation that we are not always able to cover/ it could be possible if more employees in the future	stakeholders involvement
if the prototype was implemented on the buildings of one street, it could be easier. You should know that the decision is not only mine, but when the municipality really wants to implement that, it provides a very beautiful image of Tripoli. Also, when they have something in mind, they suddenly bring employees from "under the floor". I think in this case it is feasible to do that in the evening.	I think that it is more possible to implement the project on one street, but municipality stakeholders should be willing to do it for it to happen (need for will)	Opinion about proposed system on stakeholders involvement
The proposed strategy is very beneficial and environment-friendly, especially that the water generated is not being wasted and it is recycled in an era where water scarcity is really prevalent all over the globe. Also, it is a sustainable idea that boosts the economy of water in many ways. The whole idea that the water is recycled rather than being wasted is very nice and beneficial, and it is of no doubt	I believe that the proposed strategy is beneficial as it prevents water scarcity, boosts water economy, and cover the irrigation needs of many areas	Opinion about proposed system on biophysical impact

that the amount of water could cover the irrigation demand of many areas.		
As I told you before, instead of going to the water authority to get the water needed, we can do that in the buildings by emptying the reservoirs. This might take more time as we have a lot of buildings, but it would give a beautiful image for our city. For example, we have a public garden in Abou Samra, in which NGOs have planted some vegetables. It is equipped with a water reservoir that is filled by us every now and then. Therefore, it would be a great idea to collect the condensate water from the surrounding buildings and fill the reservoir, or even from other buildings. This is because it already takes us time to get the water from the water authority, therefore, it will not be a big deal.	I think that emptying building reservoirs might take us more time but provides a beautiful image of the city/ AC water could be collected from buildings and put in garden reservoirs	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on biophysical impact
I think that having an additional source of water like this could motivate us to create even more public gardens and street greenery	I think that reusing AC water motivates us to create more greenery	Opinion about proposed system on biophysical impact
The proposed strategy could also reduce the pressure on water in the city. Sometimes, the watering trucks are not able to irrigate because some households are not receiving water, therefore the municipality goes and fills their reservoirs from these trucks. If the water is deemed clean and safe to use for personal hygiene, the idea could also be widened as to use it for filling the reservoirs of households. Therefore, the reuse of AC condensate for irrigation could reduce the pressure on water, whereby the water authority could distribute water more evenly.	I think that proposed strategy for irrigation reduces pressure on water resources in city, and allows water authority to distribute water evenly to households	Opinion about proposed system on biophysical impact
As a municipality, the incentive that could drive us to implement such a project is to enhance the image of our city locally and globally. For example, when people see that we have a neighborhood in the city in which AC water is collected and reused for irrigation, this is something really nice especially if it is done by the municipality.	Our incentive to implement the proposed project is to enhance the image of our city locally and globally and enhance people's trust and faith in our work as project not implemented	Opinion about proposed system on biophysical impact- Opinion about

It gives people more trust and faith in our work. Similarly, if we say that we have a neighborhood or street in which waste is sorted at source, this will ameliorate our image. There is the concrete side in which we are irrigating the greenery to ameliorate the aesthetics of the city, and there is the cultural side in which we will be showing to other countries that we have the ability and willingness to implement such things. In Lebanon, for example, I do not think that there is anyone that implemented such a strategy before, even in malls or commercial buildings. Even in other countries, I think that this has rarely been implemented at the residential and municipal level, it is mostly commercial.	on residential buildings even in other countries	proposed system on stakeholders involvement
In other countries, where you have a lot of money, and people who really care about the environment and about ameliorating their surroundings, every idea is welcomed. Unfortunately, in Lebanon, most of the people do not have the culture of caring for the environment. For example, the idea of collecting AC water could easily be implemented in the municipality building. We have a lot of AC units. Most of the times, the gallons are full and are draining into the floor. I always think what are we doing with this water? I do not know honestly if the cleaning employees clean with it. It could be the case; I do not know. But if they do, it is something wonderful. Or even if we had plantations in the municipality, it would also be a great idea to collect it and irrigate with it. Look, for example, I have the paper shredder, and I always shred the papers and keep them for heating purposes in my home. And I always think about collecting the scratch papers from all the offices and using them in my home, rather than throwing them or wasting them. It is a matter of small acts and small steps, but few people understand that.	I think that the problem hindering the implementation of these projects in Lebanon is the culture and lack of care for the environment/ few people understand that it is small acts that matter/ AC water reuse greatly feasible in municipality but no one is willing to do it	Opinion about proposed system on stakeholders involvement
We irrigate the public garden in front of the municipality building through a pipe and we get the water from the water	We could have irrigated the municipality public garden with AC water if	Suggestion for use- Opinion

authority. For example, if we collect the water in the municipality, we could have been able to irrigate it from this water. This is a project by its own.	we collect it in municipality building	about proposed system on biophysical impact
The mentality of people and stakeholders is the main disadvantage of the proposed strategy. You need someone who really cares about these things and about such ideas in particular. I am talking about the mentality of municipality stakeholders in particular. They should have the will to implement such projects. You also need professionals in the field who really understand how to implement the project and what is needed for that.	I think that the main problems of proposed strategy is the mentality of people and lack of will by municipality to implement these projects, as well as lack of expertise in this field	Opinion about proposed system on stakeholders involvement
I will honestly tell you, if we look at the ACs in the municipality, the number is big. This water could be collected. However, unlike in residential buildings, the piping system might not be feasible in the municipality because ACs are installed randomly. In this case, we might employ someone to collect the gallons and empty them in a reservoir.	I think that the proposed prototype cannot be implemented in municipality because ACs installed randomly; we might employ someone to collect the gallons and empty them in a reservoir instead	Opinion about proposed system on biophysical impact
Another effective idea is that every employee in the municipality could, at the end of each day, empty the gallon generated from the AC in his office in the reservoir. Honestly, if one is willing to implement AC water reuse, there is million ways to do that.	I think that every employee can empty his collected gallon in a reservoir at the end of the day/ there is a million way to reuse AC water if there is a will to do it	Suggestion for use
I do not think that there exist any financial constraints that could face the municipality in the implementation of the proposed strategy. The municipality of Tripoli is the wealthiest and biggest municipality in Lebanon.	I believe that the municipality does not have financial constraints with the proposed strategy because it is wealthy	Opinion about proposed system on cost
With regards to implementing the proposed strategy, we mainly have two constraints: the insufficient number of employees and the priorities. For example, the municipality will regard the idea of investing money in a project to recuperate AC water as something secondary, as we already have a source of water at hand.	I think that the main problems of the strategy are the lack of employees and the presence of other priorities	Opinion about proposed system on stakeholders involvement

Operating a truck to go collect the water from the water authority and irrigate with it or fill the reservoirs in the gardens does not cost as much as going to each building, filling the reservoir in the truck and waiting for the water to be emptied. It is also not forget that this operation could cause some traffic on the streets due to the continuous stopping of the truck.	I think that collecting AC water from buildings is more costly than getting water from the water authority and could cause traffic due to continuous stopping	Opinion about proposed system on cost-Opinion about proposed system on biophysical impact
if all buildings were located in the same neighborhood as the garden to be irrigated, the project might not cost much in terms of money. However, the process will definitely be time consuming. Collecting water from several buildings takes way more time than filling a reservoir from the water authority.	I think that project will not cost much if buildings and gardens in same neighborhood, but it is still time-consuming	Opinion about proposed system on cost-Opinion about proposed system on stakeholders involvement
I guess that having a fixed piping system branched to the gardens or street greenery is better than collecting the water manually. The reservoirs could be branched to pipes that direct the water towards the area to be irrigated. This will definitely cost the municipality a lot of money, especially for the installation and maintenance, but it is a long term system that irrigates effectively and more easily. There is no doubt that this is very difficult to be implemented because you will have to pave all the streets to install pipes.	I think that branching pipes to green areas directly is costly and needs effort, but it is easier and better at the long term	Opinion about proposed system on design
I think that the implementation of the proposed project needs the participation of environmental NGOs. There are a lot of NGOs in Tripoli that are capable of helping this project become a reality. An NGO, for example, could be responsible for collecting the water and we, as a municipality, could give them the authority to empty the collected water in the reservoirs of the gardens, or bring it to the municipality and empty it in the reservoirs of trucks. We are ready to cooperate with NGOs. It would be really	I think that the implementation of proposed project needs NGOs to collect water and we could give them the permission to empty it in reservoirs of gardens or trucks/ it is easier if NGOs collect it because lack of employees and no time in municipality	Opinion about proposed system on stakeholders involvement

