Urban Health: reflections on practice

Marrakech, Morocco

dpu Development Planning Unit

UCL The Bartlett

مؤسسة الأطلس الكبير
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High Atlas Foundation
Developing a self-sustaining future for Morocco

MSc Health in Urban Development

Overseas Practice Engagement Report | 2023
The Bartlett Development Planning Unit, UCL

Edited by Qurratulain Faheem
Design by Ottavia Pasta

Acknowledgement

This project was impossible without an on-going support and directions of High Atlas Foundation (HAF) - a nonprofit organization founded in 2000 committed to furthering sustainable development in Marrakech and the regions beyond. HAF acted as a local partner from the phase of planning this project till its implementation and consecutive planning for the upcoming programmes. We are indebted to all the field coordinators and management team of HAF for their contribution of time and experiences that led us to success. We are also grateful Dr. Mina Lalaoui Kamal, Dr Rachid Mrabet, Prof Najib Guedirat, Ms. Aboulrhit Ouafae and Ms. Safiya Elghmari for helping us to learn about the dynamics and complexities of socio-political landscape of Marrakech from variant perspectives.

Content

Executive summary

01
The fact sheet of WHO (2021) suggests that this number would rise to 68% by 2050.

Urban landscape being home to over 55% of the world's population[1] (WHO 2021) is at the forefront of tackling critical global development issues, particularly public health. The burden of rising noncommunicable diseases, the persistent threat of infectious disease outbreaks, an increased risk of violence and injuries are a few key public health concerns in urban areas to mention. While urbanization can bring health and economic benefits, rapid and unplanned urbanization poses numerous challenges to social and environmental health, which impacts vulnerable and poor segments of the population more hardly than others. Health inequities are visible in urban areas with work and educational opportunities centered in one part of the city while migrants and other disadvantaged groups clustered in the most deprived and environmentally degraded neighborhoods making access to health services even harder and health outcomes unattainable.

Against the backdrop of health inequalities and urban health crises, the Bartlett Development Planning Unit offers a post-graduate programme on Health in Urban Development (HUD). This year long intensive programme helps its students and faculties to critically engage with the discourse of urban health in the Global South. The programme advocates that the issues concerning urban health could not be fully understood and addressed without engaging with the social, political, cultural and economic factors tied to them. In order for students to better the social determinants of health, the programme offers a core module of 30 credits under the title of 'Urban Health: Reflections on Practice' to enable them to learn while practicing and, at the same time, put their learnings into practice through an overseas physical engagement (OPE).

In May 2023, OPE was held in Marrakech in collaboration with the High Atlas Foundation (HAF). HAF has been working in the extended region of Marrakech since 2000 across various aspects of development such as sustainable agriculture, women and youth empowerment, water and waste management and capacity building. Resting on the long-established and trusted relationships of HAF with the local communities across Marrakech, HUD partnered with HAF and worked on five themes. The themes were: urban green spaces, gender, health concerns of youth, water scarcity and agriculture. The major challenges underlying these themes were identified by HAF from their experiences of working with the communities for more than a decade. The prior identification of these theme helped HUD programme and students to prepare themselves

in advance of OPE. Prior to the engagement, the students were also offered various opportunities to engage with the field coordinators online to understand the contexts of Marrakech and about their assigned themes. There were also sessions around ethics of research, pedagogies, varying research methodologies such as participatory approaches, maptionaire, survey, key-informant interviews, desk-based research and focus-group discussions for the students to be prepared to carryout OPE in an informed and ethical manner.

During OPE that took place from 7th to 14th May 2023 in Marrakech, HAF remained an essential point of coordination and facilitation for all the five projects. HAF also ensured that informed consents were sought from all the engaged members of the communities and there is no coercion or incentivization at any point. The students further sought consent while photographing or video recording participants and ensured that none of the principle of research ethics is breached. Further, HAF coordinators accompanied each group throughout OPE to, firstly, ensure communities interests are prioritized and socio-cultural norms are respected at all levels. Secondly, to enrich students learning experience translating from Moroccan Arabic to English and providing contexts wherever needed. The result of this collaboration is that each group researched an aspect of their allocated theme in-depth which are compiled and presented through this report.

As said, there were five projects emerged from OPE in Marrakech. These projects are about: green urban spaces in the city of Marrakech; access and quality of maternal healthcare services to Amazigh women; health concerns of youth studying in universities; water shortage in the region of Marrakech and agriculture and plantation in the region. The report presents methodology, findings, and recommendations of each project as put-forwarded by the students. The report acknowledges the tireless efforts of students in their respective project which is reflected through originality of each project. In order to keep the originality intact, the report sticks to the format provided by each student without much standardization.

This report is not merely a compilation of student-led projects; but it is a spectrum showcasing the first-hand understanding of certain health concerns of the different communities in Marrakech. This report is also symbolic of the possibility and value in bridging the academia and practice world in the discourse of urban health. Where there is a dearth of literature on urban health in the Marrakech region, this report is a small contribution for which HUD, its students and everyone is indebted to HAF, its team and, above all, the people of Marrakech.

Overseas physical engagement: reflections and recommendations

Project 1
Community-led tree plantation: The case study of the DouTmaquite Cooperative in Ourika valley

Students
Aoxian Li, Boyao Wu, ChanChan Zheng, and Camilla Rossi.

Facilitators
Professor Julio Davila (UCL), Said Bennani (HAF), Youssef Tahiri (HAF), and Hassane Ahmatay (HAF).

Research Question
In what ways the social determinants of the health framework contribute to our understanding of developmental challenges in the Ourika Valley?

Background

Considering the growing interest in the academic and development sectors regarding the interconnectedness of environmental, socio-economic, and health aspects, this project explored the potential synergies between holistic and interventionist approach to health and HAF's community-based approach to climate change and sustainable development. Using the Social Determinant of Health (SDOH) framework, this study examined the complex relationships between society, the environment, and health outcomes in the Ourika Valley, with a focus on the locality of Aghbalou - a rural commune within the valley. Two projects that have received support from HAF, the DouTmaquite cooperative and community-led tree planting, served as a case study to analyse how community-based interventions could promote sustainable development while simultaneously improving health outcomes. By investigating the experiences and impacts of these projects on the local community, the study analyses and put forward recommendations for fostering greater integration and collaboration among health, environmental, and development initiatives.

Research methods

The data was collected through three methods: 1) Literature review: Ranging from various secondary sources such as academic articles, journals, and government reports, an in-depth analysis of literature helped to deepen the understanding of the latest scientific research on health and climate change. The literature review set the foundation for exploring the application of a social determinant of health framework in climate change globally and, in particular to the context of Morocco. 2) Stakeholder interviews: From February to April, the group collaborated and interviewed various members of HAF program who are directly involved with the Doutmaquite cooperative and tree planting projects. These remote conversations helped to be more informed during the OPE and engage with stakeholders in an informed manner. 3) Community-engagement: this was particularly carried out while in Marrakech visiting the communities. Considering the wide array of discussions emerging from the communities, the topic of this research broadened from climate change and tree plantation to encompassing broader sustainable developmental issues. Subsequently, the study focused on the local community perceptions around health and well-being and, the role of community-led initiatives in shaping essential health behaviors in relation to varying socio-demographic indicators.

The details of the community-engagements are as follows:

The transect walks were in Aghbalou and the nearby lands cultivated by local farmers along with the members of the DouTmaquite cooperative. Transect walks also offered a practical and experiential approach to data collection. Exploration while walking through the lands cultivated

Figure 1
Community engagements through workshops, transect walks and semi-structured interviews during OPE.

by local communities, enabled us to directly observe and document the environment and land-use practices. This method also allowed engagement with the landscape, observing firsthand interactions between humans and their surroundings, and capture context-specific information.

The workshop format included a brainstorming session and a mind map activity aimed to open space for community members to freely share their knowledge, experiences, and perspectives while also allowing them to learn about our research approach and topic. This interactive process facilitated dialogue and collective learning and, gaining valuable insights from the community's expertise.

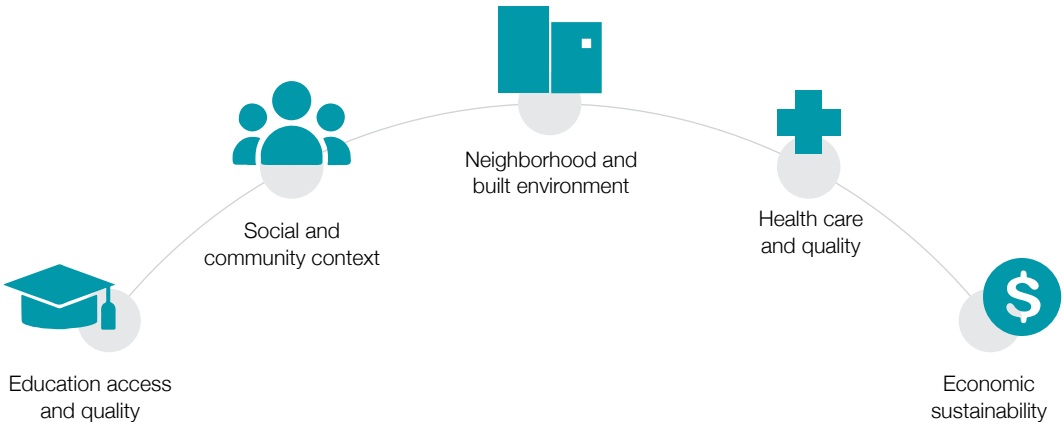
The use of semi-structured interviews provided an opportunity to have open conversations with members of HAF as well as with community members and farmers. This allowed for a deeper exploration of their unique perspectives and local knowledge, contributing to a more nuanced understanding of the subject matter.

The findings are analyzed applying the SDOH framework, which was developed by the World Health Organization (WHO) to understand how social, economic, and political factors influence living conditions and the subsequent effects on their health and well-being. Through the use of these methods, the objective was to establish an inclusive research process that places a strong emphasis on valuing the knowledge and insights of the community. We acknowledged the central role of 'lived experiences' as forms of expertise and made it a priority to place them at the forefront of our research.

Research site

The Ourika Valley is situated in the High Atlas Mountains of Morocco, just 35 km away from Marrakech. It encompasses an area of approximately 503 km2 with distinctive geomorphology and significant altitudinal variations that contribute to its rich ecological and geomorphological characteristics.

Figure 2
The framework of SDOH



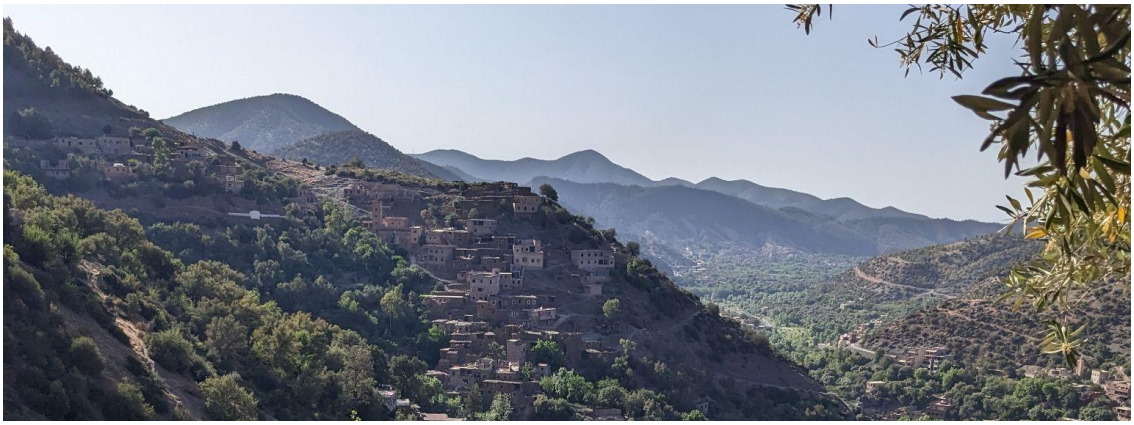


Figure 3
Overview of the mountains and the village of Aghbalou Douar.

The climate in the Ourika Valley exhibits a range from semi-arid to semi-humid, with precipitation mostly occurring during spring. The presence of snowfall plays a role in regulating river flow during spring and certain summers. However, as a result of climate change, the region has been witnessing more prominent climate extremes, including extended drought periods and intensified floods. These changing environmental conditions present new perspectives and challenges for climate research in the area.

The majority of the local population in the Ourika Valley, around 90%, resides in rural areas. The dominant ethnolinguistic group is the Amazigh, and their primary language is Atlas Tamazight. Islam is the main religion practiced in the region. The local communities rely primarily on agriculture and animal husbandry as their main livelihoods. However, the Ourika Valley's natural beauty has made it an increasingly popular tourist destination in Morocco. This has led to a gradual shift in the local population's occupation towards the tourism service sector.

DouTmaquite Aghbalou Cooperative

The Doutmaquite Aghbalou Cooperative located in Aghbalou Douar-a part of the Al-Haouz Province in the Marrakesh-Safi region. The cooperative was established in 2016 with the support of HAF in collaboration with local women residents. The cooperative's activities and successful running are due to the diligence and dedication of its head Ms Majdouli has been managing the cooperative from her restaurant.

With roots in the village, a background in chemistry, and international experience, Ms Majdouli brings a unique professional perspective to the cooperative. During frequent expeditions to the nearby hills, she researches local plants and conducts experiments on their potential use for innovative beauty products. To do this, she has been actively engaging in collaborations with university researchers. Her expertise and dedication to product innovation are playing a significant role in shaping the cooperative's overall direction.

Eleven local women work in the cooperative on a part-time basis, all of whom knew each other from before. Most of them have a basic level of education or haven't attended any form of school ever. They have a good understanding

Figure 4
Small pharmacy of plant-based medicines at the cooperative.

Figure 5
Entrance of the cooperative garden.

of coarse grains but relatively little knowledge of plants. The team shares responsibilities equally, and all women are trained to carry out all key tasks related to cooperative production, including drying, distilling, and infusing plants and herbs. The cooperative primarily focuses on producing health and beauty products using locally sourced aromatic and medicinal plants, as well as argan and olive oil, and clay. The cooperative has established partnerships with local farmers who supply raw materials such as rosemary, saffron, and bourbon geranium for their product formulations.

Tree Planting in Aghbalou

Tree planting in Aghbalou started from a collaboration between the local farmers' association and HAF in 2019. Following an initial assessment of the area's needs and priorities, HAF provided farmers with suitable fruit trees and conducted training sessions to equip them with the necessary skills for cultivation. The trees that were planted included carob, olive, apricot, fig, pomegranate, and quince trees, along with various herbs such as thyme, Artemisia, and mint. These plants are carefully selected to suit the local arid climate and soil conditions and to replace more water-intensive crops such as barley and wheat.

The tree plantation sites are located on cultivated lands near the villages of Aghbalou Bihalwan and Douar Aghbalou. Most of the lands are owned by the farmers and their families, inherited through traditional tenure systems. However, one of the tree-planting sites was situated on a plot of land that was donated to the local communities by the government, marking the first instance of such a donation.

Findings

Transect walk

The cooperative is backed by magnificent mountains that are one of the treasures of raw materials for cosmetics. There are rugged mountain paths where the women grow and collect their ingredients. Along the way, there are various plants used to produce cosmetics, such as Artemisia alba, round-leaf mint, myrtle and rosemary. The cooperative produces a diverse range of pure dew sprays derived from the distillation of over a dozen plant species. These plants benefit from the mountain water and the unique local growing environment, so they can grow healthy and strong and accumulate rich nutrients.

The cooperative uses sustainable farming methods and does not engage in large-scale cultivation, but rather respects the natural ecosystem's balance. Some plants are grown naturally on local hills, influenced by local climate and soil conditions, and have unique qualities and attributes. Some are cultivated by local farmers or cooperative staff to ensure that the growing process is in harmony with the environment, such as lavender. In addition, the local population grows crops appropriate to the season and climate, such as onions from October to December. This cultivation based on the local environment ensures the high quality and natural properties of the products. This biodiversity-dependent development model not only contributes to the cooperative's economic growth but also protects and restores the local ecosystem and provides consumers with a natural, high-quality choice of products.

Since 2017, the cooperative's focus had shifted from coarse grains and couscous production to medicinal and aromatic plants used in medical and beauty products. This transition was driven by the need to remain economically competitive, as couscous production alone was not sustainable. These resources were sourced either freely from public lands, a practice still tolerated by local authorities, or through collaborations with farmers and small producers in the area. The essence of the cooperative became centered around understanding, appreciating,

Figure 6
The plant Mastic grown naturally in the region.