easy to reuse this water if there is someone to collect it, as the employees in the municipality already have plenty of tasks to do and we have very few employees currently. In the future, maybe, if the number of employees and trucks increases, we could definitely do that.		
The number of trucks and employees needed for the proposed project depends on how the water is to be collected. For example, whether by suction or whether the reservoir is connected to a pipe that empties the water. The latter would take much more time and resources than the first suggestion for example. Nevertheless, our trucks do not contain any equipment for the suction of the water but it is undoubtedly present in the market. Therefore, either the reservoir placed down the building should be equipped with this machine or the truck. This would cost additional money. I think this strategy should be implemented in an area with high socio-economic status where residents would select adequate machinery and pay more for a better installation. It will not be easy.	I think that the proposed strategy might be feasible if implemented in wealthy neighborhoods and if people pay for the installation of a suction equipment in the reservoir to speed up the operation	Opinion about proposed system on cost- Opinion about proposed system on stakeholders involvement
I think that residents would really like this idea. However, when they will know that they will have to pay for the installation of the system and for the reservoir, because the municipality will not assist them in financing, I do not know if the idea will still look appealing to them. I think that such an idea could be better implemented at the level of commercial buildings, malls and universities, rather than at the residential level. This is my personal opinion. As I told you previously, it is a matter of culture and a matter of the area in which the strategy is to be implemented.	I do not think that people will implement the system, especially because they will have to pay for it and the municipality will not assist them/ project is better implemented at the level of commercial buildings	Opinion about proposed system on cost- Opinion about proposed system on stakeholders involvement
The water generated from AC units is of good quality and we can bathe with it, and use it for personal hygiene, I hear people say. I do not have any AC unit in my household, but I also hear them say that it is too good for cars. For example, if we find that the car engine is filled with water	I do not have AC units in my house but I hear that AC water is clean and safe to use for personal hygiene and cars as it is free of lime residues	Use of AC water- Knowledge of AC water quality / quantity

that has lime residues, we can empty it, clean it and fill it with water from the AC, as it does not contain lime residues, it is of very good quality.		
I hear that this water is clean from a lot from people. I think because it is "purified water". I also think that mostly the water that comes from ACs differs from groundwater or tap water that comes from the water authority. I think that the AC purifies the water, just like a filter. For example, if you want potable water at home you put a filter for it. They say that AC water is similar to that, it is pure.	I think that AC water is purified; the AC purifies this water	Knowledge of AC water quality / quantity
I do not think it contains any pollutants. For example, the water that you fill for the car either from the tap or from a well contains lime residues. On the contrary, the water that you get from an AC unit does not contain lime residues and does not contain any other type of pollutant.	I believe that AC water does not contain pollutants or damaging lime residues	Knowledge of AC water quality / quantity
I do not have any idea if this water could be used for purposes other than personal hygiene or car. As I told you, I do not use this water, I just hear about it. I do not have any AC unit in my home.	I do not use AC water and I do not know for what purposes other than personal hygiene it can be used	Use of AC water
I have never used AC water for irrigation at home or work, but I think that it is also good for the irrigation of plants. The water used for irrigation should not be salty and should be cold, especially during the hot and humid days of the year. Also, I do not think that it should contain any minerals or additives. But honestly, I do not personally know anything about AC water for irrigation.	I think that AC water might be good for irrigation because water for irrigation should be cold, not salty, and I think it should not contain minerals or additives	Knowledge of AC water quality / quantity
I think that one AC unit could generate around one gallon of water (8 liters) every 5-6 hours. It is a big quantity.	I think that AC units generate a big quantity of water per day	Knowledge of AC water quality / quantity
I hear that some people collect it in gallons, and if anyone has any infections in his feet, he could rinse his feet with it. In my uncle's house which contains ACs, for example, he puts the pipe that directs the water in a water gallon, and he keeps them aside. He reuses this water for the	I hear that some people collect AC water in gallons and use it for treating feet infection, car and personal hygiene, some others might use it for other	Use of AC water

car or for personal hygiene, as I told you. Other people branch the pipe to the sewage network, I think. Some people might also use it for other purposes and uses, and maybe the majority of people do not use it, but they say that it is too good.	purposes and some people do not use it at all	
In my car, the engine contains a lot of lime residues. Therefore, I am thinking to clean it and take AC water from the household of someone I know and fill it with it.	I am thinking of taking AC water from someone I know to put it in my car as it is free of lime residues	Use of AC water- Knowledge of AC water quality / quantity
If experts tell me that its quality is good for irrigation, I will use it, why not. The head of gardens department knows, and has studied these issues, I guess. If he tells me that AC water is good for irrigation, I will use it. My personal experience does not allow me to know whether it is good or not for this purpose. It might be better than well water, or vice versa.	I am willing to use AC water for irrigation if experts assure me that it is good for plants	Suggestion for use
I think it is a good idea to use AC water for gardens irrigation. Instead of a water truck, we can irrigate the garden using a water pipe installed on the ground from the ACs to this piece, for example.	I think it is a good idea to reuse AC water for irrigation through pipes directly connecting ACs to gardens	Suggestion for use
In terms of water, we do not usually face problems. There is usually plenty of water. However, reusing AC water in hot and dry days just like these days is beneficial because we sometimes face problems with taking the water from the water authority because of the tremendous demand.	We do not usually face water scarcity but reusing AC water for gardens can be beneficial when we cannot take much water from water authority sometimes in summer	Drivers for use
Reusing AC water at the level of the municipality could be hard given the lack of employees. We have a serious lack in this regard. For example, I usually work with cutting and decorating the trees, this is my profession. However, I am currently working on the watering truck just in the summer where we need to irrigate.	I believe that reusing AC water for gardens can be hard due to lack of employees in municipality	Challenges for use
If water available was not sufficient on a particular day, I try to water the unirrigated areas on other days when I have free time. For example, if i was watering the greenery in Abu Samra, and I finished early and I had too little work, I	I cover areas not irrigated due to water scarcity when I have free time	Challenges for use

go and irrigate the areas that I was not able to irrigate the other day due to the limited quantity of water I got from the water authority.		
When we do not have enough water, it is important for us to have a second, and even a third supplementary source of water. However, you should know that this does not occur frequently. This is the first year in which I worked in irrigation, but I have heard that this has happened many times last year and maybe the year before.	We should have a supplementary source of water, even though scarcity does not occur frequently	Drivers for use
There is a lot of pressure on me as I am the only worker that irrigates during the day. There is another watering truck that operates at night, and the engineer responsible has put a schedule for irrigation during the day and at night. There are two shifts.	I am too busy because I am the only worker that operates in the day and another worker irrigates at night	Challenges for use
Somedays we run out from fuel oil and benzene, so we are not able to work. It happens. We are in a huge economic crisis. Sometimes there is no fuel oil in the stations, or the municipality does not spend money on fuel oil or benzene. We have faced these issues a lot two months ago. We face these issues one or two days, not more than that. When these problems occur, we would definitely not be able to irrigate.	We were not able to irrigate sometimes this year because we used to run out of fuel oil and benzene due to the economic crisis in the country	Challenges for use
I think that the prototype is a good idea, because taking this water and making use of it is much better than it being wasted and spilled on the streets. It is better than wasting it because most people, or a huge part of them, will definitely not use it. We could use it for irrigation or give it to someone who needs water. The strategy you proposed is not bad to prevent the water from being wasted.	I think that the proposed strategy is beneficial to prevent AC water from being wasted	Opinion about proposed system on biophysical impact
As I told you, it is better than wasting this water. For example, if a building has a garden in its vicinity, water from the AC units of this building's households could be used to water the garden.	I think that AC water of buildings can be used on nearby gardens instead of being wasted	Opinion about proposed system on biophysical impact
The idea is nice, but I think that taking water from the water authority is better,	I think that collecting AC water from buildings	Opinion about

not because their water is better, water from the AC is better, but because if I want to stop at each building and empty the water it would take me a lot of time. My working hours would be finished, and I could not have started with irrigation yet. It is a matter of time. For example, my watering truck has a capacity of 16,000 liters, it needs around half an hour to be filled from the water authority and it needs around 2 to 2 and a half hours to be emptied.	is too time-consuming and I will not have time to irrigate	proposed system on stakeholders involvement
I think that it is better to install piping systems for irrigation if the buildings were too close from the garden to be irrigated to save time. Actually, drip irrigation is so much better for plants than manual irrigation. The plant can absorb water more effectively. When we irrigate manually, the high pressure of water could deteriorate the plant. Personally, when I irrigate, I stand ten meters far away from the plant and I put my hand on the pipe to reduce the pressure and its impact on plants. The installation of such a system is too easy, it is installed above the ground. It does not need any destruction. This is for sidewalks or roundabouts. However, if there were streets between the buildings and the areas to be irrigated, I think that it is not feasible to install pipes and that it needs a lot of time and money. Manual irrigation in this case is definitely better.	I think that it is better that above ground pipes (drip irrigation system) be directly connected to nearby gardens because it is more healthy for plants and saves time, but it is not feasible if streets are present in between	Opinion about proposed system on design
Sometimes, even when there is a drip irrigation system installed, it might either be demolished by people or not operating due to maintenance problems. For example, I usually irrigate all the median spanning from Sehet el Nour to Nini Hospital from 5 am until 8 am, although this median has an irrigation system in place. All the pipes there and the drip irrigation network are broken and destructed by people. These problems are not from the municipality, but from the people. There are a lot of Syrian refugees that sit there. They previously planted it with grass, it was so beautiful. However,	Drip irrigation systems installed on medians are always deteriorated by people	Opinion about proposed system on biophysical impact

homeless people and Syrian refugees sitting there have demolished it. I do not know if we will plant it again. The engineer responsible is working on this issue.		
To be honest, there is no lack of responsibility or negligence in the maintenance of green spaces. However, as I told you, there is a lack of employees in the municipality. The quantity of gardens and green spaces in the city is too big in comparison with the number of employees available. For example, in the garden of the Biaa which is too big, there are only two workers. They can barely do all the essential maintenance work alone. They need to cut the grass and trees, irrigate them, and clean the garden, all by themselves.	Problems with the maintenance of green spaces are not due to irresponsibility but due to lack of employees	Opinion about proposed system on stakeholders involvement
When it comes to watering trucks, we have only one for the department of gardens that irrigates during the day. The other truck that irrigates during the night is for "Warshet el taware2". Having only one truck during the day is definitely not enough. There are some areas that I do not have time to complete. Sometimes, when I am working, they call me several times to transport water from one area to the other or to irrigate a part that is not listed in the schedule, so I do not have time sometimes to cover the irrigation of all the areas. For example, the engineer responsible sometimes calls me to take water to a particular garden because the irrigation system there could be broken. I need to do that immediately to prevent the plants or grass from dying.	I think that having only one truck for daytime irrigation is not enough because sometimes I cannot irrigate some areas, especially that they call me to provide water for gardens in need due to broken irrigation systems	Opinion about proposed system on stakeholders involvement
I provide additional water for gardens in need depending on my schedule and on the free time I have. For example, in the weekend, I have little work to do, therefore I provide them with water during the weekend. All of this depends on how much work I have. We can say around one to two times per week on average. However, I cannot go give water to the	I provide water for gardens in need one to two times per week depending on my free time	Opinion about proposed system on stakeholders involvement

worker in the garden without being ordered by the engineer responsible.		
For the proposed strategy to happen, we will need new and recent equipment. For example, we would definitely need the reservoirs of buildings to be equipped with a system that pumps the water rapidly, or with a water pipe that has a very high pressure through which the water can flow and fill the reservoir in less than 5 minutes. Also, we need something that can replace the truck, like for example, a truck that can sprinkle water by itself. This would save me a lot of time and make this operation easier. For example, several days ago I saw on facebook a machine that could sprinkle water as long as its walking. It is amazing. This will never be available in Lebanon before 2030, if at all.	We need advanced equipment to implement the proposed strategy such as motor in reservoir, pipe with large diameter and pressure, and an advanced truck for irrigation	Opinion about proposed system on design
I also suggest building a huge reservoir for the municipality of capacity of 100,000 – 200,000 liters for example, that could be filled from this water whenever possible, and this water could be kept for later use if we face any problems with water in the future.	I suggest building a big reservoir in the municipality for the storage of AC water for later use	Opinion about proposed system on biophysical impact
Usually, from the water authority, it needs around forty five minutes to collect the water and around 2 hours and a half for emptying it. If filling every reservoir from buildings would take me that much time or even more, I suggest, as I told you, to increase the pressure of the water and get water pipes that can handle a pressure of 2-3 inches of water instead of 1 or 1.5 inches. It would need for example a maximum of ten minutes for each reservoir to be filled instead of forty five minutes. That way, instead of doing 2 rounds per day for example, I can do up to three or four. This strategy definitely needs a motor for pressure to be installed in the reservoirs of buildings and needs pipes with strong pressure, as I told you earlier. I can imagine that with this equipment in place, emptying each reservoir of 1,000 to 2,000 liters would need a maximum of 5 to 10 minutes. It is a	I think that we need water pipes that can handle strong pressure and a motor in reservoirs to speed up water collection	Opinion about proposed system on design

matter of equipment. We need a strong system and motor for suction in the reservoir and we need strong pressure in the watering trucks. A motor on each reservoir.		
Increasing the number of workers and water trucks would also definitely speed up the operation and would also allow us to divide the task by area. For example, instead of me being responsible for all the areas, we can divide the areas between the trucks and employees available.	I think that we need to increase the number of workers and watering trucks to speed up water collection	Opinion about proposed system on stakeholders involvement
If an NGO collects the water, this definitely speeds up the process too. Instead of me wasting my time to collect the water, they would do that for me. However, it depends on the technique through which we will take the water from the NGO. If it was better than the one adopted with the water authority, why not?	I think that it is better that an NGO collects the water for us but we need to figure out how to take the water from it	Opinion about proposed system on stakeholders involvement
I would definitely go for the less time consuming option for water collection. You should know that sometimes some wells have a very poor water pressure, therefore we do not use them for irrigation because the practice is too time consuming. We supplement the garden with water from the water authority. There are also some wells that we do not use anymore because the people started using them for cleaning their cars and many other purposes.	We prefer the less time consuming option for water collection/ sometimes we do not use water from wells because they have poor pressure and its pumping takes time	Opinion about proposed system on stakeholders involvement
Water from wells is not always of good quality, especially if it is near the coast. Sometimes it turns out salty and sometimes no. Sometimes even when it is not near the coast, the water could be salty. Didn't you hear about the area of mahjar el sehi, where they digged a well and the water pumped was found to be salty? There are also some wells that are not good for drinking also. The water in them could have too much lime residues. If someone drinks from it for a very long period of time, he might suffer from kidney stones or any other severe medical condition.	Well water is not always clean, and it is salty in areas near the coast and not potable	Opinion about proposed system on biophysical impact

Financially, there is no problem with the proposed strategy, I guess. This municipality is capable of doing a lot of things; there is a lot of money in its disposal.	I believe that the municipality is financially capable of doing the project	Opinion about proposed system on cost
The systems allow the municipality to collect AC water and store it for periods when there will be a lack of water in the future. We never know what happens. Water might get scarce, wells might become dry… We never know. We would have an additional source to rely on. I am afraid that if the water authority takes this water, they would not give us enough if problems in water occur in the future. They might give us only one truck per day, or whatever, you never know what happens anyway. They could also maybe restrict us from getting water for only once or twice per week.	I believe that the proposed system provides an additional source of water if water scarcity happened in the future and we do not want the water authority to take this water	Opinion about proposed system on biophysical impact
Financially, I think it would need the same amount of money as going to the water authority and collecting the water from there. If 3-4 trucks operate to collect this water, it would be great and would have the same financial expenses. The road it takes me to go to the water authority costs around 10,000 LL. I think that what you proposed could cost us less money in terms of transportation or even the same amount. I do not know	I think that the proposed system will cost us the same amount of money as taking the water from the water authority in terms of transportation if several trucks operate	Opinion about proposed system on cost
It is possible that residents install piping systems and put reservoirs at the bottom of the building for AC water collection. However, the idea that the municipality sends us to collect water from these reservoirs is impossible because this does never occur unless we do not have any source of water to irrigate our gardens. It needs too much time and effort, and it causes problems in terms of working hours. It is also weird because usually the watering truck fills water in a reservoir, not the reservoir is filled in a water truck. If someone sees me doing that, he will laugh at me. Currently, I do not think it is possible. But later, maybe, it could be	I believe that the municipality will not send us to collect AC water unless we do not have any other source of water to irrigate our gardens because the practice is too effort and time-consuming and weird; it is possible if water scarcity happens in the future	Opinion about proposed system on stakeholders involvement - Opinion about proposed system on biophysical impact