The Doutmaquite Aghbalou Cooperative

Room 1: drying

Room 2: distilling

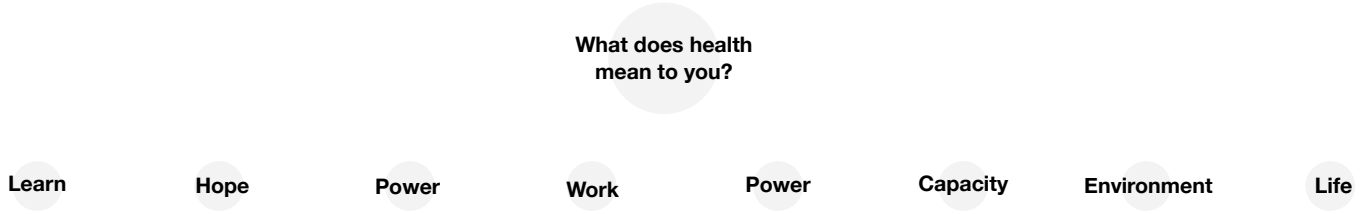
Room 3: infusing

Figure 7
The three-steps process of herbal medicine.

and experimenting with the valuable resources that the community already possessed but may not have fully recognized. An example is Mastic (Pistacia Lentiscus), a plant native to the area with potent anti-inflammatory, antioxidant, and antimicrobial properties. It is recognized for its positive effects on conditions such as eczema, as well as its ability to alleviate congestion in the venous and lymphatic systems, including varicose veins. However, it is often harvested by local women who use it to make brushes for cleaning their houses, unaware of its many health benefits. Currently, the cooperative carries out its production activities in three dedicated rooms: one for drying, one for distilling, and one for infusing. While Ms Madjouli takes the lead in exploring and experimenting with new plants, all the women in the cooperative are trained to perform all tasks related to production. They work together and share the profits equally. Ms Madjouli also promotes cooperation with local men to enhance the cooperative's integration within the local community. Although the business is not currently generating substantial profits and is influenced by the seasonal nature of tourism, Ms Majdouli has a long-term vision. She believes that this approach will yield benefits as more individuals acknowledge the significance of investing in local resources and protecting biodiversity. Her hope is that the cooperative eventually could establish a larger production facility on a plot of land she has identified in the nearby hills. This location is close to the cultivated fields from which she sources most of the primary ingredients for their products.

During the workshop conducted with around seven women from the cooperative assisted by HAF's volunteers, the central theme of health was explored. The workshop raised a very basic question "What does health mean to you?" to the women of cooperative. This approach aimed to cultivate an understanding of local perspectives on health and well-being. Adhering to participatory and co-production principles, the intention was to avoid imposing any sorts of preconceptions onto these women. Instead, the workshop aimed to foster a space

Figure 8
Women's understanding of health gathered through participatory research tools.



where the women's experiences and insights could directly contribute to the generation of ideas. As each woman expressed in one word what health meant to them, words such as "power", "hope", the "capacity to do things" and "live a fulfilling life" emerged. The importance of preventing diseases was also emphasized.

Building upon the women's holistic understanding of health, the social determinants of health was introduced to the group of women. The aim was to delve deeper about the specific societal, economic, and environmental aspects that contribute to overall well-being in Aghbalou. The conversation unfolded from discussing positive factors to examining potential obstacles that impact one's good health. Starting with the favourable aspects, the women highlighted the significance of good quality environmental conditions, well-ventilated housing, nutritious diets, and strong community bonds. As the discussion advanced, they reflected on the challenges that can hinder well-being, including limited access to healthcare and education, as well as poverty.

Regarding "the environment", they highlighted, in particular, the availability of clean water, clean air, and diverse vegetation. As they shared these thoughts, the women pointed at their surroundings to show us that, in this respect, Aghbalou is a good place to live in. However, they highlighted that over the past decade, Aghbalou has experienced both prolonged droughts and damaging floods, exacerbating water-related issues.

As the conversation progressed, the women brought attention to the fact that despite having the basic infrastructure in place, such as piped drinking water, gas, and electricity, poverty still acts as a limiting factor for people to fully utilise these resources. To prevent waste of paid drinking water in tasks such as cleaning, for example, the women continue to rely on natural water sources, such as the river, for their daily needs. Additionally, to avoid the expense of using gas, they gather wood from the forest, primarily for cooking purposes. However, they remarked with a laugh about the potential danger involved in this practice, as falling while carrying the wood could result in "rolling down the mountain". When asked about the gender division of these responsibilities, they confirmed that they are predominantly allocated to women.

When asked how they handle sickness and access medical assistance, the women placed significant emphasis on the embodied experience of illness and the vital need for rest and healing. "Feeling one's body" was highlighted as particularly important especially because many women lack ability and enough education to access health information. They stressed on the scarcity of doctors and

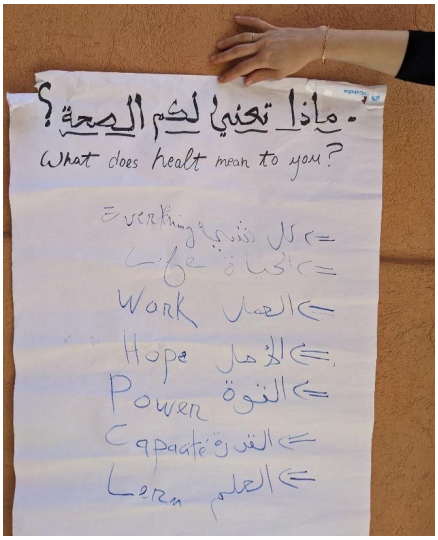


Figure 9
A participatory research tool.

specialized healthcare services as the biggest primary health challenge in Aghbalou. Currently, the only clinic in the area is staffed by nurses and primarily provides vaccinations and paediatric care, with the doctor's presence being limited to just two days a week. The women highlighted that individuals with severe medical conditions must travel to the neighboring village of Tahnawt (about 20 Kms) or even to Marrakech (more than 40 Kms), which poses challenges for pregnant women in need of medical attention.

As previously mentioned, another challenge specific to women pertains to education. A significant number of women continue to face illiteracy, and many young girls still drop out of school early to get married. This may occur due to familial pressures or the individual's own choice influenced by societal norms. Due to the obligations associated with taking on family responsibilities, early marriage limits women's access to continued education and hampers their ability to enter productive employment. When asked about the main impact that joining the cooperative had on their daily lives, the women immediately brought up the topic of mental health, and how being surrounded by a kind and caring community, working together, allows them to "forget about their problems" and feel happier.

Semi-structured interviews about tree- Planting in Aghbalou

The interview was held with the agricultural technician Abdeljalil Ait Ali, manager of the tree planting project in Aghbalou. He introduced us to the trees and plants cultivated in the area, including carob, olive, almond, fig, pomegranate, quince, and herbs like thyme, artemisia, and mint. They have also recently introduced Agave as a new species which is still mainly used for controlling soil erosion and preventing crop diseases. Planting these trees plays a vital role in preventing soil erosion, with carob and almond trees being particularly effective. Abdeljalil Ait Ali explained that the tree-planting collaboration begins with a request from a farmers' association, followed by field visits to determine the best tree species for the area. HAF provides seeds from nurseries, conducts training, and monitors tree growth all over the year. He explained how they take a "whole family approach" working with entire families and emphasizing women's involvement.

The other semi-structured interviews were with two local farmers names were Maimoona and Laila. The farmers have shifted from planting cereals to fruit trees due to water scarcity and concerns about climate change, such as frequent flooding and drought. There is a piped irrigation system that HAF installed, and they wish to further improve and modernize it, but due to a lack of official land titles, they cannot benefit from government-funded programmes. Since the trees takes time to grow, the income of both farmers has not increased yet. Their production mainly serves self-consumption. Laila told us that he is still planting cereals while waiting for the trees to grow, but he faced challenges due to the lack of rain.

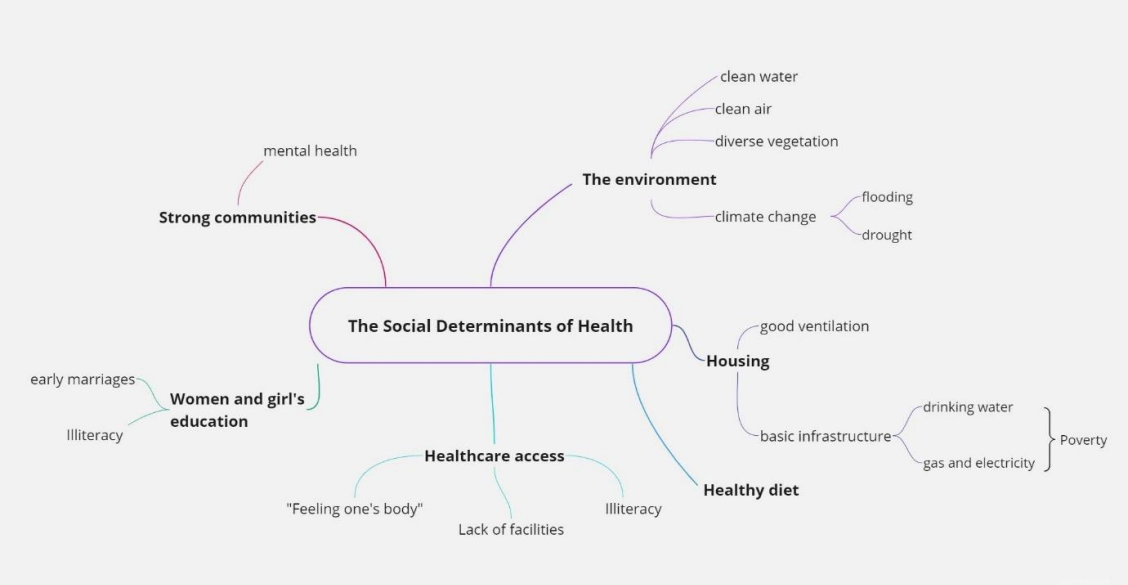


Figure 10
An analysis of the responses gathered through semi-structured interviews.

Figure 11
Semi-structured interviews.

Most lands where tree planting takes place are owned by the farmers and their families, inherited through traditional tenure systems, and cultivated through traditional communal practices. The farmers described the importance of community ties as they regulated traditional community-based management practices for managing the land, such as the practice of agdal, a temporary enclosure of resources within a delimited pastoral or forest territory. The opening and closing dates of the enclosures, the access rights, and the rules for resource exploitation are defined by the customary assembly of the community. This practice not only ensures the replenishment of vital resource stocks and promotes their sustainable use but also fosters stronger community ties, leading to long-term positive impacts on environmental and social sustainability. However, escalating tensions related to the increasing value of land in the area driven by the tourism industry was brought forward by the interlocutors at several occasions. A local entrepreneur from the tourism industry is engaged in a legal dispute with the farmers regarding land ownership. This dispute arises from the entrepreneur's intention to expand his yoga retreat business on the disputed property, showcasing the rising value and desirability of the land for commercial purposes. One of the tree-planting sites is situated on a plot of land donated to the local communities by the government, marking the first instance of such a donation.

Figure 12
Transect walk with the community.

Analysis

Our research findings indicate that when analyzing health factors in Aghbalou, it is crucial to recognize their interconnections and dependencies with the surrounding natural, built, and social environments. Factors such as climate, education, employment opportunities, social support systems, and infrastructure emerge and overlap within these contexts. By identifying place-specific barriers and opportunities for communities' well-being and development, a health-focus mapping can support the identification of priority areas for intervention, enhancing the overall impact of development programs and interventions. Overall findings signify six main determinants of health in Aghbalou.

1. Climate Change

Climate change was identified as a pressing concern both by the women of the cooperative and the local farmers. They mentioned the increased frequency and intensity of drought and flooding. The farmers' shift in agricultural production from cereal to fruit trees is a reaction to climate change and a proactive strategy to mitigate its impact. The tree planting project, as well as the activities of the cooperative, contribute to soil conservation, biodiversity, and overall ecosystem health, mitigating the impact of climate change while also affecting human health. At the same time, this transition takes time, resources and, therefore, ongoing support.

2. Economic factors

Neither the women of the cooperative members nor the farmers reported improved economic stability resulting from the initiatives. Poverty emerged as a significant factor impacting how communities' access and use essential resources. Despite having access to infrastructure, such as

gas and electricity or piped water, decision-making on how to use these resources is rooted in the economic reality of their circumstances. Crop yields are mainly used for self-consumption, rather than for generating profit. Economic constraints also impact educational opportunities, since young people might decide to start employment earlier rather than pursue further education. The attractiveness of the tourism industry was highlighted as a factor influencing young people's decision to drop out of school and start working. However, from a long-term development perspective, this strategy ultimately keeps people in low-paid, low-skill jobs.

3. Land use

Another important dimension is around the issue of land use and tenure. Women in the cooperative gather part of their resources from publicly owned land. This practice is tolerated by the local authorities but might create tensions in the long term if the cooperative expands. In case of the farmers, the absence of formal land titles prevents them from benefiting from government-funded programs, such as upgrades to their irrigation systems, which are then substituted by development organizations such as HAF. In many cases, farmers still use the traditional, labor-intensive farming way, for example fetching water from the river in bottles to irrigate their crops. Importantly, because of the increase in the land's value brought by tourism, conflicts are emerging with local entrepreneurs who are legally challenging the farmers' rights over the lands. Such disputes over land use rights could jeopardize the farmers' livelihood and disrupt the balance of the local ecosystem.

4. Healthcare accessibility

A significant barrier to health in the area is the lack of accessible healthcare services. Since the only local facility is non-specialised and visited by the doctor only twice a week, the people from the local community have to travel to neighbouring villages or larger cities like Marrakech to seek more specialised medical care. This poses specific challenges to women, as the lack of accessible pregnancy care exacerbates the risk of pregnancy-related health problems. As mentioned earlier, gender norms in the area create additional barriers for women seeking medical care, who might need to be accompanied by a male family member, further restricting their access to healthcare services. In addition, economic challenges, including poverty, compound the issue. It was reported that the cost of transportation to the closest hospital is 7 dirhams by bus or 10 dirhams by taxi, which can pose a significant financial burden for low-income households.

5. Gender Norms

During the workshop, the women brought up that gender is still a significant factor affecting women's access to opportunities. Illiteracy is still present: in 2021, the adult literacy rate in Morocco was around 67 per cent among women, compared to 85 per cent among men, which refers to a significant gender gap in education (World Bank, 2023). This has important consequences on women's health, as found out in this project, it limits their capacity to access critical health information and leads them to rely on more embodied interpretations of their health conditions. Additionally, some women reported only visiting the hospital when accompanied by a male family member a practice that can pose challenges for women seeking medical care. Many young women still drop out of school early to get married, with approximately 14% of girls in Morocco being married before their 18th birthday, and 1% before the age of 15 (Girls Not Brides, 2023). This has important consequences on their educational journey and potential career opportunities, limiting in the long-term their independence and access to resources.

6. Social reliance and support system

The research reveals that social ties, both in the local cooperative and among farmers, are vital in promoting mental health and overall well-being. The cooperative was comprised of local women and fosters a supportive environment that empowers its members. Collaboration, sharing experiences and mutual support positively impact the community's health, especially for women. The farmers described the importance of community ties as they regulated traditional community-based management practices for managing the land, such as the practice of agdal, a practice that not only ensures the replenishment of vital resource stocks and promotes their sustainable use but also fosters stronger community ties, leading to long-term positive impacts on environmental and social sustainability. However, it is important to note that the previously mentioned impact of tourism in the area, along with the resulting increase in land value, poses a potential threat to this practice.

Conclusions and Recommendations

Health constitutes a lens through which to examine the broader determinants contributing to the overall state of a community. We propose that, by combining the SDOH approach with HAF's community-based development model, there is potential for synergistic effects and improved results in promoting sustainable development. The SDOH approach provides a valuable framework to map and analyse the factors that impact community well-being and development. When guided by rigorous and comprehensive standards for evidence (Braveman et al., 2011), this approach can support the design and implementation of more targeted and multisectoral approaches to community development.

Integrate an SDOH framework

HAF's development model places a strong emphasis on including local communities and empowering them to actively participate in decision-making processes. This participatory approach to development builds upon the valuable knowledge and insights of the communities themselves. It is widely recognized that such an approach leads to the generation of more effective and sustainable solutions in the long term.

This approach shares common goals and principles and combining them can lead to a more comprehensive understanding of the determinants affecting well-being and development within specific communities. This combined approach can help identify targeted interventions that address both immediate health needs and the underlying social and economic factors causing disparities, leading to more effective, sustainable, and community-driven solutions for promoting well-being and sustainable development.

Support local innovation

During our visit to the Doutmaquite Cooperative, we witnessed a remarkable hub of innovation, creativity, and entrepreneurship. As the expansion of the tourism industry poses risks of trapping local communities in low-paying, low-skilled jobs, and the increasing value of land attracts investors eyeing traditionally owned farmlands, the Doutmaquite Cooperative stands as a compelling example of valuing local resources and empowering women. This alternative approach not only brings meaningful empowerment but also fosters long-term growth for the local area.

By recognizing the value of local resources and harnessing their potential, the Doutmaquite Cooperative exemplifies a transformative approach. The cooperative's role in providing women with a space to work together, upgrade their skills and increase their income is a step forward towards fostering women's well-being and gender equality. At the same time, by valuing local resources, actively exploring new applications, and employing sustainable practices, the Doutmaquite Cooperative simultaneously preserves the community's distinctive heritage and enhances its resilience. Prioritizing the needs and interests of the local community, this approach not only safeguards the cultural and environmental integrity of the area but also ensures that the benefits of development are shared equitably among community members. Learning from and supporting this endeavor can foster further positive change in the area and create an original example for other localities and cooperatives.

Increase reach to girls

The IMAGINE Workshops, along with a comprehensive “whole family approach”, are instrumental in the High Atlas Foundation’s efforts to address harmful gender norms and advance women’s inclusion and participation in society and decision-making processes. It has been observed that many young girls in Aghbalou interrupt their education to marry early, indicating the potential of extending the reach of these activities to them. Transforming such practices deeply rooted in cultural norms will undoubtedly require considerable time and effort, as acknowledged by the women in the cooperative.

Empowering women has a ripple effect that goes beyond individual benefits, and there is significant scope for the women of the Doutmaquite Cooperative to become influential role models, inspiring younger generations and igniting a virtuous cycle of empowerment and growth. Linking women’s cooperatives to schools could create an opportunity to develop joint programs that facilitate outreach efforts and ensure the protection of girls’ right to education. Establishing this connection could serve a dual purpose: introducing children and youth to the concepts of gender equality and educating them about the local environment, available resources, and untapped potential. The cooperatives can also serve as spaces to implement workshops, seminars, and sessions for children. By integrating these topics at an early stage, young individuals can develop an understanding and appreciation for both gender equality and their surrounding environment, fostering a sense of responsibility and empowerment for sustainable development.