possible if we will be facing water scarcity problems.		
If we suppose that there is water scarcity, we are obliged to adopt such strategies to take enough amounts of water. Therefore, we will definitely need additional number of employees and watering trucks, because I can never cover all the green spaces in the city on my own. As I told you also, we need advanced equipment and a strong water pressure to do that, or else I would take us forever. In this case, emptying 10 building reservoirs would take us only one and a half hours. It would be possible with the availability of more employees. It could also be applied in one area of Tripoli and I would have one day for example in my schedule for the collection of this water and the irrigation of the gardens that are located near this area.	We need advanced equipment and strong water pressure, as well as more employees for the strategy to happen/ it also needs to be applied on one small area	Opinion about proposed system on design- Opinion about proposed system on stakeholders involvement
I think that this strategy would need funding from NGOs or any other agencies. This is because you need to install a motor and a big pipe in each reservoir. Today, the motor costs around 150$, which is equivalent to 1,500LBP, it is equivalent to my salary. If all the installation on the buildings are ready, and with the adequate equipment, I do not think water collection would cost us any significant additional expenses. transportation costs are too minor to even take into consideration. We will be making use of this water and storing them for the municipality. It is for the sake of the municipality, it would profit from it.	I believe that the strategy needs funding from NGOs for the installation of systems unless residents install them / if residents install them it can be possible because transportation costs are minor	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
Employing new workers for the proposed strategy is difficult, I do not know why honestly. The civil service board did not request any new workers since 2015. It has been around 4-5 years that they have not requested any additional worker.	I think that employing new workers for the proposed strategy is difficult because no employment in the municipality from 5 years	Opinion about proposed system on stakeholders involvement
AC water is distilled water and it is free from any components and impurities. It is water that does not contain lime residues, iron (fe) or any other component, as it comes in the form of vapor only. I know	I believe that AC water is distilled and free of lime residues, iron and impurities; it does not	Knowledge of AC water quality / quantity

that it does not contain any elements, but I never thought of testing it or something. I do not think that it contains any elements that are beneficial for plants. This is what I guess.	contain elements essential for plants	
Concerning its quality, I think that this water is of very good quality. The fact that it does not contain lime residues makes it very appropriate for use for the car battery, however, I do not have any idea concerning its use for irrigation. I use AC water for the car battery/wipers and for the iron. I have a big iron like the one they use in commercial shops, and I use AC water for it.	I use AC water in car battery/wipers and iron because it is free of lime residues, but I do not know if it could be used for irrigation	Use of AC water- Knowledge of AC water quality / quantity
I think that it could be used for drinking after treatment. I guess it would be similar to bottled water we usually drink. I even think that if this water undergoes minimal treatment technologies, it might become even cleaner than bottled water. This is because the natural geological formation of Lebanon is calcareous, and consequently, all water contains lime residues. Therefore, I think that distilled water that comes from ACs is too clean, pure and I am sure that it does not contain any lime residues.	I believe that AC water could become potable after treatment; it could even become cleaner than bottled water	Knowledge of AC water quality / quantity
AC water is too good for use in personal hygiene practices, especially for rinsing the hair. For example, I usually shower with this water. I have a problem with my hair, as it falls a lot. My hair has been long for about 6-7 years, but it does not get any longer. I tried to use AC water and I noticed that my hair got stronger and started to grow. It is also perfect for the skin. I have an AC unit at home, I use its water for showering. My wife also uses it in cremes, she is an expert in herbal compositions out of experience, as she is a bio-chemistry graduate. It is very good for these purposes, and this is out of experience. She uses it in cremes as it does not contain any minerals or other components that could damage the skin. We really benefit from this water.	I use AC water for personal hygiene especially showering because it is too good for the hair and skin; my wife uses it in herbal cream compositions as it does not contain elements that damage the skin	Use of AC water- Knowledge of AC water quality / quantity

Everyday, an AC unit generates at least 8-10 L, especially if the weather is too humid like these days. We have a lot of humidity in the air, especially because we are located at the coast. In my house, every 16 hours, approximately, the AC unit generated around a 10L gallon of water or even a bit less. Every time the gallon is full, I empty it and use the water, or close it and keep it for later use.	AC unit in my house generates around 10 L of water every 16 hours especially when the weather is too humid	Knowledge of AC water quality / quantity
I mostly see people using this water for the car engine and for the iron. But I do not see anyone using it for other purposes, it is being wasted. It is even becoming a source of damage. My neighbor, for example, keeps the water outlet unbranched, therefore we always hear the sound of the water, and this leads to water leakage towards my balcony and so on. And there is a lot of people that do like him. In general, people either leave it unbranched, or branches the pipe into the sewage network or into a gallon for collection.	I see that some people use AC water for the iron and car, and others either leave it unbranched or let it drain to the sewage network	Use of AC water
I have a plant at home; however, I think that the plant needs basic elements such as iron and some other components to grow, especially during winter. Sometimes, we supplement plants with these, especially as tap water nowadays is also poor in those minerals. I have never used AC water for plants, and consequently I do not know its advantages and disadvantages, because honestly, I know that is free from any minerals and components. I have not tried to use it. I might be wrong, and it might even be a misconception, I do not know.	I have never used AC water on my household plants and I do not know if it is good for plants because it does not contain minerals	Use of AC water- Knowledge of AC water quality / quantity
I usually do not supplement garden plants with minerals. However, when I notice that plants are becoming yellow or dry, I supplement them, but this could happen only once per year. In general, you can say that I do not supplement the soil with anything.	I do not supplement garden plants unless they are yellow or dry and this happens once per year	Challenges for use
Here in the garden, I have a water well. It is water that comes from the ground; therefore, it is of good quality and has all the necessary components for plants. This	I irrigate my garden with well water that is clean and has the minerals essential for plants	Challenges for use

is maybe why I do not usually need to supplement the soil with minerals.		
Personally, I am an employee at the municipality, but I usually take my own decisions concerning the garden, as I consider it as my second home. I finish my working hours, and I come during the night also. I usually work according to my experience, and in compliance with the garden's requirements. Therefore, if I know that the water is too good for irrigation, of course, I will use it without even referring to the municipality.	If AC water is good for irrigation, I will use it in garden irrigation without even referring to the municipality	Suggestion for use
Reusing AC water for irrigation is a new experience. I would like to see its advantages for plants. I have some trees in the garden that are too weak, even though I care for them a lot and maintain them regularly. If I find that this water is beneficial, and can make plants grow stronger and faster, I will use it.	I will use AC water for plants if I find that it makes them healthier; it is a new experience	Suggestion for use
AC water can solve the problems related to the lack of irrigation. You know that nowadays, the electricity is too weak, and we do not have an electrical current most of the times. If the electricity comes, it comes around four hours per day only. Four hours per day are not enough, especially for huge gardens. They can also put on the water motors for a very short period of time because of the lack of fuel oil and its high price, therefore, they cannot cover the irrigation of the entire garden.	I believe that AC water reuse solves the problem of lack of irrigation in gardens due to electricity shortage problems	Drivers for use
In the garden I am responsible of, if I only rely on the working hours of the municipality, all plants will die. The electricity comes only around one hour, and I never know when it comes, it is either in the morning before I come or at night after I leave. And in this garden, I do not have a motor, therefore, I wait for this hour to irrigate the entire garden. In this hour I rush to irrigate everything I can. Sometimes, the electricity does not come all day. I come at night to check it, and when it comes, I irrigate everything, even if at night. I do not abide by my working	I work overtime and often come at night to finish what I have not been able to complete during the day due to the lack of electricity	Drivers for use

hours, I work overtime and often come at night to finish what I have not been able to complete during the day due to the lack of electricity. If I work only during my working hours, the grass and plants would die from the lack of irrigation.		
A short time ago, the engineer responsible, although I like and respect him a lot, put so much pressure on me and gave me so much work to do. I was tasked with cutting all trees in the city, and with caring about my garden at the same time. I told him you should choose between the two; I either work inside my garden, as usual, or I work outside in the city, but I cannot do both, because this would drive me to care less for my garden due to the tons of tasks I have, and this not what I want. I wanted to leave the department of gardens, and request my transfer to the administration, as I have done Arabic literature in the university. However, because I respect and like him a lot, I agreed to stay in the gardens department. There is too much work pressure. Most workers are irresponsible and negligent. They do not love their work, they only do it, sometimes not properly, to gain money.	I was given too much tasks lately and I even worked several things at once; there is too much work pressure on employees in municipality and most of them are irresponsible and negligent	Challenges for use
Another problem that could be solved by AC water is that in this garden, I do not have an irrigation system. The only garden that has a nice irrigation system is the biaa garden, however, unfortunately it is not operational yet, although they have spent a lot of money on it. There is an irrigation system that works on a timer, which facilitates the irrigation and saves time. The entire garden, although it is big, could be irrigated in four hours.	I believe that the presence of AC water compensates for the lack of irrigation in garden due to absence or damaged irrigation systems	Drivers for use
In my garden, I do not have an irrigation system, therefore I bought this plastic faucet from my own money. Before the economic crisis, it costed me two dollars. I bought few ones and I used them for the garden. I needed a pipe and some other equipment, but I could not wait for months for the municipality to respond. Therefore, as I was responsible for the biaa garden, I	I do not have an irrigation system in my garden and I created my own irrigation system from my own money because the municipality takes a lot to respond to demands and we are provided with only few	Drivers for use