Project 2
Mapping the health behaviors and health challenges faced by university students

Participants
Eunice Yuan, Jialin Li, Mingcan Lyu, Yanzi Ning

Facilitators
Prof. Haim Yacobi (UCL), Ibtissam Niri (HAF)

Research Question
What are the prevalent health behaviors and health challenges among university students and, how can we effectively map these to propose targeted intervention strategies for improved student health outcomes?

Background

The importance of understanding the social determinants of health within university settings is well acknowledged. University is a hub of students who are above 20 years and are dealing with different responsibilities in life along with academic stress. Universities also often brings about significant lifestyle changes among students. Furthermore, the university years are viewed as a crucial phase in which health behaviours can be formed and modified, both in beneficial and detrimental ways. This study explores the health behaviours and challenges faced by students at the university in Marrakesh through the lens of the Social Determinants of Health (SDOH) framework. It delves into how various factors – such as income, social and physical environments, health services, gender, and culture – influence students' health. We concentrate on four prevalent health issues: smoking, diet, physical activity, and access to healthcare identified through a preliminary survey. Guided by these insights, we propose strategic, context-specific interventions to tackle these challenges. By integrating multi-disciplinary approaches, our research underscores the significance of addressing health issues from a holistic perspective, particularly in the transformative university environment.

Research Method

Before conducting the fieldwork in Marrakesh, HAF coordinators helped to list down some of the health behaviours that they have commonly observed among university students in Marrakech. These problems were around major themes of smoking, diet, physical activity, and access to healthcare for further fieldwork. This information provided an initial understanding of the health challenges of young adults or university students and, helped to develop semi-structured questions for focus group discussions and in-depth interviews.

Figure 13
Focus group discussion with male students and an explanation to SDOH framework

Focus groups and in-depth interviews

Three focus-group discussions (annex 1) were carried out with the students of law programme at a private international university of engineering and law studies The first FGD was conducted collectively with a group of 11 students (6 males and 5 females) followed by two FGDs conducted separately for males and females.

A discussion guide was prepared for the focus group. It was organized into four sections related to smoking, diet, physical activity, and access to healthcare. During the focus groups, participants were encouraged to share their experiences and opinions around the concerned health behaviors. We used open-ended questions and prompts to stimulate discussions and ensure that all participants had the opportunity to express their viewpoints.

In-depth interviews were carried out with randomly selected students who consent and showed willingness to be a part of our discussion. Using semi-structured questions, the interviews aimed to gather more detailed and personal insights from the university students. All FGDs and in-depth interviews were audio-recorded to ensure accurate data, and photographs were taken to document the research environment.

Maptionnaire

The method of using spatial information tools and technologies such as maps for data analysis and visualization during the research process. As a spatial expression tool, maps can help researchers understand the distribution, changes, and correlations of geographic space, thereby better exploring and solving health problems. The health data was matched with the geographical location information of the university campus and its surrounding areas. In addition, the results of spatial analysis were visualized to generate a health risk map. This map displayed the health risk levels at different points of location in the university campus and surrounding areas, which helps to intuitively understand the health differences in geographical space.

Figure 14
Identification of potential health risks through maptionnaire

Findings and Analysis

Mental stress

The very common concerns raised by the students during FGDs and interviews were around the balancing of their social roles and expectations along with academic stress. For example, the participants said:

“I am a mother of three children...” - a female student.

“I am a single mother...” - a female student.

“I am responsible for my family and myself.” - a male student

“I am now thirty-four years old, and I have my own job...along with studies.” - a female student.

“I come from a city in the south of Morocco...I study during the day and then work at night.” - a male student.

These statements bring forward the various social roles and expectations carried out by students along with their studies. Their family responsibilities or lack of opportunities in their own cities magnifies the mental stress that a student usually faces while undergoing higher studies. These stressors are potential reasons for depression and tiredness that are directly correlated to health behaviors such as smoking.

One of the staff reported informally that the dropout rate in their university is around 70% especially among post-graduate students. The above-mentioned stresses offer a possible explanation behind a significant drop-out rate among older students. But it also indicates that the stress of unfinished degree programme followed by undeserving work opportunities could further increase the mental stress to these students.

Future employment and career choices

"Morocco economy situation...need a job to support his family and himself" - a male student

Many students were skeptical about their career prospects. The economic instability in Morocco and the recent COVID lockdown has stressed a lot of students about their future and career choices. Some students were aware and keen to learn more about the internships and employment opportunities offered by private companies.

"I want to do PhD in the future, and the university offers some academic conferences or discussion groups, and these would be useful for me."

Some students sounded ambitious about their future plans and career choices and were appreciative of the programmes and engagements at their university.

Physical activity and availability of sports facilities in the university

The research also explored the relationship between physical exercise and student health.

"The thing is that we have a sport club. I think that the gym is not well managed...there is gym only for the staff..."-Female student.

Several students confirmed their participation in the sports club. They do not only enjoy physical exercises, but club also fosters a sense of community, and facilitate the development of various skills. Nonetheless, FGD identified that students have certain limitations in joining these sports clubs at the level of university. Specifically, access to these clubs is restricted to specific enrolment periods for example in the beginning of the year when some students might not be ready to join extra-curricular activities and certain provisions of the club are exclusive to the staff. Such features of the club

Figure 15
Food stalls selling snacks located outside the university.

discourage students to fully avail the club opportunity. The findings indicate that less than half of the students (about 45%) actively engage in sports or physical activities. Those who participate in sports reap significant benefits from the available sporting facilities. Notably, the impact on mental health appears to be pronounced among the participants, significantly reducing their stress levels.

"I visit the gym when I am depressed" – Male student.

For instance, a male student shared that gym is t therapeutic to him and he visits a gym whenever he is stressed. Most students believed that physical exercise is vital to their overall health. However, the number of students who identified as physical active was not significant. The first reason was identified to be gender. It was common to see male students sporting in the campus while there were not female students sporting or exercising. Most of the male participants also found more involved in regular exercises such as football and running; female participants were reluctant to participate except for a couple of students who enjoyed dancing or swimming indoors. There are gym facilities in the campus but accessible to the staff. The students rely on external facilities. There were limited sports facilities in the campus. While there is a gym facility, they are primarily accessible to the staff, leaving the respondents to respond regarding external workout options. These findings demonstrate the diversity of physical activity preferences based on gender and factors beyond the scope of this research, emphasizing the need for schools to consider and accommodate this diversity. The students expressed their disappointment in not having a well-equipped gym that could offer them a variety of physical training and exercises and, the fact that most of the services are reserved to the staff. Furthermore, the issue of overcrowding within the university campus also hinders student participation in physical exercises. Consequently, all the students who participated in the focus group expressed a lack of substantial experience in exercising within the university premises. There was a definite need for advancing gym facilities for students and offering a wide range of sports options within the school setting to encourage more students to participate based on their interests and passions.

Healthy eating and diet

"The majority of the students here are not from Marrakesh. We are from the outskirts or from other regions. We have several expenses to manage like, you know, rents and what we're going to eat and etc." - Male student

"It's much cheaper for students to eat in cafeteria like they have special prices. But if you want to eat healthy, you can go to the restaurants nearby." - Female student

Many students were not originally from Marrakesh and had moved to the city for their studies. This transition had an impact on their approaches and life choices, food remained the significant aspect. Students highlighted hardships in managing living expenses in Marrakech because of which they opt for affordable and convenient food options. Convenience remained a reoccurring factor in influencing dietary choices. Students mentioned the availability and affordability of fast-food options, such as Moroccan pancakes (msemmens) and instant noodles which were easily accessible on campus. The low cost of these food and readily available in the campus canteen reinforced its consumption.

"In the cafeteria we have also fast food. So it's not a big difference when we eat it [in campus or outside campus]" - Male student

Some students expressed dissatisfaction towards the food served at the university's cafeteria. Their dissatisfaction was mainly towards the unavailability of hot fresh food within the campus. In their words, the food in campus canteen is as unhealthy as it is available on the streets and at hawkers. This suggests that the university's food offerings may not prioritize health and nutrition, potentially impacting the dietary choices of students who rely on these options for their meals. Participants also noted that healthy food options tend to be more expensive, particularly when compared to the cheaper prices offered at the university cafeteria.

"If [we] have time, [we] cook traditional dishes. But if [we] don't, I mean if you're studying, you're going to eat anything. Yeah. You know the snacks there outside, just fast food if you don't have time" - Male student.

"If I have a lot of things to do, if I'm busy I'll take [eat] anything." – Female student

Time was mentioned as the second most important factor behind opting for quick meals even if that's unhealthy. Students emphasized that their busy schedules and academic commitments limit their ability to spend time on cooking and consuming nutritious meals. This is a similar trend and a constant factor among students in different contexts as well (Deliens et al., 2014; Amore, Buchthal and Banna, 2019). This time constraint has led to a reliance on fast food and snacks as quick and convenient options among students in our focus group.

Access to healthcare

When it comes to access to healthcare services, we discovered that the university has only taken the most basic steps:

"…They have a doctor or a nurse. Or when its severe, they get the paper signed so that they could access the facilities, outside the university" – Female student.

Most students reported to reach out to their families and friends when they are unwell rather than seeking a medical advice. Only a few (about 10%) mentioned that they first seek opinion from a healthcare professional. Despite the level of stress and various factors mentioned by the students, none of the student has ever reached out to a professional such as a doctor, psychologist, or a therapist. Even students who are indulge in risk-taking behaviors such as drugs consumption or alcohol or smoking also don't seek professional help. The same is observed about the sexual healthcare concerns where the first point of advice remain family and friends.

Even though the students participated in the study did not mention any diagnosed health issues, but about 70% of them had faced at least more than one healthcare issue in the last couple of years. In addition, most of them (92%) reported constant psychological stress and over a quarter (27%) mentioned issues in their social relationships. The students denied any discussion about sexual health within the university as a part of their academic or extra-curricular discussions. The reason provided by the students remained socio-religious factors according to which sex-related discussions in public are seen indecent, and therefore prohibited. The other reasons mentioned by the students in not seeking professional

healthcare support or guidance are:

- Lack of confidence in the services and their competency.
- Lack of availability of transportation to reach to the services.
- Lack of affordability to pay the charges or seek an appointment in emergency.
- Fear of shaming or stigmatisation especially in cases of sexual or mental health concerns.
- Fear of isolation and social discrimination.

Conclusions and Recommendations

The study showcases the complex interplay of socio-economic factors, personal responsibilities, and environmental factors shaping the health behaviors and challenges faced by university students in Marrakesh. A high level of mental stress was identified, often arising from the struggle to balance academic commitments with social roles and expectations, contributing to a high dropout rate. Uncertainties about future employment prospects further contributed to this stress. Physical activity was recognized as beneficial, but engagement was hindered by limited facilities, gender dynamics, and restrictive club access policies. Dietary behaviors were influenced by convenience, affordability, and a lack of healthy options in the campus canteen. Access to healthcare services was minimal, with most students turning to family or friends for advice rather than healthcare professionals. Our findings emphasize the need for a holistic, supportive approach to student health, encompassing the provision of mental health services, improved sporting facilities, better food choices on campus, and accessible healthcare services.

Multi-stakeholder collaboration to provide support for students' future plans

Multi-stakeholder collaboration is essential to provide comprehensive support to students for their future endeavours. By involving various stakeholders, such as educators, parents, government entities, and community organizations, students can benefit from a holistic approach to their educational and career development.

Career Counseling

Educational institutions can collaborate with career counselors, industry professionals, and employers to offer career counseling services. This collaboration could help students explore various career options, understand the job market, and make informed decisions about their future plans.

Internships and Work-Based Learning

Collaboration between educational institutions and businesses can create opportunities for students to participate in internships, apprenticeships, or work-based learning programs. This hands-on experience allows students to apply their knowledge, develop skills, and gain practical exposure to their chosen fields.

Partnerships beyond academia

Collaborations between universities and varying sectors such as private sector, government sector, industries would enable students understand and prepare themselves for better working opportunities. Stakeholders from the business sector can provide input on curriculum development, offer guest lectures, and facilitate industry visits, ensuring students are equipped with relevant skills and knowledge.

Networking and Alumni Engagement

Building strong networks and engaging alumni can benefit students to prepare for work industry. Alumni can share their experiences, provide career advice, and offer networking opportunities for students. Collaborative efforts involving alumni associations, career centers, and educational institutions can facilitate these connections.

Investing in sports

Sports and club activities have proven to be effective interventions for university students in mitigating stress levels. The literature consistently demonstrates exercise's positive impact on mental and physical well-being within educational environments (Tyson et al., 2010). However, implementing such interventions necessitates a monetary investment to enhance the existing infrastructure. The university should consider investing in comprehensive gym facilities, courts, and fields and acquiring state-of-the-art equipment to cater to the physical exercise requirements for its student and staff equally. These investments would address issues like overcrowding, which, as evidenced by our focus group findings, currently dissuade numerous students from engaging in sports activities on campus. Furthermore, by providing sufficient on-campus facilities, students would no longer need to seek external alternatives, such as paid gym memberships, thereby fostering greater accessibility and inclusivity.

Support extra-curricular activities

The financial investment in sports facilities should be supplemented by including a broader range of sports to cater to the diverse needs and interests of the student population. The existing literature highlights the growing significance of inclusive and diverse sports, which also take into account individuals with disabilities (O'Rourke et al., 2023). Consistent with our research findings, gender influenced the choice of physical activities. The availability of diverse sports options would encourage

greater student participation, as it aligns with their passions. Furthermore, including sports like Korfball, which both genders can play, would enhance inclusivity. Moreover, the investment must consider the needs of individuals with disabilities, often overlooked in crowded sporting fields.

Additionally, the university should also hire sports professionals from various fields to help the students exercise and natural talent at this university. Services from professionals such as coaches and trainers come at a small fee, but they will give the students tips on how to exercise to meet their optimum physical and mental health. Additionally, they will help pinpoint natural talents to levels that students could pursue successful careers in professional fields.

Finally, facilitating open access to sports clubs would serve as a complementary measure to the financial investment in sports facilities and the hiring of professionals. These clubs should be readily available to all students, enabling them to subscribe at any point throughout the academic year rather than being constrained to specific enrolment periods. Moreover, establishing a formalized management structure for these sports clubs, encompassing accountability for club operations across the entire university, would alleviate the burden currently borne by disparate faculties. Consequently, more students would gain access to these clubs, allowing them to engage in physical exercise while fostering a sense of community.

Reconsidering the nutritional benefits of the food choices at campus' cafeteria

Making changes to the food offered in cafeteria settings can have a significant impact on promoting healthy eating habits among students. The university can take proactive steps to promote healthy menu options by establishing guidelines for food procurement that prioritize local, organic, and ethically sourced products. We propose that this can be done through collaboration with local farmers and producers as a valuable strategy in promoting sustainable food practices and fostering a connection between the campus and the surrounding community. This can be leveraged by HAF's connections and programs such as Farmer to Farmer (F2F) and agricultural development initiatives, which can facilitate the development of direct purchasing relationships with local farmers.

The university can actively engage with the local farming community by organising farmers' markets. Previous research has consistently demonstrated that individuals who shop at a farmers' market at least once in the past year tend to report higher fruit or vegetable intake (Jilcott Pitts et al., 2015; Freedman et al., 2017). They are also more likely to consume five or more servings of fruits and vegetables daily (Jilcott Pitts et al., 2013).

This intervention can have a significant impact on promoting healthier eating habits among students in the university. By implementing food assistance programs, such as food vouchers or access to food pantries, students facing financial constraints can have improved access to nutritious food options. This ensures that healthy food choices are more affordable and readily available, making it easier for students to incorporate

nutritious meals into their daily diets. The establishment of guidelines for food procurement that prioritize local, organic, and ethically sourced food products can lead to the inclusion of healthier menu options in campus cafeterias and dining facilities. This provides students with a wider range of nutritious choices and encourages them to make healthier selections when dining on campus.

Overall, this intervention aims to create an environment that makes healthier eating choices more accessible and appealing for students. By combining healthy menu options and collaborating with local farmers, the university can create a comprehensive approach to promote affordable healthy eating among their students.

Increase in accessibility to healthcare services

The wellbeing and general health of students, teachers, and staff can be promoted through enhancing the university's healthcare resources. Universities can better serve the various healthcare requirements of their community by improving their healthcare resources.

In-house healthcare Professionals

The university could make an effort to establish a health point within the campus for any immediate and urgent health issues. The point where professionals such as either doctors, nurses, counsellors or other healthcare specialists are available. It could also be in form of health camps where regularly there are different kinds of health screening and checkups are offered to the students and staff. These services must be addressing diverse healthcare issues including adolescent health, mental health, sexual health, and drug usage.

Referrals to a range of healthcare services

Considering the academic institution as a safe space for students, there should be efforts to either have an access point on campus that could service students an opportunity to seek information or referral to various services. The university should definitely invest in networking with primary healthcare, preventative care, mental health services, reproductive health services, and other health promotion initiatives in order to facilitate timely and safe referrals for expert opinions.

Project 3
Public parks and Urban Health: A Case Study of District Menara, Marrakech

Participants
Chen Feiyan, Johanna Florez, Shengbo Ling, Ziqian Wang

Facilitators
Liza Griffin (UCL), Abdelkarim Ouguinaz (HAF), Mustapha Tarhbaloute (HAF), Mustapha Yahya (HAF), Safiya El Ghmari (Santa FeInstitute)

Research Question
What is the role and the quality of urban parks in the overall health of Marrakech's inhabitants and in relation to climate change?