took some of the equipment that I know that the workers there do not use, and I fixed and evented my own semi and mini irrigation system. There are no equipment, we buy everything from our own money. From a short period of time, the engineer responsible requested some equipment because we were desperately in need, they got us only very few and basic stuff for daily simple activities. The plastic faucet I got really facilitates my work and saves me time, but I got it from my own expenses. We nagged for a very long period of time so that they bought a small box and distributed the few pieces among the gardens, but this is after I got my own.	equipment when we request that	
I never requested a watering truck, thank god. When I am working with irrigation, I close the door of the garden and start working very hard. I irrigate manually and I take the faucets from one place to the other to irrigate all the garden. In this hour, my work is equivalent to the work of 4 hours. You should not forget also that I come at night sometimes. Sometimes I come at 12 am, when the electricity is available, and I irrigate. I never rely only on this hour, I consider that the hours that I do not work in during the day, I have to recompensate for them at night, even though I have another work to do in the evening. If I do not work overtime, and if I do not come at night, I definitely had to request water, because I can never finish the irrigation of this garden in one hour only	I have never requested a watering truck for the supplemental irrigation of my garden because I work hard in the hour when the electricity comes, and I come at night to complete the irrigation of the entire garden/ I had to request water if I do not work overtime at night	Drivers for use
AC water could definitely solve the problem that I need additional water for irrigation when we have no electricity during the day. In general, all gardens usually request additional watering trucks to help them with irrigation due to the lack of electricity.	I believe that AC water could solve the problem of additional water need for irrigation when we have no electricity during the day	Drivers for use
the proposed prototype is a very good idea, because AC water is usually wasted and we can make use of it, so why not collect it in a way that benefits the city and covers the additional needs of the gardens	I think that the proposed prototype is beneficial to avoid wasting water, reduce water leakage in buildings and meet the	Opinion about proposed system on

department for water. As I told you, it is beneficial because we are reusing the water.	additional water needs of gardens department	biophysical impact
Honestly, I do not think that the municipality would not do the proposed project, especially if they will have to pay for and install the systems on buildings. Listen, my relative lives in a building in which all AC units are branched to pipes like the prototype you showed me, and the water goes to the sewage network. He lives outside Tripoli. Unfortunately, I think that it could be implemented in any area, but not in Tripoli.	I think that the municipality would not do the proposed project, especially if they will have to pay for and install the systems for buildings	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
If only engaged in water collection, the municipality would not have a problem to collect the water. This is because, as we say, we should profit from everything that is free. This does not differ from its regular operation, because workers are already getting water from many places. We usually get the water from water from the firefighters or from the water authority. I do not think it would cost a lot of money, and would not take them a lot of time, and even if it were the case, I do not think that it is a problem if they worked a bit longer to get this water.	I think that the municipality would do the project if only engaged in water collection because it is not costly and only takes a bit more time and it does not really differ from its regular operations	Opinion about proposed system on cost - Opinion about proposed system on stakeholders involvement
For the people who really have a conscience, there is no problem with that. There are workers who do not have a conscience, they used to fill water in the watering trucks, and empty the water in one place. They do not irrigate, even though their working hours during the night are too adequate for irrigation because there is no sun or any other thing. They used to put the water in one place and go sleep. Therefore, I am telling you that people who have a conscience and who love their work, do not have a problem with that and they would even love doing it. The worker has around 8 working hours, I would take him around three hours to gather the water and three hours to empty it. It does not take much time and the idea is so good.	I think that water collection and use for irrigation is only feasible for workers who have conscience and who love their work and it does not take much time	Opinion about proposed system on stakeholders involvement

To ameliorate the proposed idea, I can only suggest having a pump or motor in each reservoir to speed up the water collection process. Of course, the truck should also contain a machine that could easily suck the water in a short period of time. It is an easy operation.	I propose putting a suction equipment in watering truck and a motor in reservoirs to speed up operations	Opinion about proposed system on design
I told you that the municipality might not do it because it already has a huge irresponsibility with regards to basic needs, so what if it was something secondary, like the strategy you proposed. First of all, the municipality has a huge lack in employees, especially in the department of gardens, our number is too small. There are some gardens, for example, that have not opened yet and they did not even work with it, because of the lack of employees and because of its irresponsibility regarding basic issues. It has a lot of accumulated tasks and work to complete already.	I think that the municipality will not do it because they already have a lot of accumulated tasks to do and will perceive the project as secondary	Opinion about proposed system on stakeholders involvement
If the municipality was not negligent, the municipality has too much money. This strategy costs a minor amount of money compared with the amount of money in the municipality. They would spend money only on employing few additional workers to collect the water, if the project expended to a very large scale, so that every worker collects the water of one area for example. It would cost them a bit more in terms of transportation, but these are minor things that we do not even need to talk about.	I think that the municipality is financially capable of doing project as it only costs money to employ more workers and for transportation, but this is only if they were not negligent	Opinion about proposed system on cost- Opinion about proposed system on stakeholders involvement
I am too far away from politics. However, as I knew, in the era of PM Saad Al Hariri, they prohibited the employment for about five years I guess, I do not know how much exactly. There is a lot of employees that left the municipality, as they got very old. These employees were used to the routine of working there. If you go now to the municipality, you can see old people that have already retired but that go there and sit all day because they are used to that. Old employees leave the municipality, and they are not replaced	There has not been any employment of new workers in the municipality for five years because it is prohibited	Opinion about proposed system on stakeholders involvement

with new ones. For example, they put me in this garden as a replacement for a retired employee, but this led to a lack of employees in the garden that I used to be responsible of. There is no replacement.		
In the department of gardens, especially, there should always be room for employment because every garden that opens needs at least one worker to maintain it. In the municipality, they think that our department is the most relaxed in terms of tasks. In winter, you know, we usually clean the sewage networks from the leaves of trees and we clean the streets to prevent flooding during winter when it rains. This is a nice practice, and I am usually involved in it. I get really tired during the summer, and when winter comes, I have to go do this work and also I have to cut the trees in my garden. This also leads to lagging in the work in my garden. This leads to work pressure inside the gardens and outside the gardens. We can say that every one of us works his work and the work of others. We definitely need new workers.	We need new workers in the gardens department to be able to complete our tasks adequately	Opinion about proposed system on stakeholders involvement
The head of municipality has the authority to request new employees, but he does not. There were head of municipalities before that were stronger than him. They used to take their own decisions. The city was so different, and the worker had his own value. They used to be more psychologically relaxed. Nowadays, it is the opposite way round; we suffer from psychological and work pressure and distress. I usually have another work in the evening, and from a short period of time, I went and cut all trees that are present on the Mitein street, and because I work with all my heart and work hard, I worked very hard to finish them. I was really tired, my back hurt a lot. I went and told the engineer responsible that I want to take a vacation of one month, on my own expenses, and I left my family and went one month to Nigeria to relax a bit. This is all due to the pressure. I was too tired,	The head of municipality does not request new employees and we are too pressured and not psychologically relaxed	Opinion about proposed system on stakeholders involvement

both mentally and physically. I came back and found out that he prepared a lot of tasks for me to do.		
The government and municipality are used to begging and profiting from others. The municipality has too much money; the amount of money in this institution gives me a headache. It does not need any NGO to come and collect this water. The municipality only needs to employ its money in the right place and at the right time. I will tell you a very short story that shows you how much the municipality likes to profit from everything for free. As I told you, I was previously responsible for the biaa garden, and I used to perform all the work there. One time I went to the head of a concerned department and I told her that we need to maintain and fix the benches that are present in the garden. I suggested that I do this work because I have my own equipment, I have all types of machines required for these tasks. I told her I just want you to provide me with the necessary materials and I would fix anything. There are benches that have 3 wood blocks on the seat and 3 wood blocks on the back. I would fix the broken ones and replace the ones that do not even exist. I volunteered and offered my own services to do that with my own machines, I do not want anything in return. They profited from my equipment, instead of bringing ones from the municipality, and they saved too much money. This saved them the money that they would give to the contractor, and this person as much as he works, it will not be good because he does not have any experience in this field. there is a lot of financial capabilities in the municipality, but they do not employ them well, because honestly, the stakeholders there only want to steal money.	I think that the municipality does not need an NGO to collect AC water because it has a lot of money, but stakeholders do not employ it well because they want to steal it	Opinion about proposed system on stakeholders involvement- Opinion about proposed system on cost
Regarding the proposed project, If AC water was really good for plants, we would have done something really good on two levels: first, you would have made use of this water instead of wasting it.	I believe that proposed strategy prevents wasting water and would save money spent on minerals if it was good	Opinion about proposed system on