Background

This study uses a case study approach to examine the role of parks in promoting the health and well-being of Marrakech residents while exploring the overall quality of the city's green spaces. The Menara district was chosen considering there are several parks nearby. The five parks selected for this study are Menara Garden, Annahda, Azli, An Mezoir and Ben Tourmet. While focusing on parks within the Menara district, the study aims to explore the ways parks are used by local residents and, the role played by parks in promoting people's health and well-being, particularly in the context of climate change. The study combines quantitative and qualitative methods including a survey, spatial mapping, observations, and interviews with key-informants. The insights gained from this study provide valuable information towards understanding the current state of parks in Marrakech, their impact on communities, and management policies at the regional level.

The framework selected for this study was the Healthy Parks Framework which consists of ten characteristics that contribute to health & well-being outcomes for parks and green spaces. The framework also provides a structure to support the assessment and reflect on the observations made during the visits and analyze the collected data. Through this evaluation, the study aims to provide a comprehensive and an in-depth understanding of the current state of the parks in Marrakech. By identifying the strengths and weaknesses of the parks, we hope to generate recommendations for future park development that considers the needs and expectations of both locals and tourists.

Research aims and methods

The project aims to explore the role played by urban parks among the city of Marrakech's inhabitants' health and in relation to climate change. Considering the Healthy parks' framework (Griffin et. al., 2022) as theoretical approach, this study evaluates the quality of the urban parks in the city of Marrakesh and understand the elements for management and decision-making related to the urban parks in Marrakesh.

Research methods

The study seeks to obtain data which will approach to address some research gaps about how urban parks might shape the daily lives and health among residents in Marrakech. The three tools used to gather findings are:

Survey

The study used a quantitative survey method to explore some of the socio-demographic characteristics of park users (Annex 2). It also assessed the purpose, frequency of visitation, time of arrival and stay in the parks, preferences, and thermal adaptation behaviours. The questionnaire was administered to some of the users who voluntarily participated in the survey. Thus, the sampling was by convenience, but it was based on a criterion i.e., adult women and men over 18 years who voluntarily accepted to participate. Visitors in the parks were approached randomly. The questionnaire took about 5-10 minutes to complete.

Spatial Mapping

Using the Healthy Parks as a guiding framework, a mapping was carried out to determine residents' perceptions of key features of Menara Park. Therefore, we chose five of the ten framework's features to ask the participants to locate these elements within the parks for the mapping. This enabled the residents to participate in pointing out the places which they perceive as active, safe, comfortable, quiet, and calm spaces and those with a variety of landscapes. In doing so, the study explored the ways the selected parks in Menara offer different facilities from the perspectives of the residents.

Quasi-structured observations

During the visits, observations were made to examine the main users of the urban parks, the ways urban parks are used, the existing conditions and facilities relevant to people's health behaviors. The observations made during the visits were also focused on evaluating the quality of the parks considering the ten characteristics of the Healthy Parks Framework since this provided us with a structure to support the assessment and reflections on the elements of the health-promoting parks.

Key-informant interviews

To understand the management and the related public policies to urban parks at the district level, semi-structured interviews were conducted with key stakeholders. This includes the chairman of Menara District, the director of services, the president of planting services, the director of monitoring and evaluation services, the president of equipment Services and a maintenance worker at Ann Mezoir park.

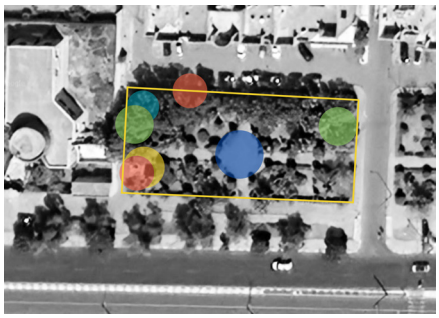
Figure 16
Way in which parks are used.

- Active places
- Safe places and routes
- Variety of landscape
- Quiet and calm places
- Comfortable places
- Active routes (places)
- Noise children
- Safe spaces and routes

Menara garden

Annahda

Azli



Ain Mezoir

Findings and Analysis

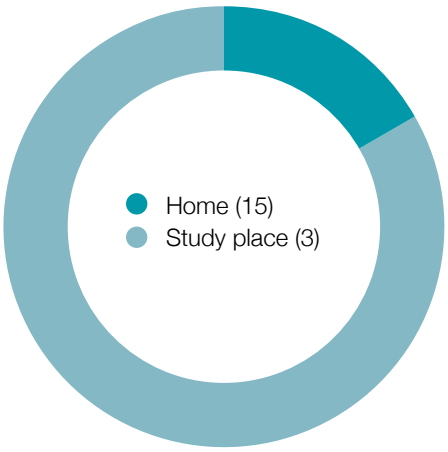
Demographic profiling of the Menara's inhabitants

The research was carried out in the district Menara, one of the six districts of the city of Marrakesh, located in the west. According to the High Commission for Planning of the Kingdom of Morocco, between the last two censuses (held in 2004 and 2014), the population in the Commune increased from 280,275 in 2004 to around 409,829 in 2014 (Haut Commissariat Au Plan, 2004 and 2014); hence making it the most populated district in the city. The share of women and men was 50.8% and 49.2%, respectively. The largest age group was those aged under five years followed by those aged 5 to 9 and, 20 to 24 years. Residents mostly follow an expansive pyramid shape with a larger proportion of the population in the younger age cohorts.

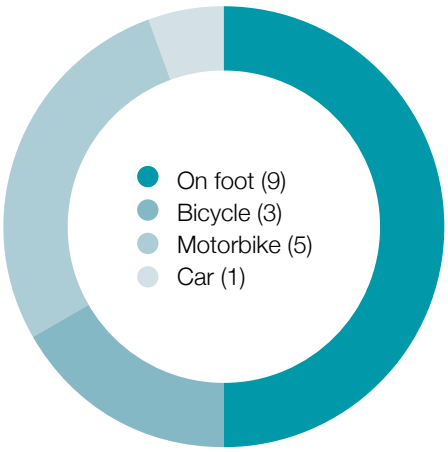
Regarding the level of education, the General Census of Population and Housing (RGPH) – 2014 showed a significant gap between males and females in relation to educational attainment where women have the lowest levels of qualification compared to men. Moreover, a larger proportion of both women and men did not report any educational qualification (28.9% and 16.8% respectively). Yet, the proportion of Menara's inhabitants with non-educational levels was lower than those reported at the national and province level where, for instance, the share of women who did not report any educational level was 45.2% and 36.1% respectively. The latter is related to the lesser illiteracy rate of the Ménara District in contrast with Morocco and Marrakesh province's rates as well. Meanwhile, the national and province illiteracy rate for women was 42.1 and 32.5, the illiteracy rate in the district Menara was 24.1.

Figure 17
Graphical analysis of the participants responses

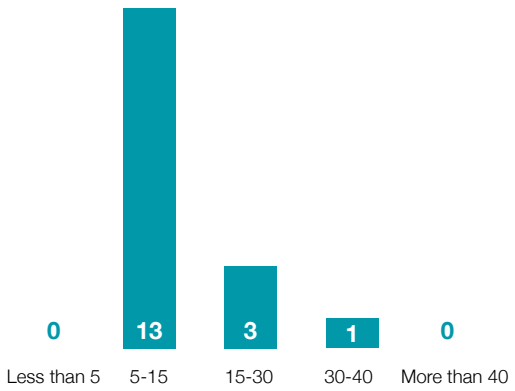
Departures of participants



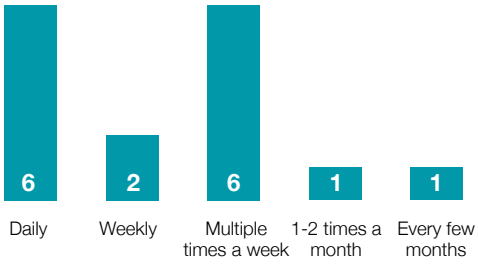
The way participants reach the park



Time spent on the way to parks



Frequency of visit to the park



In terms of the level of educational attainment, primary school was the highest for both women and men (23.6% and 27% correspondingly) followed by secondary school with around 17.1% for women and 19.1% for men. Only 16% of women and 18.4% of men have completed secondary school (registered as "Qualifying secondary") while under 12% of responders were in university. In Menara, in 2014, the share of the active population (employed and unemployed) was 36.5% which represented 149,725 persons. The distribution between men and women followed the same trend shown at province and national levels characterized by the existence of a significant gap between women and men. For instance, in Menara the proportion of active men is almost threefold the proportion of active women.

As for the profile of the occupational groups, about half of the workers are craftsmen and small traders. However, the proportion of women in this occupational group is only 25%. On the other hand, the second largest occupational group in the municipality is members of local legislative bodies, directors and managers of companies and the civil service, and professionals, where the proportion of men is again the highest in this group (66.9%). Still, this occupational group represents just 18.4% of the jobs in Menara.

Findings from the study

The current research findings could be classified in three main groups.

Users of the Parks

In total, 17 people (10 males and 7 females) participated across four parks. Only one participant had recently moved to Marrakech, while the rest had lived there for more than ten years or from one to five years (n=9 and 4). The majority of participants were between the ages of 18 and 24, with a higher proportion of males. Secondary education was the highest degree of education (n=9), and the majority of participants (n=7) were students, mostly females. In terms of their origin, 15 participants visited the parks from their homes, with times ranging from 5 to 15 minutes.

Walking was the primary mode of commute followed by motorbikes. Interestingly, motorbikes were predominantly used by women (3 out of 4 motorbike users). Around 12 participants visited the parks daily or multiple times per week, with visits occurring on any day (n=8 and 7, respectively). A majority of people spent 30 to 60 minutes in a park. In particular, while the survey had a nearly even gender distribution, it was discovered that more men of all ages were using the parks. Women

Figure 18
Participant's length of residence near the park

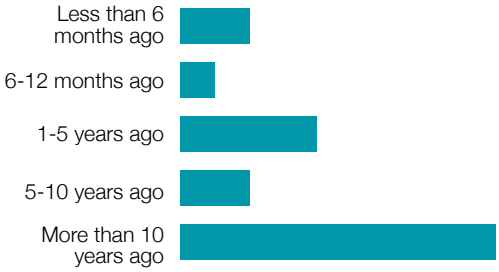


Figure 19
Participant's level of education

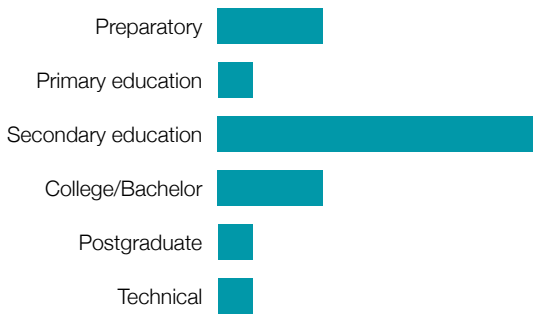
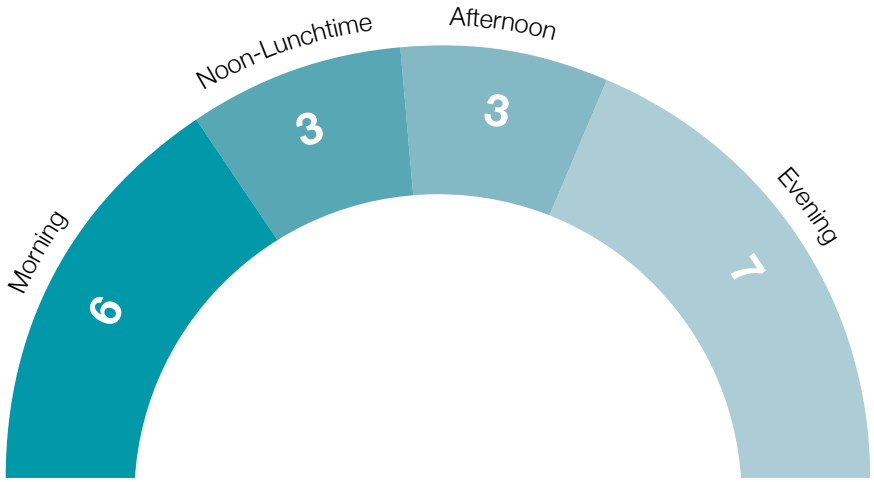


Figure 20
The time of a day when participants visit the park



made up a smaller fraction of the population and were restricted to a shorter age range. The survey was conducted between 10:30 a.m. and 1:00 p.m., emphasizing the need for expanded time range observations.

Role of the parks as active places

Although activity or fitness didn't come as the main reason for the survey participants to visit a park, it was observed that many people used the park for walking and jogging especially middle-aged adult men. There are dedicated tracks for jogging and running in some parks such as Menara Gardens and Annahda Park. Some young women were also observed jogging, particularly in Menara Gardens. However, during the morning and noon visits, a lower proportion of females than males participated in exercise. It could be argued that men were more active in using the park, while women were more focused on relaxation and resting activities. However, observations at other times, such as in the afternoons and evenings, are necessary to understand the differences between the use of park by male and female residents, especially given that the surveys and interviews indicate high park use in the evenings. Regarding equipment for physical activities, despite a need for maintenance, residents were observed using available equipments such as football or out-door gym in Annahda Park. Residents were also observed using the available space for social activities such as gathering and playing a game of boccia. An accompanying picture shows a group of middle-aged and older men playing bocce ball in the shade of a tree.

Opportunities for promoting physical activity in parks can be enhanced by focusing on three aspects.

The Function of parks in encouraging social connections

According to the survey, the second common reason for the participants to visit the park is socialization such as spending time with family and friends. The park was also used as a place for communal gatherings and intimate dates between youth. Some participants mentioned that families gather in the park in the evenings for meals and that the evenings are the peak time for residents to visit the park. This observation was further confirmed during the interviews that the park was lively in the evenings, with families sitting on the grass, having conversations, and having meals. It can be concluded that social activities are more prominent in the evenings. A reason could be the weather of Marrakech in which evenings are cooler while days are extremely hot.

Figure 21
Purpose of the participants to visit a park

Role of parks in facilitating the connection to nature

The connection with nature was highly rated by residents as the most important aspect of the park. In the survey, participants were asked to rank the five important elements they found in the park. The presence of trees was highlighted as the most important element. Other nature-related elements included grass, ambience or atmosphere, fresh air, flowers, birds, and fruit. The importance of trees in providing shade becomes apparent when considering the relationship between people and nature in the context of climate change. Vegetation cover plays an important role in the comfort and well- being of local people, in maintaining the greenery of the park and in the efficient use of water for irrigation.

District Council officials and maintenance workers highlighted the significance of adequate vegetation (which is resilient to heat) in reducing water demand during periods of extreme heat. This effective use of water can help alleviate health problems, maintain greenery and provide evaporative cooling for the urban environment. Representatives of the district council referred to a project aimed at renovating the existing park and implementing an irrigation system using recycled water.

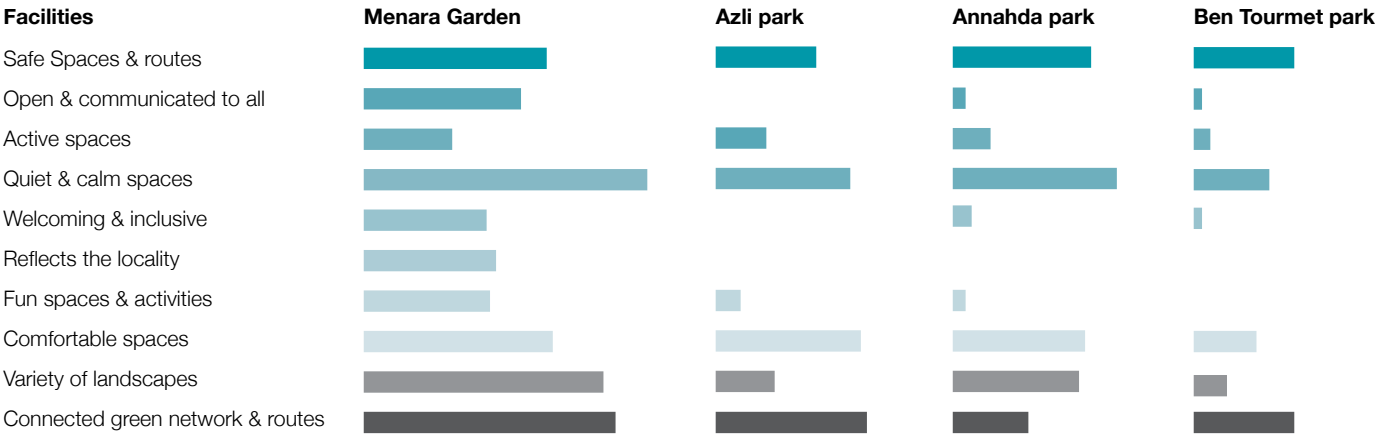
Elements for the management and decision-making in Menara parks

In respect to management and administration of urban parks and green spaces at the borough level, two factors need to be considered to understand the implementation of new projects. Firstly, the borough lacks independence in terms of decision-making, and although the borough is responsible for designing, implementing, and evaluating development projects, project funding and contracts depend on the mayor's office. The district is also responsible for overseeing contracts with private entities for park maintenance. According to the district representatives interviewed, this limitation can hinder the long-term effectiveness of government projects. It is also important to note that there are two systems of government in the country: one representing the monarchy through the Minister of the Interior, and the other at the regional, provincial and municipal levels. Therefore, depending on the King's plan of government, these representatives may exert significant influence on decision-making at the commune level, even in the presence of elected representatives. The priorities at the highest level may therefore differ from the needs identified at the local level.

Figure 22
Characteristics and scores

Characteristics	Score
Fun spaces & activities	2
Variety of landscapes	2
Welcoming & inclusive	1
Quiet & calm spaces	2
Reflects the locality	2
Active spaces	3
Safe spaces & routes	2
Open & communicated to all	2
Conencted green networks & routes	1
Comfortable spaces	3

Figure 23
Facilities in the parks



According to the graphic, first, parks score moderately well in terms of providing interesting spaces and activities, and the combination of more fitness-oriented facilities or organised activities to encourage physical activity could further strengthen the role of parks in promoting healthy lifestyles. Second, most parks need to be more inclusive. The low scores for welcome and inclusivity indicate a need for improvement. Creating accessible pathways, considering diverse user needs and promoting cultural inclusion can help to create a more inclusive and equitable park environment. Third, while parks score satisfactorily in terms of safety and open communication, there is room for improvement in terms of enhancing connectivity to green networks and routes. Fourth, the park's excellent performance in providing comfortable spaces shows that it understands the needs of its visitors. The overall park experience can be enhanced by

continuing to prioritise comfort by ensuring adequate seating, shaded areas and well-maintained facilities. By addressing these issues, the park can become a more vibrant, inclusive and sustainable space that contributes to the overall well-being of visitors and the surrounding community.

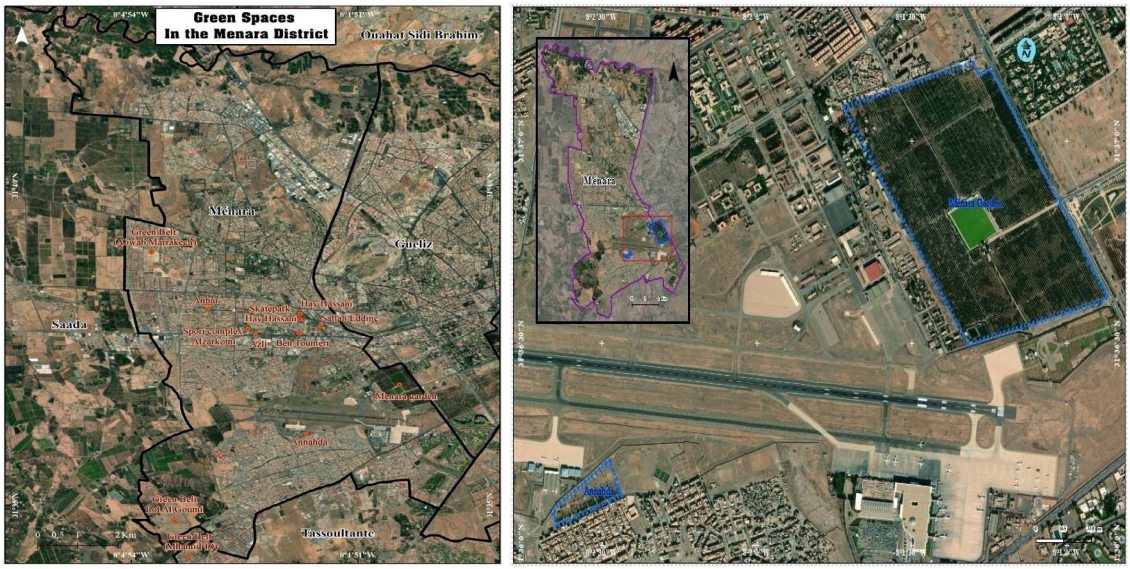
In addition, representatives of the district councils expressed concern about the lack of water, which is a major concern for them. Efforts are being made to promote more rational and efficient use of water. The project currently underway is the creation of an integrated irrigation system for the regional park using recycled water. However, delegates stressed that attention should still be paid to ensuring access to drinking water, a key issue that needs to be adequately addressed. Other topics discussed included raising community awareness of green space conservation and the council's commitment to implementing spatial justice in development projects in the district.

Conclusion and recommendations:

It is evident that the green spaces and public spaces contribute not only to the aesthetics of the environment but also to the wellbeing of the residents. Considering the climate and water resources within the Marrakech city, it could be a high maintenance to build and maintain green spaces. However, it appears that such resources are vital and are much appreciated by residents. Despite of the hot weather and gender norms, the parks are utilized by men and women equally and all the users appear to use such facilities for physical exercise, mental relaxation and socialization. There are, nonetheless, various ways to ensure maximum utilization of the parks which could be ensure though following ways:

First, raise awareness of safe cycling access and pedestrian safety, which is essential to promote active transport modes. At Menara Garden, there are no cycle paths connecting to the park or nearby cycle parking facilities. In addition, during observations, it was possible to identify a number of parks that lacked

Figure 24
Urban parks and green spaces in Menara district



pedestrian crossings to the park. For example, although there is a school next to Annahda Park, no pedestrian crossings were seen connecting the educational institution to the park. Second, maintain walking paths, remove barriers that could lead to falls and encourage walking or jogging. Third, maintain active spaces to promote physical activity for all ages and ensure that sports facilities or playgrounds have shaded areas for daytime use.

It is worth noting that the lack of lighting in some parks poses a safety issue for participants, especially women. This situation may limit their use of parks with limited or no street lighting. It should be noted that a limitation of this field study was the lack of night-time park observations, and it is recommended that future studies address this aspect in depth.

Reduce security risks at the parks

Menara Parks' security issues have been of great concern. Our research shows that there have been incidents of insecurity in the park due to insufficient lighting during the night. The safety of park visitors is jeopardized by inadequate lighting, which fosters a favorable climate to illegal activity. For instance, our survey shows that there have been instances of people visiting the park with evil intent, which has caused discomfort and put visitors at risk. To improve the overall experience and promote security inside Menara Parks, it is essential to address these security issues and ensure the safety of park visitors.

Hot weather and climate change

The hot weather in Menara Parks poses a significant challenge. The park's location in a region with a desert climate subjects it to high temperatures and intense sunlight. The scorching heat can make it uncomfortable for visitors to spend prolonged periods outdoors, affecting their overall experience at the park. Climate change has worsened the situation, as evidenced by prolonged drought seasons. Additionally, the hot weather can also impact the well-being and safety of individuals, increasing the risk of heat- related illnesses such as dehydration and heatstroke. Adequate measures, such as providing shaded areas, installing misting systems, and promoting awareness about staying hydrated, are crucial to mitigate the challenges posed by the hot weather and ensure the comfort and safety of park visitors.

Build careful water management strategies

And the last challenge is maintaining healthy vegetation and greenery in drylands requires careful water management strategies, including efficient irrigation systems. However, Some parks do not have efficient irrigation systems, so it will bring great trouble to the greenery and vegetation in the park. Drinking water is the main concern of local residents. The water challenges can also be improved through an effective water management strategies such as using efficient irrigation systems, such as drip irrigation, to minimize water wastage.

Project 4
How does access to maternal clinical care and quality of maternal care influence women's health? A case study in Amazigh communities in Marrakech-Safi region

Participants

Rui Sun, Wenjie Zhang, Xueyi Jiang, Xuehao Hou

Facilitators

Qurratulain Faheem (UCL), Fatima-Zahra Laribi (HAF)

Research Question

How does access to maternal clinical care and quality of maternal care in Amazigh communities in Ourika valley influence women's health choices?

Background

Al Haouz is one of the eight provinces of the Marrakech-Safi region. Ourika is a rural commune in the province of Al Haouz. According to the High Planning Commission (2014), the population of Al Haouz is 571,999, of which almost half of the population comprise of females (280,204) and half as males (291,795).
The study focuses on maternal healthcare concerns among Amazigh community settled in Ourika which accounts for about 27 thousand people in the Al-Houza province. Through participant-observations, interviews, and participatory events, this study explored the dynamics of maternal healthcare within the Amazigh community in relation to their settlement patterns. The study employs in-depth interviews conducted with representatives from maternity home, rural commune and local cooperative to understand the situation of maternal care in the area, to study the impact of access to maternal care and quality of care on women's health, and to propose interventions. In our survey, we use the effective "Three Delays" (Thaddeus & Maine, 1994) model to assess the maternal clinical care in Marrakech. We review the research on the factors that delay: (1) the decision to seek care, (2) arrival at a health facility (3) the provision of adequate care.

Research methods

The study comprised of a transect walk of the route that pregnant women living in the High Atlas Mountains take to reach to the closest maternity home; a visit to the local maternity home in Ourika and the office of the rural commune; in-depth interviews with the staff (midwives and the director) of the maternity home and the president of the rural commune and; participatory-discussion with two local cooperatives (Aboughlou and Azmz ntimgharine). One of the cooperatives, Aboughlou, is located 37 km from Marrakech. There are still 39 women involved in this cooperative, all of whom are Amazigh and Muslim. Another cooperative

Azmz ntimgharine living in the High Atlas Mountains contains seven members, five women and one man. The interviews and participatory activities were all semi-structured with some probing questions outline before the visit (Annex 3). The participatory sessions for the local cooperatives consisted of two main sessions. In the first session, women were invited to graphically represent on a white sheet of paper the most difficult months before, during and after pregnancy, the months when they received most support from their husbands, and ask questions based on this information. The second session was structured started with a 'raise the hand' activity where women answered by raising the hand and it helped to advance the discussion. For example, "Raise your hand if you have experienced a lack of transportation during your trip to maternal house."

Findings

Maternal healthcare access in Ourika

In Ourika, maternity homes serve as the first point of contact for pregnant women. It was a well-established one-storey healthcare with a capacity of only 12 beds all crammed into a room less than 30 square meters, placed with a distance of less than a meter between each bed. In the entire nursing room there has only five staff, and the maternity home we visited only eight beds, with a maximum capacity of 12 beds due to the space available. There is no doctor there, only midwives, especially in winter when staff are urgently needed, and short-term workers are used when there are not enough staff.

The maternity home a public institution that received foreign funding to excel their services; however the staff continue to face challenges. Indeed, the staff was on a strike when the visit was made. The cases are tried to be resolved at the maternity home to prevent transportation to the hospitals. It helps women in receiving quicker care, and also prevent hospitals from getting excessively crowded. It appears that there are key differences between the maternity homes and hospitals, specifically in their operational structure and resource procurement. The director of the maternity home said,

"You are always looking for partners, donors everything because it's like an institution not like the hospital. But for the hospital, everything needs to go back to the government, and they need like to get authorization from the government. So, this like a public."

Therefore, they may also face issues of dependency, reliability, and instability due to the lack of stable partners and donors. This might lead to variations in care quality, service, and safety standards.

Transportation to the maternal services

"Not all of them have cars. Sometimes, a woman waits for two hours, with no car to come here. They can be very late."

She continues,

"for women in remote areas, the challenge is not only to reach to the maternity home but first, to cross the rough passage through the mountains on their feet to the main road from where the ambulances can pick them. Altogether it takes them atleast three hours from the time they leave their home" – 47 years old female midwife at the maternity home.

Figure 25
Usual route from for a woman to seek any sort of maternal healthcare services

Women in the High Atlas Mountains expressed their concerns as, "… if you call the ambulance, it doesn't arrive immediately. You have to wait for at least three hours." The challenged in travelling to the maternity home doubles up from November to March due to the heavy snowfall in winter. Similarly, the situation can become even more dire in August when the river floods. "When the river is float, it is difficult to reach to the hospital" says a 30-year-old female participant. In such cases, women who are expected to deliver during these months move to the maternity home until they deliver their child. This means that some women stay in maternity home for more than two to three months. The staff provide food to these women during those months but does not allow any family member to stay with them until it's the time to deliver a child.

Services at the maternity homes

The services offered at the maternity home are limited. For example, there is no obstetrician of gynecologist doctor to deal with emergency cases or carryout cesarian or hemorrhage. Patients in any case other than vaginal delivery are referred to the hospital which is 1.5 hours road travel from the maternity home. There is also no facility or provision for blood transfusion. The main reliance for managing blood loss is on medical intervention. Similarly any case of forcep delivery or c-section are transferred to the hospitals. In a case of women with anemia, maternity home directly refers them to the hospital to avoid any complications or delays. A 32-years-old woman in Aboughlou shared her stories with a heavy heart that:

"Even the ambulance wasn't available when I needed it. I had to rely on a neighbor to take me to the hospital. Yet, care at the hospital is not guaranteed. I went there several times but didn't receive the care I needed. I underwent checkups and analysis, but I still don't know why my baby passed away,"

Another woman joined her and said,

"There is no doctor at the maternity home. I visited several times and each time, I was told that they couldnot do anything for me. It was only when I began bleeding that they took immediate action and gave me required care."

The other challenge includes shortage of staffing especially during the months (winters or rainfalls) when pregnant women stay in the hospital for longer durations.

Referrals to the hospitals

On average, these maternity homes receive around 93 female patients per month. Of these, approximately 23 patients, or 24.7%, end up being referred and transferred to the hospital. However, the transportation from the maternity home to the hospital is also time-taking and expensive for many women in the Ourika valley. The journey takes around 40 to 45 minutes via hospital ambulance.

Women's choices of childbirth

During a participatory event hosted by the Local Cooperative in Aboughlou, 10 women were asked about their birthing preferences. Six of them favored childbirth at home with the help of midwives, three of them shared their preference to go to the maternity home, and one was comfortable with either. The reasons shared by women who preferred childbirth at home included language barriers between them and the healthcare professionals, the desire for social support or family members during child birth which is not allowed in the maternity home, delay in care due to long and tough travels to the maternity home, lack of transportation that cost money and time to the entire family and lack of respect by healthcare professionals if they end up in the hospitals. All these women mentioned that hospital remain their last resort and only in a case of emergency.

"Going to the hospital is for abnormal deliveries. After giving birth, even though I felt I had suffered, I didn't see a need to go to the hospital or to undergo any surgical procedure. Culturally speaking, it's considered shameful to seek hospital care unless it's absolutely necessary." - A 45-years-old female participant

A 36-years-old female participant shared that, despite giving birth in hospital, she suggests other women to deliver their babies at home delivery with a midwife. She had lost a child while giving birth in a hospital and, in her opinion, the time and efforts made in reaching to the hospital were the main reasons that she lost her child. Another participant who is a mother of seven said,

"I gave birth to one of my children in the hospital and the rest were delivered with the help of a midwife. To me, it doesn't make much difference. Childbirth isn't easy, whether it happens at home or in the maternity home".

In contrast, women of younger age that is below 30 years shared a different point of view. They shared that their diet isn't organic and they donot have similar strength as women before. In its consideration, they prefer to go to maternity home and if needed to a hospital. A 26-yearsold woman said,

"In maternity home, all food was natural, cheap, and readily available, which helped make our bodies strong. If I feel faint during childbirth, I'd rather be in the hospital where they can immediately respond, as opposed to being at home."

Maternity home and Hospital

Women at Maternity home found it easier and happier to give birth here. One woman said:

"Here, it is closer to my home than here in the hospital, and here my mother and family can come and stay with me, the hospital sometimes does not allow family to stay with me, I am alone, and the medical staff here are very good."

Young women prefer to give birth in hospitals because of the more reliable quality of care. One younger woman analysed,

"I have given birth to all my children in hospitals so far, I feel safer and get better treatment, after all, the facilities and doctors' competence are better in professional institutions, and they can get me better and more timely treatment if something unexpected happens."

Traditional midwives

Some women prefer to give birth at home by a traditional midwife. They shared comfort and access as two main reasons. Some of the older women said,

"we feel more at ease giving birth at home. It is a familiar environment, and we have our families with us if any complication arises. We know midwives very well. They are kind to us and assist us during the childbirth."

For some women, the experiences of their neighbours or relatives of delivering a childbirth at maternity home were discouraging. One woman said she was unhappy with the professionalism and attitude of the medical staff in the hospital. A few women reported,

"When we go to the hospital, many of the medical staff are on their phones and the medical staff don't attend to us until it is an emergency."

Analysis based on the 'three-delays model' in seeking maternal healthcare

The first delay: delay in providing adequate care

Following Thaddeus & Maine (1994) Three-Delays model, the first delay is in making a decision to receive healthcare. In Ourika valley, from the perspective of healthcare professionals, the first delay is mainly due to over-reliance on traditional practices and mother's inability to recognize danger signs and reaching maternity care in time. Also, it was informed that there is a common perception among women that the maternity care or healthcare professional should only be sought in an emergency situation Whereas

the women during participatory events shared varying reasons for not seeking professional healthcare. The most popular reason was financial constraints and making transport and social arrangements in travelling from their village to maternity home. Several women also believed that traditional treatment was beneficial for their babies. The other major concern remained around unpleasant experiences of women in delivering a baby at maternity care or hospitals. Besides, some women mentioned that the lack of funds or situations when their husbands are not in the town and have travelled for work make it even more difficult. They end up borrowing money from villagers to pay for transportation and medical expenses. Almost every women shared that the cumulative income of the entire household is not enough to cover the expense of transportation to and from the health center. They earn daily wages which means leaving a village for weeks would reduce overall income for the household in addition to the bearing the cost of ambulances, taxis and hospital charges.

Most of the midwives in the community go to the homes of women who need to give birth to help with labour, but the sanitary conditions for home births are not very good. A woman said,

"Home births do not usually have the entire house sterilised, and even less have an operating table and fully sterilized disposable surgical instruments."

They use the old methods of delivery, which can be problematic, such as hygiene and infection, and if problems arise, they cannot be solved by the facilities on site.

The second delay: delay in reaching to the healthcare

The second delay concerns postponement in reaching a maternity care or hospital. The challenge for pregnancy women further felt during the transects walk. The condition of roads in the High-Atlas Mountains are highly vulnerable and risky for pedestrians and vehicles equally. The condition of the roads and pathways across the mountains were explore through transect walk in which it was difficult to walk with best footwear. The pathway was highly steeped made of rocks and small pebbles which started rolling as someone walk on it. Some pregnant women travel on mules and donkeys to cross the road and for some women who are bleeding or could not mount on an animal, villagers carry them on their shoulders via hand-made wooden stretcher. The mountain roads are very narrow, and most lanes can only accommodate a maximum of two vehicles. Bad roads can therefore prolong or exacerbate critical health conditions, making long-distance travel an essential concern. On the other side, driving in the summer might take up to two hours and driving in the winter can result in road closures due to snow. This makes it harder for patients.