And second, if it was really good for plants and would make it grow without having the need of adding minerals, it would save us money for the maintenance of the garden. It is a very good idea. I think that it is a very successful and nice project. It saves the municipality money from many angles. It would provide the municipality with water for free. We have a lack of basic minerals for plants, and if this water replaced the need for these minerals, it would be very beneficial for all the gardens in general.	for plants and makes them grow healthier	biophysical impact
This strategy would save the municipality money primarily by providing water for free. The municipality signs a contract with the water authority to take water from it. There are water meters that work in the gardens and that check how much water was consumed so that we can pay for that. If this water was collected from buildings, this will provide water for free for the municipality and this decreases its expenses on water.	I believe that the strategy would save us money by providing free water because we usually pay for water through metered systems	Opinion about proposed system on cost
Through proposed project, AC water would be a good alternative, or supplement, to tap water or well water, especially that sometimes, well water comes salty and this is not good for plants. In this garden, the water from the well comes salty, especially as we are too close to the sea. It gets diluted gradually when it rains. We suffer from this problem, however, I think that the plants in this garden got used and adapted to this water, despite its salinity.	I believe that the proposed strategy provides non-salty water for plants instead of salty water received from wells especially near the coast	Opinion about proposed system on biophysical impact
It is also important that you know that well water gets scarce during summer. As the water from wells is salty, I think that AC water could be a good alternative for it. It might not cover all our irrigation needs, but could definitely help with that. Salty water is not good for plants, it makes them die. The garden is well maintained perhaps because we usually mix between water from the well and tap water. Maybe if we only irrigated from tap water, crops would	I believe that proposed strategy prevents and mitigates water scarcity and provides alternative for salty well water	Opinion about proposed system on biophysical impact

not have been able to grow and all greenery would have died.		
I know that this water could be used for a special purpose, but I honestly forgot what it was. I honestly do not have any idea about this water, I have not heard anything about it before. Or, actually, I heard about it, but I forgot.	I do not know for what purposes AC water can be used; I did not hear about AC water but forgot	Use of AC water- Knowledge of AC water quality / quantity
I think that the AC generates very limited amounts of water. I do not think that it could fill more than one small gallon per day, even when there is a lot of humidity in the air. I previously observed AC units, and I do not expect that it could generate more than one small gallon per day, if at all.	I believe that an AC unit generates minimal amounts of water; only one small gallon per day	Knowledge of AC water quality / quantity
People deal with AC water depending on the installations available. If there is a way to branch it to the sewage system, they usually do that. However, if this option is not available, they usually collect the water in gallons to prevent it from leaking on the floor and throw it	I know that people either connect AC water to the sewage network or collect it in gallons and throw it	Use of AC water
The quality of this water is really bad because it consists of the humidity of the air that was inside the room. It is definitely not potable, however, it could be used for cleaning purposes because it is water at the end of the day. I think that it also be used for irrigation, but I do not know why honestly. Excuse me but I do not have any information about this water.	I believe that AC water is not clean because it is the humidity of the air inside the room; I believe it can be used for cleaning purposes and irrigation, but I do not know why	Knowledge of AC water quality / quantity
How much water would an AC unit generate? The quantity is too little. If we are told that the quantity of AC water is huge, we are willing to irrigate our garden with it. What is the problem? It is water at the end of the day.	We are willing to use AC water for irrigation if we were told that the quantity is big	Knowledge of AC water quality / quantity - Suggestion for use
If you tell me that ACs could generate huge amounts of water, and I have a need for water, therefore I would really welcome any source of water that could support the irrigation of this garden.	I welcome any source of water that could support the irrigation of this garden	Suggestion for use
We do not suffer from water scarcity problems. However, there are plenty of problems that happen in the pipes and irrigation system installed. We suffer only	We only suffer from water scarcity if the weather is too hot and dry but we face	Drivers for use

sometimes when the weather is too hot and dry.	problems in irrigation systems installed	
I would use AC water for the irrigation of this garden, as I told you before. However, even big reservoirs are not enough for the irrigation of this garden. This water could irrigate only a minor part of this garden, I guess.	I am willing to use AC water for irrigation, but it could cover only a small part of this garden	Challenges for use
Do you think than an AC unit really generates a lot of water?	I believe that the quantity of AC water is small	Knowledge of AC water quality / quantity
Our country is famous for its richness in water resources. We are not in need for condensate water from AC units to supplement us with additional water resources. Our country is the country of water!	We have a lot of water resources in the country and we do not need AC water	Challenges for use
Many regions in Lebanon have problems due to lack of water. What is the problem if you give us water from ACs? I do not really know about the quality of this water for irrigation. However, I know that in general, the water used to irrigate should not be salty. If this water is not salty, then it would definitely be suitable.	I think that there is water scarcity in many areas in Lebanon and I do not have a problem using AC water for irrigation if it is not salty	Drivers for use- Suggestion for use
The water used for irrigation in this garden is definitely not salty, and we usually drink from this water as well. For this garden, we have one groundwater aquifer from which we pump water. It is not salty as it is not near the coastal area.	We use well water for the irrigation of this garden; it not salty and it is potable	Challenges for use
We need AC water. We face problems with water because there is a lack or no electricity sometimes, and if there is no electricity, there is no water for irrigation. For example, now the motor is on. I put it on at 10 am and it will stay on until 1 pm only. I put it on to be able to irrigate, but the time is definitely not enough. If there is electricity always, our water would definitely be sufficient, and all the garden would be irrigated entirely.	We cannot irrigate all the garden because there is no electricity sometimes and we are not able to put water motors on	Drivers for use
We always face problems with the piping systems. Lots of times the pipes get broken, and the municipality takes about two to three days to come and fix them. Sometimes, we wait a lot until they	We face a lot of problems with irrigation systems as the get broken and damaged, and the municipality	Drivers for use

respond to our request. We stayed two months without water because of two faucet locks that are broken, and the municipality did not fix them. The faucet locks cost 84$; it took the municipality two months to replace them. They are not poor, the municipality. They have a lot of money; they can easily fix that if they wanted to.	takes a lot of time to fix or replace them although it is wealthy	
When something gets damaged, we usually call the responsible engineer, and he, in his turn, tells the head of the municipality to get his approval to fix it or replace it.	We need the approval of the head of municipality to fix damaged equipment	Drivers for use
We do not irrigate while waiting for the municipality to fix the damage of the irrigation system. Sometimes we irrigate manually, however, the water is too little because there is no adequate pressure. This garden cannot be irrigated manually with the available number of workers. Look how much it is big; it is 18,000m.	When irrigation system is broken, we irrigate manually, but we cannot irrigate all the garden because it is big and the water pressure is not enough	Challenges for use
I think that the proposed prototype is a good idea. However, this is not effective during the day because there is a lot of sun and the water evaporates directly. The irrigation of gardens should mostly be at night. In this garden, we irrigate from 7 until 10 am because the weather after this hour starts to get really hot and sunlight is too strong.	I think that the proposed strategy is a good idea but should be implemented at night to prevent water evaporation	Opinion about proposed system on biophysical impact
Moreover, we cannot rely on AC water as the only source of water because this garden is too big and cannot be irrigated manually. It would only be used as a supplemental source of water for irrigation.	We cannot only rely on AC water to irrigate the garden because it is too big	Opinion about proposed system on biophysical impact
There are no employees that irrigate this garden at night. We requested employees from the municipality but there is a lack. If there were reservoirs of AC water available, and employees that can irrigate at night, the idea would be possible. It would be a great idea, but as I told you, there are no employees.	The proposed idea would be possible if there was employees for night irrigation of gardens	Opinion about proposed system on stakeholders involvement
My only concern is to enable plants to live and grow. If I have an additional source of	I would irrigate with AC water to enable plants to live and grow	Opinion about proposed