Figure 26
A road connecting the valley to main road which is unpaved and highly unleveled.

Only a few women mentioned that they were able to hire a taxi that could come all the way upto their village to pick them from their houses. Similar narrative was confirmed when a midwife shared an incident where a woman, for the birth of sixth child, went into labour. Since her husband was out for work, she waited for almost four hours him to return and arrange transport. Further, the travel to the maternity home took even longer for her to reach due to traffic congestion. By the time, she reached the maternity home, her case looked too complicated to be dealt at the maternity home so was referred to go to the hospital. By the time she reached the hospital, it was difficult to save her and her baby's life. The head of rural commune mentioned that there is only one ambulance between seven villages, and they do not have government fundings to construct a road to connect villages with the highway. However, in some cases, the government institutions go beyond their reach to help people for example sending a helicopter to transport a woman. This incident was also mentioned by women in a village that, once, an emergency helicopter was sent to transport a woman to hospital as it was a rain flood and impossible to go by roads. However, she had to wait for five hours for all the arrangements, and even though she eventually made it through, she experienced trauma because of the difficult situation.

The third delay: delay in providing adequate care

The third delay refers to delays within the healthcare facility such as maternity home or hospitals. There were considerable issues within the maternity homes such as insufficient staff, equipment, or medications, delays in administrative matters such as admissions or official papers and poor clinical management. The usual waiting time communicated by healthcare team in the maternity home is around 45 to 60 minutes before being admitted to the nursing room. According to female participants, most of the time patients are kept awaiting in the nurse room and are told that a staff will visit them soon, but it takes more 40 to 50 minutes for anyone to come and see them. After admission, the pregnant woman is admitted to operation room where the maximum stay is of 48 hours until she is fully ready to give birth. Once fully dilated, the mother is taken to labour room for delivery and then admitted to the ward for observation. The capacity of maternity home is limited so sometimes, patients are accommodated in the lounge area and sofas are turned into make-shift beds.

A female participant recalled her experience and shared,

"I went into a hemorrhage but the maternal home could not do anything. They could not transfuse blood but can only temporarily stop the bleeding with medication, and then the only way was to ambulate me to the hospital."

Quality of Maternal Clinical Care

Regarding the quality of maternal clinical care, the study referred to the best service quality hospital model (Abdel-Basset, M. et al. 2019) which focuses on the quality of maternity care in terms of Professional capability, hospital equipment and pharmacy and medical treatment.

Reduced services at the maternity home

There are no doctors in the local maternity homes, and the reliance is only on the midwives. The staff donot routinely check the vital signs of women or neonates such as heart rate and blood pressure on a daily basis unless there is a clinical sign of concern such as a change in the colour of the baby's skin or any visible symptoms in the mother etc.

Staff competence

The midwives and medical staff at the maternity home have relevant and required qualifications. The staff also undergoes training on a monthly or quarterly level to refresh their skills and knowledge. However, training is optional and based on their own circumstances. Training is usually provided in the form of workshops, presentations, group training and generally lasts between one and two days and is offered by the government or the donors. However, women in the community felt that the staff in the maternity home are incompetent. Though it was a characteristic of traditional midwives that they acquire knowledge and skills from their elders and experienced midwives, often women thought that it is equally true for the midwives in the clinic. Women understood the limitations of midwives in general. In their words,

Figure 27
The proximity of beds in the maternity home

"Sometimes there is a limit to what the midwives can do, and many of them have done everything they can when there is an unexpected situation, such as a hemorrhage, but there is nothing they can do."

Supplies and equipments

All the medical equipment and supplies are provided by the government. The government, as shared by the staff, tests and approves the quality of all equipment and supplies before sending it to the maternity homes. The quality of medical facilities is the same in all these government-supported institutions. During the visit of the maternity home, the medical equipment appeared rustic and unhygienic. For example, the medical equipment on the treatment table had a blood spot. The patient beds in the general ward were placed very close to one another (with eight beds in a space of about 30 square meters). Both the aisles and the beds were small enough to accommodate a single person.

Figure 28
Rustic trays and loosely left unsteriled supplies in the delivery room

Poor quality of medication

The medications available at the maternity home appear to be very limited and ineffective for a wide range of maternal and neonatal healthcare challenges that may arise during a childbirth. The medical staff complained, "there are only some very basic medicines in the maternity home. The government does not allow us to have the rest of the medicines. We have appealed many a times to allow us to manage maternal complications to some extent until the ambulance arrives and transport the patient to the hospital; but the appeal is still pending." Another medical officer added,

"The medications we already have is not effective either. There have been cases when pregnant women were bleeding profusely and we have used medication to stop the bleeding, but it didn't work."

Communications

There isn't any central system of health management and information. There is no online interchange of information between all health facilities, and one local woman said,

"It takes a very long time and is very cumbersome to keep repeating the condition, symptoms, etc. every time you go to a different hospital or facility, and the process is still different in each place."

Similarly, there isn't any unified system of coordination or information dissemination. Regarding the facilities and condition of health facilities, government staff visit hospitals and maternity homes to review them, and medical staff said,

"But usually, the government comes when they have a problem, there is no daily review, the frequency is about once a month."

Conclusions and recommendations

Access to maternal healthcare is a basic right to every woman. In remote locations such as Ourika valley, accessibility to healthcare services is a challenge that has multiple facets. It is not only about building a facility, but it involves the socio-cultural dynamics of women and their families, availability of professional services, connectivity and linkages between services and residential villages and a lot more. These problems demand a high-level consultation and discussion among several stakeholders including health department, planning and building department, health education, community mobilization, private and NGO sectors. The inaccessibility to maternal healthcare services could lead to various health challenges such as hemorrhage, sepsis or even moralities of a mother and a child. There could be other ways to solve this issue which could be:

Establishing more maternity homes and hospitals

- The government could provide arrange training programmes to improve the skills and knowledge of traditional birth attendants into skilled-birth attendants. This way maternal healthcare will be accessible to all the women who could or could not reach to the maternity home for any social, cultural, or financial reasons. This would also improve the overall medical professionalism and service level within the maternity home but distributing the volume, but also solve the problem of language barrier. Else, the traditional birth attendants after receiving trainings could be hired at the maternity home to support the staff.
- There is also a need to conduct regular audits and monitoring of maternity homes.
- The concerned departments should listen to the voices of front-line caregivers and patients to ensure that maternal rights are protected. The demands of the staff to improve the services should be considered so that the staff does not go on frequent strikes; thus, offering more and better services to the pregnant women.
- In addition, in the long run, the government can use more technology to increase the coverage and quality of maternity care. For example, with the spread of electronic devices such as cell phones, the government could support more e-consultation or telehealth. This will widen the network of competency and care among staff outside Ourika.
- There is a potential to establish a centralised health management information system to avoid delays due to unnecessary admission procedures as well as reducing mismanagement of information that can risk a human life.
- And there is currently no unified system of collaborative management among Maternity Homes and hospitals, and the most traditional paper-based communication is still used, so a lot of maternal information gets lost in the process. Therefore, the government can gradually improve the coordination system between local Maternity Homes and hospitals, so that the limited medical resources can be maximized through information sharing.

Improving road infrastructure

- There is an evident need to build more roads and increase connectivity for villagers living in the High Altas Mountains. This is essential to facilitate the women to be able to safely reach the maternity homes in least possible duration.

- Some roads are built but need upgradation and maintenance. Especially the roads in the mountains leading to specific villages are in poor conditions causing significant tremors and discomfort to travellers.

- A robust centralised information system could help sending announcements such as weather alerts or health alerts etc. This would be helpful for local women to go to the nearest maternity home in advance of the winter and flood periods.

- There should be a provision of more ambulances to ambulate pregnant women or any other ill person to the require healthcare facility in time and safely.

Promoting knowledge related to maternity care

More and more healthcare awareness sessions and home visits in the villages can be of enormous help. It would help reducing the efforts and time of the women to travel to maternity home for information. Also, it will bring awareness and gain women's confidence on institutional healthcare system.

Leveraging the already established institutions

- There are cooperatives run by private and not-for-profit organizations such as HAF. These cooperatives have intricate network and trusted relationship with residents as they engage them in various socio-economic and developmental activities. During the interviews, several women mentioned that Cooperative has helped them a lot, not only to receive timely help during pregnancy and delivery, but also to earn income by joining Cooperative's programs. Currently the government provides a budget of $10,000 for large organizations and $3,000 for small organizations.

- These cooperatives could be used as a platform for health mobilization sessions and activities. Such as diet and health, maternal healthcare, antenatal and post-natal healthcare and neonatal care and immunization. The programmes could be expanded to different socio-economic aspects of development to offer a holistic programme. For example, women have little time to generate income because of the many daily chores they have to handle. Many of them also lack skills to market or promote their homemade products. Such skill-based programmes could be integrated with marketing, promotions and healthcare awareness.

Project 5
Water and health in Marrakech

Participants
Qiwen Huang, Xiaoxuan Cui, Zihan Liao and Shayn Stephens

Facilitators
Nura Ali (UCL), Safae Ben-Karroum (HAF), Abderrahim (HAF), Mohammed (HAF)

Research Question
How does water security impact the health of residents of Akrich and Achbarou, Morocco?

Background

In Marrakech, the disparity in access to sufficient water resources between geographical areas, as well as between rural and urban locations and social classes, is considerable (Dadush & Saoudi, 2019). Especially access to clean water is not evenly spread and does not meet the needs of people in remote places particularly. Safe drinking water resources are an essential component of life, yet access to safe drinking water is not always equitable. This can lead to several health issues due to poor water quality, including water-borne illnesses, and can have a detrimental effect on the local population.

Water stress and scarcity in Morocco

Morocco is a chronically water-stressed nation, meaning that they withdraw at least 25% of its freshwater resources (UN Water, 2023). Water scarcity can be broadly defined as a lack of sufficient water for human consumption (Oki & Kanae, 2006; Schulte & Morrison, 2014). Hoekstra (2000) has explored the concept of water scarcity, demonstrating that it can be addressed from a supply, demand, or economic perspective. Gain and Giupponi (2015) describe two major indicators of water scarcity, with the first being supply-related, meaning the amount of water obtainable for human use compared to renewable freshwater supplies, and demand-related, referring to how much water is required concerning the available quantity.

The Social Determinants of health (SDH)

The World Health Organization (WHO) defines the social determinants of health (SDH) as the conditions in which people are born, grown, work, lived, and aging, as well as the external forces and systems that shape the environment they live in, all having an impact on the overall health outcomes. Health and wellness also vary depending on one's income: those with lower socioeconomic status tend to experience poorer health. Unequal access to the social services and resources that contribute to the social determinants is a major

Figure 29
The landscape of Akarich

issue in public health. Inequalities in these areas can lead to significant differences in health outcomes, with certain populations experiencing higher rates of disease, disability, and premature mortality (Ramos-Morcillo et al., 2019). In this manner, the SDH framework provides a comprehensive way to examine the root causes of unequal water distribution. By considering the broader social and economic context of access to water, the framework can identify factors such as poverty, gender, race, and location that contribute to the unequal distribution of water resources.

Spatial inequality

The uneven distribution of resources across geographies is a manifestation of overall inequality (Al-Sharafat, 2019). An unequal allocation of economic and social resources and opportunities within a geographical region is what is referred to as spatial inequity. Inequalities between urban and rural areas, between large and small cities, between affluent and disadvantaged areas, and so on, can all be examples of spatial inequity. Spatial disparity heightens the likelihood of impoverishment, joblessness, alienation, relocation, and unfairness (Yasouri, 2010). The northern and coastal regions of Morocco have more abundant

water resources than the southern and inland regions. For example, the northern Rif region and the northwest coastal areas receive more than 1,000 millimetres of rainfall annually, while the southern regions receive less than 200 millimetres (Schilling et al., 2012). This disparity is further compounded by the fact that most of Morocco's population is concentrated in the northern and coastal areas, which puts additional pressure on water resources in these regions. In addition to these wide geographic factors, there are also significant disparities in water access and availability within individual regions of Morocco. For example, rural areas often have less access to water resources than urban areas, and poorer communities may lack access to safe and reliable water sources altogether (Hursh, 2016).

Historical and contextual overview of water distribution in Marrakech

Levels of groundwater in Morocco have been steadily decreasing for over 50 years due to decreasing precipitation and increased exploitation of water that has accompanied the development and population growth, and Marrakech is a rapidly growing urban region that is heavily impacted by this reality. In 1970, 100% of drinking water in Marrakech and the surrounding area was derived from the region's shallow aquifer which is primarily replenished by runoff from the High Atlas Mountains. That number has shrunk to just 5% today due to the decrease in the production of the shallow aquifer, with the remainder of drinking water drawn from surface waters. A huge amount of groundwater is currently being used to meet growing agricultural production demands (Analy 2021). The overall water demand currently still outpaces the supply (Hssaisoune 2020).

Historic and modern actors

For centuries, water supply for irrigation and drinking water in Marrakesh was provided by man-made irrigation systems called khettaras which used gravity to direct groundwater to the surface (Faiz & Ruf 2010), and man-made canals called seguias were utilized to redirect surface waters (Ruf 2018). Before the French protectorate was established in 1912, control of water was decentralized, and managed by private users, community groups, or state actors such as the Ministry of Habous. One of the first decisions of the French protectorate was to shift the control of water to the state and declare it a public good. The colonists drew up maps of khettara and seguia systems to utilize them, and also implemented more modern techniques, building dams and pursuing hydraulic advancements primarily to support agricultural pursuits. That shift toward modern technology has continued, and after independence in 1956, Morocco continued to pursue hydraulic advancements and a lot of land was sold to and run by large public companies. Most of the khettaras have dried up throughout Morocco due to overexploitation of the groundwater that would replenish the systems, although there are still some active khettaras in the Tensift region, including in the areas surrounding Marrakech. Currently, it remains difficult for the state to completely control agricultural water use, and private users still drill and exploit resources (Ruf 2018).

Legal framework

Access to water is a constitutional right in Morocco. In 1995, the Law of Water 10-95 was passed in Morocco to improve water development nationally, regulate the distribution of potable water, and improve disparities between rural and urban areas, and prevent illegal water development and water pollution. The law established the river basin agencies to manage development and regulation at a river basin level and introduced financial mechanisms to protect water resources (Alaoui 2013). The National Initiative for Human Development that was launched by the government in 2005 provided a framework for improved sanitation and water access specifically in informal urban settlements (Tazi Sadeq 2020).

Water sources

In 2009, Morocco launched its National Water Strategy and National Water Plan to reinforce and strengthen the 1995 law. Some targets of the plan include constructing 3 dams per year, water transfer programs to enable the delivery of water from the north to the arid south and the introduction of nontraditional water resources such as desalination of seawater and wastewater treatment. The law also aims to mitigate the rapidly expanding demand for water by incentivizing saving water and penalizing over-pumping (Hssaisoune 2020).

Recycled water

In 2020, around 76% of urban households were connected to sewage networks nationally, and the remaining households used septic tanks. The proportion of treated wastewater in urban areas reached 55% in 2019 compared to 7% in 2006. Rural areas are still mostly disconnected from these networks, and the government has goals to improve connection in both rural and urban areas by 2030 through its National Shared Sanitation Program launched in 2019. As of 2020, there were 6 active desalination plants for wastewater and 2 for industrial use, with an additional 3 under construction (Haut-Commissaire au Plan, 2020).

Dams

Morocco has a robust dam infrastructure that collects rainfall and supplies most agricultural demands country wide (Hssaisoune 2020). Nationwide, Morocco has 145 large dams and 130 small dams with several under construction (Haut-Commissaire au Plan, 2020).

Cause of water scarcity and access inequality in Marrakech

Morocco faces significant development challenges due to its chronic water resource shortage, exceptionally low rainfall, and unpredictable climate change. The nation virtually perpetually experiences severe droughts (Hursh, 2016). As its population rises and the demand for economic development increases, Morocco is faced with the reality and challenges of water scarcity (Mandi and Ouazzani, 2013). Morocco is currently one of the most water-stressed nations in the world, with a per-person annual water access rate of about 600 cubic meters (The World Bank, 2022). Both natural and human factors contribute to Morocco's water shortage.

Natural factors

The Atlas Mountains snowpack is significantly impacted by Morocco's low and erratic precipitation rates, which have further exacerbated the severe drought that affect the entire country. Morocco's climate is primarily arid and semiarid (Diao et al., 2008), and according to Tekken and Kropp (2012), the average annual precipitation in Morocco has reportedly dropped by almost 10% over the past 30 years. Current precipitation rates could cause the average agricultural output in Morocco, to drop by 30% by 2080, which will negatively affect the country's poor who depend heavily on agriculture (Schilling et al., 2012).

Human factors

Agricultural practices and environmental contamination are both factors of human contribution to water scarcity. Pollution such as urban or industrial wastewater, and agricultural activities, lowers the quality rather than the number of water resources (Netherlands Enterprise Agency, 2018). Agriculture is one of Morocco's key sectors and uses about 80% of the country's water, and the majority of Moroccan farmers rely on surface water for crop irrigation (Kurtze et al., 2015). Such irrigation systems, however, are frequently ineffective and do not permit subsurface irrigation, which causes increased rates of surface water evaporation and further reduces the amount of fresh water available (Assouli et al., 2018). In addition, the use of chemical fertilizers can contribute to contamination in agricultural runoff, further contributing to scarcity (Savci, 2012).