water like AC water, I will definitely irrigate with it.		system on biophysical impact
The availability of water provided by the proposed idea itself is amazing. I wish everyone gives me water to allow this garden to flourish and grow. I suffer from problems with water, not because it is scarce, but because there are no electricity. Nowadays, the electricity is coming for only around 2 hours per day, and the municipality has asked us to try to reduce the hours of operation of motors as much as possible because fuel oil is too expensive nowadays.	I believe that the proposed idea is amazing because it gives me water to enable the garden to flourish and grow because I do not have water due to electricity shortage	Opinion about proposed system on biophysical impact
Moreover, the idea is welcomed because, as I told you, we face a lot of maintenance problems in the irrigation system that sometimes take too much time to be solved. The municipality is significantly lagging behind in this regard. Also, we have a problem because we only have one groundwater aquifer to irrigate this huge garden, located in the lower part of the garden. We definitely needed another one in the upper part, because the pressure of the water is really low. AC water, if used for irrigation, could possibly enhance our ability to water all the garden effectively.	I believe that the proposed idea could enhance my ability to water the garden effectively, as I have problems with irrigation systems and only one well for the entire garden's irrigation	Opinion about proposed system on biophysical impact
I think that installing a piping system that directs this water to the garden is better than collecting it and irrigating manually because if they were connected to the irrigation system, they would have been irrigated with faucets. The faucets irrigate thousands of drops per minute. But it is too difficult to demolish every road in Tripoli to install piping systems and then rebuild it. That is why I think that irrigating manually, through municipality watering trucks, during the night, is a much viable option.	I think that directing AC water from buildings to gardens directly is better than collecting it for manual irrigation but is difficult to demolish roads and build these systems	Opinion about proposed system on design
The main problem of the proposed strategy is that the municipality is too irresponsible. It is chaos, nobody obeys the other. I always ask them to send me one or two watering trucks everyday to help me with the irrigation of the parts that	I believe that the strategy is not possible because the municipality is irresponsible; they rarely send watering	Opinion about proposed system on stakeholders involvement

I am not able to finish each day, but they never respond. This garden is the most beautiful in Tripoli, give us water to maintain it, I tell them, but they do not answer.	trucks for irrigation when needed	
The municipality has a lot of green spaces to care about and irrigate during the day, but we have in the municipality around 4-5 watering trucks, they could dedicate one for this garden if they wanted to, especially when I have problems in the irrigation network. When I have a problem, I urgently need a watering truck that could pass by and irrigate manually.	I believe that the municipality could dedicate one truck for this garden because it has many, but they do not want to	Opinion about proposed system on stakeholders involvement
When the irrigation system was broken, they sent the truck once per week to irrigate the part to which water was not reaching, but this is definitely not enough. Yesterday, they fixed the problem and I was finally able to irrigate this part that was nearly dead. Now we are irrigating it, but after what? After it was nearly dead, and we are trying to make it live and flourish again. It needs some time to live and grow again.	The municipality used to send the water truck once per week when system was broken, and this was not enough; the damaged part was nearly dead	Opinion about proposed system on stakeholders involvement
Every week, we need at least one watering truck to help us with the irrigation of this garden. However, the municipality does not send us one if we do not ask for it. Even when we ask, they do not respond sometimes.	We need at least one watering truck to help us with garden irrigation, but they do not send it if we do not ask for it	Opinion about proposed system on stakeholders involvement-Opinion about proposed system on biophysical impact
When the watering truck comes, it helps me with the irrigation because I cannot cover all the garden with the poor water pressure available. Even if there is an irrigation system installed in most of the garden, we cannot open all the faucets at once because we need a strong pressure of water. That is why we need to wait for each part to be done to be able to operate the other. I wish I could operate them together; I would have covered the entire	The watering truck helps me cover the irrigation needs of the garden because I cannot open all faucets at once due to water pressure problems	Opinion about proposed system on stakeholders involvement-Opinion about proposed system on

irrigation needs of this garden in less than one hour.		biophysical impact
I wish that the watering truck comes every day. This would be more than amazing. However, there is a huge lack of responsibility in the municipality. There is also a lack of employees there. They do have many watering trucks. It is not a matter of trucks. It is also not a matter of employees, in my opinion, because the watering truck only transports the reservoir of water, and then I water the garden with a pipe, not the employee on the truck.	I wish that the municipality sends me a truck every day, but they do not, although they can, because they are too irresponsible	Opinion about proposed system on stakeholders involvement- Opinion about proposed system on biophysical impact
I am willing to use AC water for irrigation. I wish everyone could provide me with water, especially with reservoirs for manual irrigation, because the irrigation system provides a limited pressure of water, and consequently I need supplemental sources	I am willing to use AC water for irrigation because I need a manual source for supplemental irrigation	Opinion about proposed system on biophysical impact
It is also very important to know the timing for irrigation. I usually irrigate from 7 until 10 am, after that, it will not be beneficial to irrigate. On the contrary, it would burn the plants and lead to their death. It is definitely better to irrigate at night. If there were someone to irrigate at night, you could have seen the garden even more beautiful and green.	It is better to irrigate the garden at night or in the early morning to benefit plants the most	Opinion about proposed system on biophysical impact
Nobody comes at night. I previously tried to work at night, I used to come from 6 pm until 12 am. I worked three months and they did not pay me at all. Therefore, I stopped coming. I told them thank you I do not want to work at night anymore. I used to come because I really love this garden. I volunteered if you want. I used to work in the morning and at night.	There are no municipality employees who are willing to work at night	Opinion about proposed system on stakeholders involvement
Sending a water truck to irrigate at night is not effective because workers do not know what to irrigate. I need to be present to tell them where to irrigate. If they come without my presence, they could irrigate some places that are already watered and demolish them because too much water is as bad as too little.	It is not effective to send watering trucks at night because workers do not know what parts to irrigate in the garden which might cause damage	Opinion about proposed system on stakeholders involvement

I am not willing to come at night even if they get me additional water, not because I do not want, but because I am not being paid during the night shift. It would be a waste of time, effort, and energy.	I am not willing to irrigate at night with AC water because I will not get paid for that	Opinion about proposed system on stakeholders involvement
The situation in the municipality was much better before. We have been suffering from these problems from around 5-6 years. When something breaks down, we worry because we will not be able to irrigate, unless we will do that manually	There were not much problems in the municipality 5 years ago	Opinion about proposed system on stakeholders involvement
Our problem is definitely with water, the pressure of water is too bad. This creates all the problems. We have only one groundwater aquifer for irrigation, we definitely needed another one on the other end of the garden. This is all the issue. I need either another aquifer, or manual irrigation. However, because the option of digging another well is not viable, we need to resort to supplemental manual irrigation. It is definitely better than nothing. I would highly encourage having water from the AC, as you suggested.	Having another well in the garden is not possible, therefore, I encourage having AC water as a manual irrigation source	Opinion about proposed system on biophysical impact
All new buildings now dedicate a specific place for AC units on each balcony. This is nice because we will no longer see the bad appearance of the randomly dispersed AC units on the external façade of buildings. It is not aesthetically pleasant; every building has pimples. [Ironically] Yes, I call them pimples. They are too ugly. In new buildings, the situation is better. They put all the AC units in a particular and unified place, and in symmetry, and they branch them to pipes inside the building towards the sewage network. Perhaps, rather than directing the water to the sewage network, they could branch the pipes to a reservoir, as you suggested, I assume. The problem in old buildings is that there is no piping system inside the building	All AC units are randomly installed in old buildings but new buildings are starting to organize places for AC units and branching them with internal pipes to the sewage network	Opinion about proposed system on biophysical impact
If the proposed project is to be done, I think adjustments should be done in the placement of AC units and with regards to	AC units should be placed on balconies in a specified place but most	Opinion about proposed