More and more people are settling in cities due to urbanization and population expansion, and the already limited water resources there are subject to unequal distribution in terms of quantity, quality, and cost (Hursh, 2016), which widens the health inequality gap. First, there is a severe disparity in the distribution of water resources between rural and urban areas in Morocco. Moreover, over 30% of the rural population must travel at least 10 km to the nearest sanitation facility (Yaakoubd, 2009). Since many rural households must travel different distances to access water due to a lack of sanitation facilities, this has an uneven impact on the health of different households, with women frequently being more vulnerable than men because they are often the ones who carry out activities like childcare and household chores.

Morocco has experienced rural-to-urban migration since the 1980s, which has contributed to slums in cities (Hursh, 2016). The quality of the water resources available to slum dwellers in cities is not much better than in the countryside, and many locals frequently satisfy their water needs by digging wells and using surface water, which is frequently contaminated due to a lack of treatment, exposing them to water-related illnesses (Niasse and Varis, 2020). Urban areas also draw more water-intensive industrial facilities, but these facilities, including water storage and wastewater treatment plants, only cover some regions of the city, ignoring the slums that make up most of the urban area (Bahri, Brikké, and Vairavamoorthy, 2016).

Slum dwellers are more susceptible to health risks associated with water than the middle and upper classes are, a characteristic that also shows up in the form of water competition between urban and rural areas and industries (Garrick et al., 2019). Water shortages and scarcity have been known to contribute to social and political instability in other water-scarce nations as well as negative impacts on citizens' quality of life (Almer, Laurent-Lucchetti, and Oechslin, 2017).

Impact of water inequality on urban health in Marrakech

Access to safe and clean water is a fundamental human right and plays a crucial role in maintaining good health. However, in many developing countries, including Morocco, water inequality is a growing concern, leading to negative health outcomes, particularly in urban areas such as Marrakech. The below section examines the impact of water inequality on urban health in Marrakech, with a focus on the relationship between water access and health outcomes, the specific health impacts of water inequality in Marrakech, and the disparities in health outcomes between different socio-economic groups.

Overview of the relationship between water access and health outcomes

Inadequate access to clean and safe water has been linked to numerous health problems, including water-borne diseases, malnutrition, and mental health issues. According to the WHO (2020), lack of access to clean water, sanitation, and hygiene is responsible for the death of approximately 1.4 million children under the age of five each year. Additionally, water scarcity and water insecurity have been identified as significant factors in the spread of infectious diseases, such as cholera and typhoid fever.

Discussion of the specific health impacts of water inequality in Marrakech

Marrakech, like many cities in Morocco, is facing water inequality, leading to negative health outcomes for its residents. The city's rapid urbanization and population growth have placed significant pressure on the water supply, resulting in an unequal distribution of water resources. As a result, residents of poorer neighborhoods are more likely to experience water scarcity and unsafe drinking water than those living in more affluent areas. The following are specific health impacts of water inequality in Marrakech:

Figure 30
Traditional method of fetching water from well and drinking

Water-borne diseases

Inadequate access to clean water and sanitation facilities increases the risk of water-borne diseases such as cholera, typhoid, and diarrhoea. According to a study conducted in Marrakech, the city's poorer neighbourhoods experience a higher incidence of water-borne diseases than the wealthier areas (Prüss-Ustün et al., 2014).

For instance, reservoirs serve as the rural communities' water delivery systems in the Assif El Mal Valley (in the vicinity of Marrakech). Rainwater and water directly from rivers that have been highly polluted with numerous dangerous microorganisms feed these reservoirs. Without any sort of treatment, the local community uses them as drinking water. According to surveys, the absence of a significant sewage and solid waste disposal system causes the locals to experience a variety of health issues, including vomiting, diarrhoea, hepatitis A, and other conditions (Aziz et al., 2017).

Malnutrition and parasitic diseases

Water shortage in Marrakech has resulted in lower agricultural output and inadequate food, both of which have contributed to malnutrition, particularly among children. Malnutrition can impair development and weaken the immune system. In addition, the use of untreated wastewater for agricultural purposes contributes to food poverty and health issues such as parasitic illnesses (Amahmid and Bouhoum, 2005).

For instance, El Azzouzia, Marrakech, has long used wastewater for agriculture due to a lack of fresh water. However, the possible health risks associated with the reuse of municipal wastewater, which is connected to the danger of pathogen transfer to people, must be taken into consideration. During tasks like wastewater irrigation and agricultural practices, including harvesting, residents in locations with wastewater irrigation are exposed to sources of pollution, which results in infection. Consuming polluted agricultural goods is another possible transmission pathway. One research discovered that numerous plants that are often eaten raw (e.g., radishes and tomatoes) were irrigated with wastewater (Melloul et al., 2002). This practice raises the danger of infection in vulnerable groups, making residents of wastewater-irrigated regions more vulnerable to illnesses including ascariasis and whipworm disease.

Mental health

In urban Morocco, public taps are the primary source of water supply for impoverished inhabitants, and despite their greater density, households who rely on public taps spend more than seven hours per week collecting water (Devoto et al., 2011). Residents may experience stress and anxiety because of the time burden connected with collecting water, which arises when individuals struggle for access to public faucets or share private taps and must split the cost of water among relatives or neighbours. Even inside families, the allocation of water collection activities and the distribution of available water among different applications can cause conflict. This has the potential to have a detrimental influence on residents' time management, social integration, and psychological well-being.

Disparities in health outcomes between different socio-economic groups in Marrakech

Different socio-economic classes in Marrakech have differing health outcomes because of water inequality. Poorer neighbourhoods in the city have a higher incidence of water-borne diseases, malnutrition, and mental health issues. In contrast, wealthier neighbourhoods in the city have better access to clean water and sanitation facilities, resulting in better health outcomes. A study conducted in Marrakech found that the wealthiest neighbourhoods in the city had lower rates of water-borne diseases than the poorest neighbourhoods (Prüss-Ustün et al., 2014). For example, unlike other areas of Marrakech where water is obtained by drilling wells, the inhabitants of Assif El Mal have a low socio-economic status and cannot afford to drill wells. They consume polluted water from cisterns, and most people, particularly children, have contracted waterborne ailments such as gastroenteritis, dysentery, diarrhea, and viral hepatitis A and B (Aziz et al., 2017). Among the more affluent households in urban Morocco, they are more likely to have access to private taps. Even rich houses without private taps may handle their water problems more effectively (for example, by employing someone to deliver water). Therefore, compared to impoverished homes that rely on public taps, they have better access to quality water as well as decent sanitation, and the time saved may be employed for money-generating or social activities, as well as maintaining good mental health (Devoto et al., 2011).

In a nutshell, in Morocco where water stress and scarcity are a constant reality, unequal access to water has become an increasing concern, particularly between socio-economic groups and between urban and rural areas. Due to increased demand for water and over-pumping of groundwater, as well as increased issues with quality and pollution, equal access is a challenge in Morocco. Poor access to clean water has led to various poor health outcomes throughout Morocco, including water-borne diseases, malnutrition, and mental health issues. The disparities in health outcomes between different socio-economic groups are a classic example of the social determinants of health, as health outcomes are seen to be higher among rural areas and in groups of lower socio-economic status. These disparate health outcomes highlight the need for policy interventions to address the underlying determinants of this water inequality and promote equal access to clean and safe water.

Figure 31
Water pools constructed by HAF to collect and store water in efficient ways for plantation projects

Research methods

This research aims to investigate the influence of water security on the health of residents in Akrich and Achbarou, Morocco. This study aims to: firstly, assess the timeline of water security in the community and its evolution over time. Secondly, explore the policies governing water use in small communities like Akrich. Thirdly, identify the current challenges faced by the community and explore potential future opportunities for improving water security. Lastly, investigate the specific needs related to water and health within the community. Lastly, examine the ways irrigation water affect food quality and availability, highlighting the potential impacts on the overall well-being of the residents.

In-depth interviews and a survey

The questionnaire was divided in five sections: demographics, water access, water and health, economic factors, and community and infrastructure (Annex 4), with the goal of identifying how the women's experiences with water and health have changed over time. The survey was conducted among women in Akrich and Achbarou All the interviewees were married women, aged between 34 and 60, the number of family members ranges from 2 to 8. In-depth interviews were held with six women from Achbarou Cooperative. Interviews were held with:

- Interview with the manager of the HAF "House of Life" nursery manager Abderrahim Beddah.
- Interview with the president of the association and a member in Akrich, covering topics such as the water and irrigation systems, how the water was obtained before and after the implementation of the current system.
- Interview and survey six Achbarou residents about their experiences with water security and water-related health issues in the past and present.
- Interview with the director of the Water Museum in Marrakech, which may have provided additional context on water-related issues in the region.

Observations

A major share of findings is based on the observation of the physical locations such as the well at the House of Life nursery, a school in the village, the sites of the two wells dug by HAF that have not yet been completed, the main khettara source, and a seguia connected to the village mosque. These observations offered us unique context into the technical side of water sourcing in the villages.

Timeline analysis

A timeline of water management practices and policies is created through interviews and, primarily, based on the information obtained from the Marrakech Water Museum. This timeline research methodology helps to identify the challenges and changes in water management practices over time, offering insights into the evolution of water security in the region.

Findings

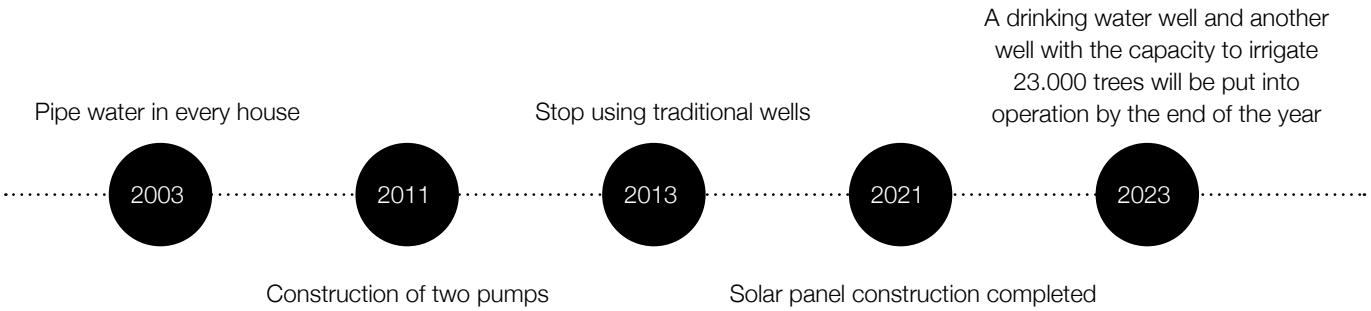
According to Abdennabi El Mandour, the Director of the Museum of Water Civilization in Marrakech, the government program called Programme d'approvisionnement groupé en eau potable des populations rurales ("PAGER") started in 1995. The programme focused on digging wells and installing piped water systems in rural areas. The programme helped to bringing access to piped drinking water to over 90% of Moroccans. In villages that are more difficult to access (i.e., mountainous and/or far from urban infrastructure), the program installed community taps. Currently, the primary concern of the Moroccan government for water in rural areas is to improve sanitation to ensure groundwater and surface water is not contaminated with wastewater. Many villages are equipped with small treatment plants that recycle wastewater. In other areas, natural methods are used such as sand and reed root filtration.

The fact that there is a water museum in Marrakech at all speaks to the significance of water in Morocco, and it is rather unique. The director shared his ambition of portraying Morocco as an example for African water use policies and practices, and the Moroccan government has a long history of development of water security.

Timeline

The timeline of the evolution of the water project based on the findings in the water museum and the main key points are as below.

Figure 32
Evolution of Akrich Water Program



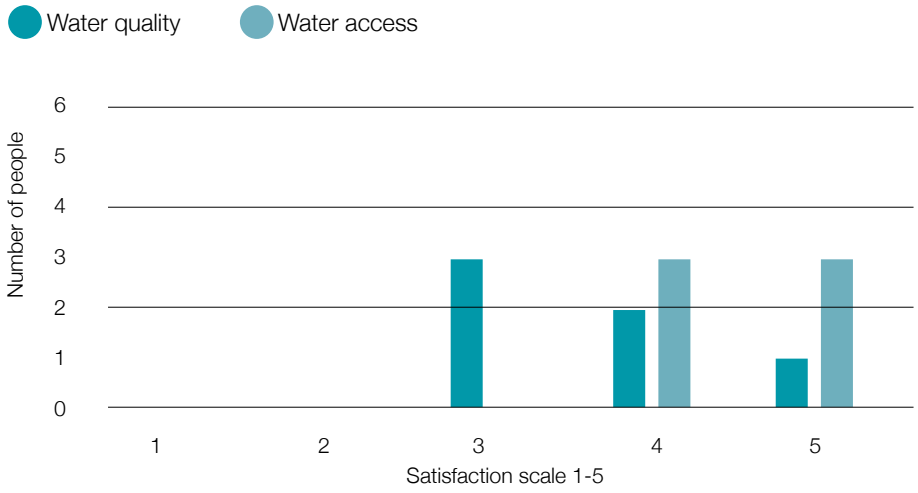
Survey and in-depth interviews findings

The survey helped to understand the challenges faced by the women of Achbarou Cooperative as a part of the nursery project.

Water access

A half of the respondents were neutral about the water quality while 33% were partially satisfied and 16% were satisfied. Approximately half of the surveyed individuals reported feeling sometimes satisfied with regards to access to water, while the other half were very satisfied, thus indicating that most respondents feel secure in their access to water.

Figure 33
A graph showing participant's level of satisfaction with the quality of water



Water and Health
Out of all the individuals, none had experienced any waterborne disease. This is a positive result, indicating that the surveyed population has access to clean and safe water sources. One participant did report that she has had some issues with her kidney in the past that her doctor suggested may be caused by drinking piped water directly. Subsequently, she now boils the water before drinking it.

Economic factors
The water bills of the six respondents range from 40 MAD to 115 MAD per month. It was observed that the respondents felt that water payments had precedence over their other household expenses. More than 50% of the respondents believed that, although water can be expensive, it is worth the cost. People are willing to pay for water to have access to a safe and reliable source.

Community and Infrastructure
Out of the six people interviewed, none had ever contacted local authorities to report any issues relating to water. No members of the community had attended a community meeting about water access or quality, as women are not permitted to attend these types of meetings. Only one respondent indicated that her husband had attended such meetings. Most people seem to be content with the way in which the authorities have managed issues related to water.

In-depth Interviews Results
Along with in-depth interviews with residents, two members of the Akrich and Achbarou water association- the group responsible for managing the community's water systems including receiving payment for water bills were also interviewed. The association is a nonprofit organisation that represents the interests of the community to the government.

Accordingly, irrigation water in the community comes from rainwater that is stored in a large basin, and then allocated to different households at different time slots. Due to reduced rainfall in past few years, many crops are reported to be died and they have been able to produce less food.

In general, there are four main points regarding water and health that were important to the residents of Akrich and Achbarou communities.

- **Scarcity of irrigation water**
  All of our respondents reported being impacted by the droughts of the past few years. Water scarcity was an issue since the 1970s throughout the region, but the past few years have had a more acute impact on the area. Interviewees reported that many of their trees died during recent droughts, and they have been able to produce less food for their households. One respondent reported that their monthly water bills is higher than other residents because their household chooses to use house water to irrigate their outdoor plants. However, this is not an option for all residents, and some residents reported that they have stopped farming altogether due to recent drought. Residents also reported feeling stressed about irrigation water but never about drinking water.

- **Issues with piped water**
  While the interviewees generally reported being satisfied with the overall quality of their drinking water, the association leaders informed that the hard water from the pipes is not as clean as the river water they used previously. The current pipes have not been revisited since 2003 and requires replacement.

- **No water at schools/current system does not serve the whole community**
  The head of water association reported that the capacity of the well is not enough for the entire community. This means about 56 households are not supplied water through pipes. There also issues reported regarding the current infrastructure as the storage basin is currently 2 km away from the well source, and then it is a further 1 km away to the community houses. The long distance also results in losing some water during supply.

  The gravity of the problem was exemplified when all the women interviewees shared that they visit their children in school everyday during the lunch hours to refill their water bottles as there is no running water in schools for drinking and washing.

Figure 34
The arid landscape of the school

- **Positive impact of piped water and solar panels**

Even if the scope of interviews didn't explore mental health exclusively, yet every interviewee brought up the impact of water scarcity on their mental wellbeing. The head of water association indicated that the current system of piped water isnot robust, and the high amounts of calcium in the water sometimes bother residents opposed to the "cleaner" water they used to fetch from the khettaras. However, they donot wish to switch back to old systems as access to water is more convenient through piped waters.

The interviewees at the cooperative spoke consistently of the positive benefits of the piped water on their mental health. Before the piped water was installed, they carried water from seguias, sometimes carrying it themselves and sometimes using animals. They spoke of the stress of needing to constantly fetch water for drinking and washing, needing to travel to wash their clothes, and worrying about having enough water at home for when guests came over. Now, they report significant improvements in their mental health and stress levels, using words like "good," "comfortable," and "easy" to describe how they feel about having water in their homes.

Two villages, as reported by HAF coordinator, are heavily impacted by recent droughts, and do not have piped water in their homes. In his view, acquiring more solar panels would be the best solution for the community right now, and would also greatly benefit the neighboring villages. He spoke highly of the solar panels' impact on Achbarou, as did many of the other interviewees, and noted that money saved on electricity has been put back into the community.

Analysis

So, how does water security impact the health of residents of Akrich and Achbarou, Morocco? We entered this research wanting to find out about how structural factors outside of residents' control - primarily scarcity of water - impacts health directly or indirectly using the Social Determinants of Health framework. Below we break down the factors contributing to health relating to water security in the community.