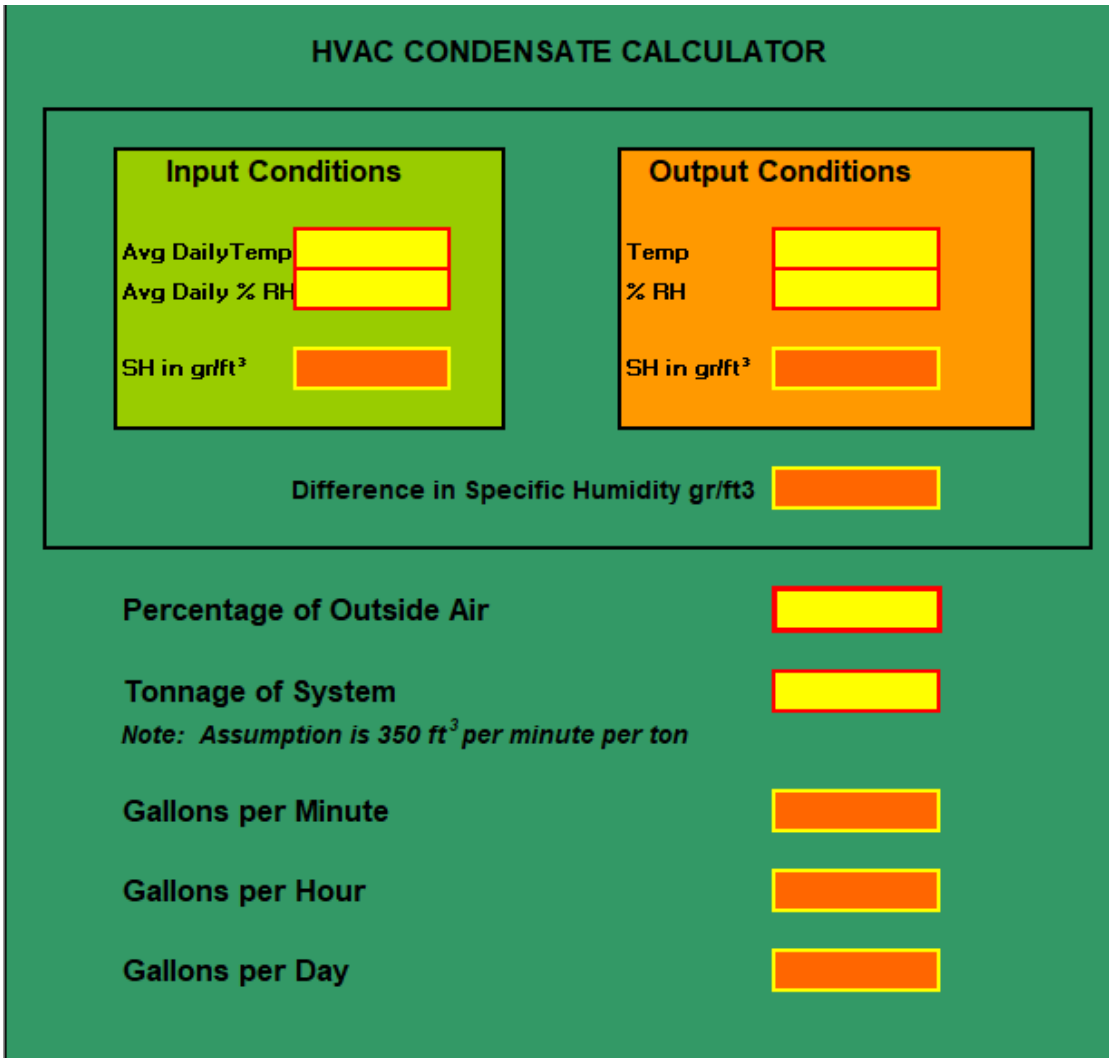
the appearance of the pipes. Personally, and as a decision-maker in the municipality, I do not think that anything could hinder this strategy from happening if neighbors were willing to do that, and if they all accept. I do not have a problem. However, you should know that in the law of buildings, the external units of ACs need to be placed on the balcony in a place that is not visible to the outside. They cannot be placed on windows, for example. According to the law of buildings, they cannot be placed on the external façade directly. They should not be visible. However, as you notice, nowadays nobody cares about that. They all install their AC units randomly and this causes a lot of problems between neighbors due to water spills and leakage.	people do not implement that/ I believe that the proposed strategy is feasible but needs adjustment of AC unit placement on buildings	system on stakeholders involvement - Opinion about proposed system on biophysical impact
For this to happen, I would suggest that building residents rearrange the places of their external AC units and that common adequate spots on the balcony be found to install the units symmetrically. Wait, let me show you the text in the law that details the standards for the installation of AC units in residential households. Okay, look, it should either be placed inside the balcony in an invisible spot, or on the side of the balcony. The important is not to damage the aesthetics of the external façade.	I believe that building residents should rearrange the places of their AC units symmetrically to be able to implement the proposed system	Opinion about proposed system on biophysical impact
Aside from aesthetics, installing an external AC unit on the window would bother the neighbors as it might make an annoying sound and prevent the neighbors from opening their windows, especially if the AC was big and makes too much noise. We always encounter problems of this kind. Sometimes, people even install their AC units on the window and keep its water flowing without collecting it. This spills water on the neighbors and causes a lot of problems too. They do not branch them to a pipe that is branched to the drain on the balcony or anything. In my home, for example, the external AC units are placed on the balcony and I branch the	Installing AC units on windows bothers neighbors due to water leakage and sound problems/ AC units in my house are placed on balconies and branched to the sewage network drain	Opinion about proposed system on biophysical impact

pipes of water of the ACs to the sewage network drain.		
As a municipality, we cannot consider external AC water pipes as a nuisance, because if there were any other choice, it could have been implemented. There is no other choice. However, in every building, they should adopt the same strategy in terms of AC unit placement and pipe installation, to prevent damaging the external appearance of the building. This is what I recommend.	We do not think that external pipes would damage the appearance of buildings if all households adopt the same design in AC units and pipes placement	Opinion about proposed system on biophysical impact
The external AC units could also be covered with any type of iron boards for decoration or anything. Also, I would recommend that you prevent implementing that on the principal façade of the building. Always try to do that on the back of the building; that is on a façade that is not too visible to people.	I think that AC units could be covered with iron boards for better appearance and system should not be installed on principle façade of building	Opinion about proposed system on design
You cannot put the AC water reservoir on the principal façade of buildings. It should be invisible underground. This is because on the sidewalks in front of each building, we do not usually put anything. You could put for example on the back of the building, or on the secondary, most invisible, sidewalks of the building if they were not dedicated for cars. We do not have a problem as long as it is not located on the principal façade of the building, and as long as it is invisible and does not take the place of any other thing. However, you should know that you cannot put a ceiling or cover this reservoir with any type of material, it would be a violation.	AC water reservoir should not be placed on principle building façade and should not be covered with any material	Opinion about proposed system on design
You can put the reservoir on the secondary sidewalks of the building, but you should also be careful about the entrance and exit of cars. You should be careful that the reservoir does not tighten the area for cars to enter or to exit, because nowadays these sidewalks are too tight. They are of around 3 meters and a half. In short, you should put the reservoir in a place that does not bother anyone and that is not on the principal façade and sidewalk of the building. You can also put them in the	AC water reservoir could be placed on secondary sidewalk of building or in the parking if the place was not dedicated for cars or tightens car entrance and exit	Opinion about proposed system on design

parking on the back of the building, where the space is not dedicated for cars.		
There are no requirements for reservoir's design. It is just that you cannot put a ceiling or cover this reservoir with any type of material. This is considered a violation because it looks as if you are building something. I will be obliged to send someone to remove them or require the party responsible to take a permit for that.	AC water reservoir cannot be covered with any type of material	Opinion about proposed system on design
I think that the proposed strategy is feasible. Why not? This water is being wasted anyways. Why not collect it in a correct way that benefits the city? The water of AC units could sometimes be used for the iron, for the machine that cleans carpets and also for the battery of the car. I usually use this water for these purposes. I either collect it from the ACs of which the pipe could be put in a gallon, or I tell my husband to bring me from the gallons of this water collected from the AC units in his shop. This is because in his shop, he collects the water in a gallon, and he throws it. So why not use it? It could be used for many purposes, and its clean water, therefore, wasting it is too unfortunate for us.	I believe that the proposed strategy is feasible because it prevents water wasting and because AC water is clean and can be used for iron, car battery/wipers and carpet cleaning machine – I use AC water from my husbands shop for these purposes	Opinion about proposed system on biophysical impact - Use of AC water
The municipality would do the project, why not? I think that the biggest incentive for the municipality to engage in this project is that it could save money because it usually pays for the water it gets from the water authority. If this was implemented, the expenses spent on water will definitely be less. It would save money, how much I do not know, but it would definitely save money.	I think that the municipality would do the project to save money because it pays for the water it gets from the water authority	Opinion about proposed system on stakeholders involvement- Opinion about proposed system on cost
The proposed idea is good because it is recycling. It could start at a very small scale and then expend towards the entire city. It is beneficial for the future. It would also definitely give a beautiful image of Tripoli and prevent the leakage of AC water on people walking down the streets [laughing]. It is impossible. The other day	I think that the municipality would do the project because it contributes to water recycling, provides a beautiful image of the city and prevents	Opinion about proposed system on stakeholders involvement- Opinion about

I was standing in front of the bank to get money, my clothes got wet from the water coming from the AC installed on their building, but what can I do? I will not go as a municipality member and tell them. There should be a solution for that. You need to place them under the AC unit and let the water spill on them, then they will know. If they feel the damage, they could then fix the problem; or else, they will not.	annoying water leakage on building façades	proposed system on biophysical impact

APPENDIX E


HVAC CONDENSATE CALCULATOR
Input Conditions
Avg DailyTemp
Avg Daily % RH
SH in gr/ft³
Output Conditions
Temp
% RH
SH in gr/ft³
Difference in Specific Humidity gr/ft3
Percentage of Outside Air
Tonnage of System
Note: Assumption is 350 ft³ per minute per ton
Gallons per Minute
Gallons per Hour
Gallons per Day

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