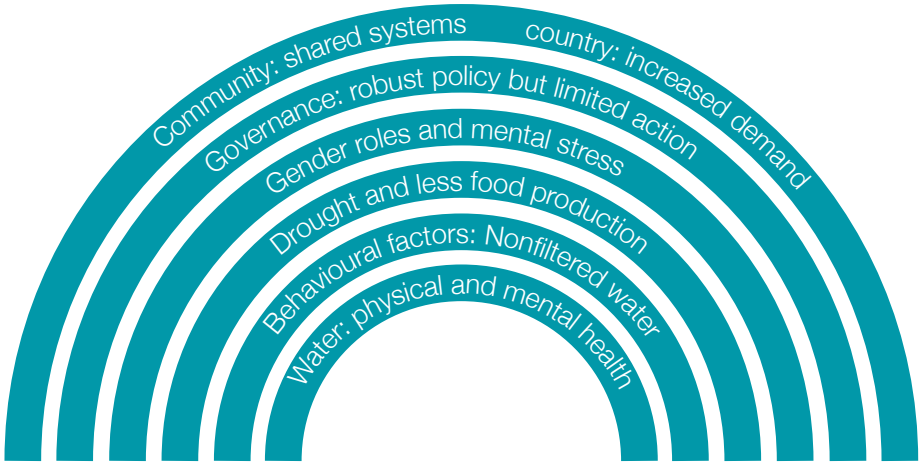
Structural factors

Governance

It is clear that significant activism is needed to engage the government on new projects, evidenced by the fact that 56 households still remain without drinking water, and most interviewees indicating medium satisfaction with government interventions. As said by the president of the Akrich and Achbarou water association, 'the government efforts are not enough, and the community should not wait for the authorities to improve their situations." The association shared that even if they maintain a good relationship with the governemnt authorities; there is a limitation to what they can advocate for.

In future, additional interviews could be conducted with leaders to find out more about why leaders feel the government's reach has not been enough, what efforts they have made to increase government intervention, and how this impacts health.

Figure 35
The concentric circles of problems associated with scarcity or compromised level of water



Gender roles

Gender may be a factor that influences health relating to water security in Akrich and Achbarou. Specifically, the rigid gender roles regarding water management in the villages, and that they differ in Akrich and Achbarou pose more stress on women than men. The mental burden of water management was made clear to us through our interviews with women at the cooperative who previously had to travel for water. Future research could dive more into the mental health burden on men in the community based on their water management roles.

Community/Societal factors

Water sharing is a practice at the community-level across the history of Morocco which is observable in the community's reflection ed in modern systems, specifically in shared irrigation water practices in Akrich and Achbarou, as well as in the role of water associations regular community meetings regarding water issues. The residents found the idea of 'shutting off the services of water' quite alienated. The association shared an incident that once a widow woman wasn't unable to pay for utilities, so the association waived her bills for water permanently. Overall, it seems that the community structures surrounding water sharing contribute positively to the health of the community.

Environment: Scarcity

Research has suggested that the increased demand for water due to tourism, as well as individuals digging illegal wells has significantly contributed to decreased groundwater levels and therefore water scarcity. However, these two issues were not found in this study.

Mental health

It appears that the mental health has a direct impact related to water scarcity in Akrich and Achbarou. Almost every community member discussed the stress caused by worrying about recent droughts and irrigation water drying up. The positive effects on mental health of acquiring piped water into homes cannot be understated.

Material circumstances

Water scarcity has affected various assets of the communities such as trees and crops that were their source of food. Many residents have stopped farming altogether due to drought. This is occurring in Akrich and Achbarou in spite of an overall increase in agricultural production in Morocco in recent years, so there is clearly a socioeconomic and health disparity in Morocco. None of the interviewees reported being impacted to the level that they were worried about going hungry, but having less food was a stressor for many. Future research could dive deeper into who has more access to irrigation water resources and why.

Behavioral factors

While overall the community reported satisfaction with the quality of their water and zero instances of acute water-borne illness, two participants reported mild physical discomfort caused by drinking water and one had reported a clinical diagnosis of renal stone. The implication of the response is that there is currently a limited health impact on some residents, and that benefits could be achieved by residents boiling or filtering their water before drinking.

Conclusion and recommendations

In conclusion, this study looks at the crucial topic of water security and how it affects the health of the people living in the Moroccan villages of Akrich and Achbarou. The study suggests some interventions that may address these health issues in light of the data currently available. It was evident that the recent changes in accessibility through pipe supply and the solar panels installed through HAF projects have made major improvements to the lifestyles and well-being of these communities. It appears that the additional wells installed by HAF would improve health equity in the community. All in all, this study serves as a call to action, calling all parties involved to cooperate, distribute funds, and strive towards sustainable water security that will improve the health and standard of living of residents of Akrich and Achbarou. By doing this, we may move towards a time when everyone has fair access to clean, safe water, which will improve both individual and societal well-being.

Relevant stakeholders

We have created a map of relevant stakeholders relating to water management in the community. Public sector, which is comprised of four primary parts, plays a significant role in the coordination, provision, and distribution of water resources. Community members and volunteers are crucial in advocating, mobilizing the community, creating capacity, and encouraging action on issues related to water security. The involvement of local citizens and farmers, as significant subjects with essential knowledge about local conditions, aids in the understanding of local water demands, the design of interventions, and the promotion of behavioural changes in water use by decision-makers. In addition

to teaching students about water conservation and saving water, for example, school officials can make sure that every student has access to clean water.

Specific Implementations

Households

Access to clean drinking water has always been a major challenge for villagers. To address these issues, HAF has dug two wells for Achbarou village: one for drinking water and the other for irrigation. The first well - drinking water: The first well was dug to provide clean drinking water to 56 families who do not have access to clean drinking water. In order to improve water supply in times of drought, intervention on additional methods of water conservation may improve community health.

Based on the results of our findings, we suggest pursuing further research into reporting mechanisms for water-related problems and complaints. Though residents report overall satisfaction with government processes, it was suggested that infrastructure needs updating, and that government can sometimes be “unresponsive,” so there may be room for improved mechanisms here.

We believe that some benefits could come to the community by drinking boiled or filtered water instead of directly from the tap. Further research is needed to determine the extent of physical discomfort due to drinking water in the community. If research continues to suggest that drinking water is impacting health, we suggest an outreach program promoting water filtration or boiling. Our research suggests that government television ad campaigns to promote water conservation have been successful in the community, so a similar model may also be successful for promoting the use of affordable personal water filters or boiling before drinking. Since Akrich is also linked to municipal systems, there may also be room to explore additional treatment infrastructure to improve the drinking water quality.

Community

During our research we found that the water association organises monthly water meetings and activities in the community, but female residents are not allowed to participate. We suggest engaging in additional research to determine whether women’s views are being considered in decision-making processes, considering that there seem to be specific gendered roles around water management in the community.

Figure 36
Water of museum in Marrakech

Figure 37
Stakeholders involved in the Interventions.

Additionally, there may be room for additional research into irrigation water in the community. We know that drought has negatively impacted the community in recent years and that there is not enough water to farm anymore. While the irrigation well from HAF will provide plentiful irrigation water for many farmers, it may also be beneficial to explore additional water collection strategies if the community would value it. Finally, communities should actively engage in partnerships with government agencies, HAF, water suppliers, schools and other relevant stakeholders. Through these partnerships, communities can support water-related activities, share resources, and benefit from the expertise and knowledge of different organisations. Collaborative efforts and shared responsibilities can increase the effectiveness and sustainability of water management initiatives.

Orchards

Climate-resilient water management methods and climate-smart agricultural practices that can resist drought and water scarcity are required due to Marrakech's long history of dealing with environmental issues such as chronic droughts, substantially decreased precipitation, and global warming. HAF has organised the digging of an irrigation well for the planting of 23,000 trees in the village of Achbarou to provide to local farmers.

Our interviewees indicated that the installation of solar panels has greatly improved their lives and reduced their water costs.

Additionally, the government can work with HAF, colleges, and other research organizations to study cutting-edge approaches to managing the water used in orchards. Using drought-tolerant tree

species, precise irrigation methods, or alternative water sources like rainwater collecting or wastewater treatment are a few examples of solutions to increase water efficiency that can be developed in collaboration with agricultural specialists. To ensure that various viewpoints and local expertise are included in the process of policy formation and implementation, mechanisms for interaction with farmers, water authorities, local community centres, etc. should also be established.

Schools

Based on the survey results we found that the schools in Akrich village still do not have piped water, so mothers bring their children bottled water daily during lunch for drinking and washing. Abderrahim suggested that the community is already trying to install a basin at a local school to provide piped water in the future. We wanted to flag this for HAF in case there is an opportunity to work together on this future project.

Evaluations of the interventions

Evaluation is crucial to any intervention, and below we have included some suggestions to evaluate the proposed interventions in this report. Evaluation plans should include reporting mechanisms specific to health impacts as well as determine whether water issues are being positively addressed. To guarantee that the community continues to benefit from the water safety measures and programs for years to come, the evaluation should also consider their long-term viability.

Effectiveness

Assess the effectiveness of the interventions to determine the degree to which the objectives have been met, specificallythe standard of piped water in people's houses, the supply of safe and dependable water supplies in schools, and the promotion of sustainable fruit tree development and agricultural practices.

Efficiency

Assess the impact of policies on the health and well-being of students, community members and farmers. For example, whether improvements in access to clean drinking water, reductions in waterborne diseases, and overall environmental sustainability are achieved.`1

Equity

Evaluate how much the policies address water inequalities and advance social equity in educational institutions and rural areas and identify any gaps to adjust further intervention.

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Appendix

Annex 1

Semi-structured questions for FGDs group 2

Introduction

Who are we

1. What this research is for; why are we conducting this interview
2. Ensuring confidentiality and anonymity of survey participants
3. Voluntary withdrawal from study
4. How the data will be used
5. Tick consent box and sign

Demographic characteristics

1. What is your gender?
2. How old are you?
3. What are you studying at university?
4. 4. What year of university are you in? (Eg Year 1, Year 2 etc.)
5. Where do you live (campus/home)?
6. What is your household composition? (who/how many people do you live with?)
1. Are you currently working in a full time or part time job? If yes please specify
2. What is your monthly expenditure/income

Lifestyle issues and health behaviour

Health behaviour

Do you do any of the following:

- Smoke cigarettes (Y/N)
- Smoke e-cigarettes (Y/N)
- Drink alcohol (Y/N)

If yes, how often do you do these activities in one week?

- More than 5 times a week
- 4-5 times
- 2-3 times
- Once a week

Physical activity

How often do you exercise in one week?

- More than 5 times a week
- 4-5 times
- 2-3 times
- Once a week
- Never

Diet

How many times a day do you eat?

- 1x
- 2x
- 3x

What does your main meal consist of and how is it prepared?

- Freshly home-cooked produce
- Restaurant meal
- Pre-cooked, microwave or TV dinners

Do you eat in the university cafeteria?

- Yes
- No

If yes, how would you rate your satisfaction with the food of the university cafeteria?

- 5
- 4
- 3
- 2
- 1

Have you been avoiding some foods for health reasons? If yes, please state what and why

- Yes
- No

What percentage of your regular diet consists of meat and meat products?

- 90% or more
- 75%
- 50%
- 25%
- Less than 25%

How much of your diet consists of vegetables and non-animal products?

- 90% or more
- 75%
- 50%
- 25%
- Less than 25%

Social interactions and sexual activity

1. How many times in a week do you go out with friends
2. Where do you normally go out with friends? (restaurants, shopping malls, park etc.)
3. Have you ever had sexual intercourse? (Y/N/IDK)
4. The last time you had sexual intercourse, did you use a condom (Y/N/IDK)?
5. The last time you had sexual intercourse, did you use a birth control pill (Y/N/IDK)?
6. If you answered no to the previous two questions, please state what form of birth control you use

Sanitation

1. From a scale of 1-5, with 1 being least cleanly and 5 being most cleanly, please rate the cleanliness of the cafeteria on campus/at home
2. From a scale of 1-5, with 1 being least cleanly and 5 being most cleanly, please rate the cleanliness of the toilets on campus/at home
3. Do you have access to clean water on campus/home?
4. Have you ever gotten sick due to the state of these facilities?

Mental health

(all likert questions until question number 8)

1. Have you been able to concentrate well on what you have been doing?
2. Have you been able to enjoy your normal day-to-day activities?
3. Have you been feeling happy, all things considered?
4. Have you lost much sleep over worry?
5. Have you felt constantly under strain?
6. Have you been feeling unhappy or depressed?
7. Have you been losing confidence in yourself?
8. Have you been worried over your appearance and how you look to others? (Y/N)
9. Have you done anything to improve your appearance? And if so how? (eg diet, physical activity, etc.)

Access to healthcare

1. When was the last time you went for a health checkup with a doctor?
2. Where do you spend most of your time and which clinic do you visit most often?
3. Do you feel it is easy to access clinics/hospitals where you live?

Annex 2

Project 3: Survey Questionnaire

VARIABLE	QUESTION	ANSWER OPTIONS
IDENTIFICATION OF THE CASE STUDY SITE		
Name of the park assessed	*Variable to identify the park's participants	Park 1: Menara Gardens Park 2: Annahda Park 3: Azli Park 4: An Mezoir Park 5: Ben Tourmet
Date	Day/Month/Year	
Time	Hours:minutes	
SOCIODEMOGRAPHIC CHARACTERISTICS OR PEOPLE'S BACKGROUND		
Age	What is your age	(0) 18 – 24 years (1) 25 – 35 years (2) 36 – 64 years (3) 65 – 79 years (4) 80 and over
Sex	Sex	(0) Male (1) Female
Education	What is the highest level of education you have completed?	(0) Never attended school (1) Primary education (2) Secondary education (3) Technical (4) Preparatory (5) College/Bachelors (6) Postgrad
Occupation	What is your occupation?	(0) Unemployed (currently looking for work or not) (1) Employed (2) Self-employed (3) Retired (4) Homemaker or caregiver (5) Student

VARIABLE	QUESTION	ANSWER OPTIONS
USERS' RESIDENCE AND LOCALIZATION		
Residence in Marrakesh	Do you live in Marrakesh?	(0) No (go to question 10) (1) Yes
Home's location	On the attached map, please mark the suburb where you currently live?	Answer on the map
Duration of residence	How long have you lived in this place suburb?	(0) Less than 6 months ago (1) 6 – 12 months ago (2) 1– 5 years ago (3) 5- 10 years ago (4) more than 10 years ago
Dominant location	On the attached map, please mark the suburb where you spend most of the time at day on weekdays.	Answer on the map
URBAN GREEN SPACES PURPOSE'S VISITATION/USAGE/ATTENDANCE AND FREQUENCY		
Departure place	Where are you coming from to this park?	(0) Home (1) Workplace (2) Study place (3) Other (4) which: ?
Location of the departure place	In which district is located this place?	Answer on the map or list the district
Purpose (Or primary use)	What is the most important reason for being in this place?	(0) Just walking through the space (1) I'm on my way home from or to work, school, store or any other place (2) Spending time relaxing with friends and family (3) Exercise (sports/jogging/) (4) Traditional purposes (5) Taking a break from the noise of the town (6) Getting some fresh air (7) Enjoying the aesthetic Beauty (8) Getting inspiration or reflective time (9) Herding livestock (10) Community drama's, meetings, cultural events (11) Collecting firewood/fruits/ medicines (12) Other (13) which: ?

URBAN GREEN SPACES PURPOSE'S VISITATION/USAGE/ATTENDANCE AND FREQUENCY

Means of transport used	Which means of transport do you usually use to visit/pass this place?	(0) On foot (1) Bicycle (2) Public transport (3) Car (4) Other (5) which: ?
Travel time from home	How long does it take you from your home to reach this place	(0) Less than 5 minutes (1) 5 – 15 minutes (2) 15 – 30 minutes (3) 30 – 60 minutes (4) more than 60 minutes
Frequency of visit	How often do you visit/pass this place?	(0) Rarely (1) Daily (2) Multiple times/week (3) One/week (4) 1-2 times/month (5) Every few months
Time of day for a visit	What time of day do you often visit this place? (Multiple answers possible)	(0) Morning (1) Noon – Lunchtime (2) Afternoon (3) Evening
Time spent in the UGS	How long do you spend in this place?	(0) Less than 5 minutes (1) 5 – 15 minutes (2) 15 – 30 minutes (3) 30 – 60 minutes

URBAN PARKS FACILITATORS AND BARRIERS

Perception Importance of existing facilities *	When you are in this place, what are the five (5) elements you notice?	1) 2) 3) 4) 5)
Perception of Missing Facilities*	Are there any specific elements in this place that make you feel negative about this place?	If yes, which?
Changes in utilization of parks during heat	Please think of the current heat and the heat in the hottest months in the city. Has the frequency and the purpose of visit this place changed during the heat?	No If yes, how?
Health and Heat	Have your health state changed because of the heat in the hottest days	No Yes, how?
Other park's attendance	Do you visit any other parks in the city?	No Yes, why?

Annex 3

Project 4: Guiding questions for Midwives at a maternity home

Interviewees	Examples of interview questions
the director the Maternity Home	How many women do you see for treatment every day? How many of these women are from the Amazigh community? Do you think they receive maternal clinical care services differently from other patients? Can you share a short story about a patient you have helped treat before?
The midwife of the Maternity Home	Why do patients choose to see you for medical treatment instead of going to a hospital? What is the process for women seeking medical treatment from you? What problems might arise during this process? Is it a home visit or do patients come to you? How do you diagnose their condition specifically?
the president of the rural commune	What are the three or five major challenges that you face to improve the maternal care in your region? In past few years, have there been any systematic or policy level changes to address these challenges?

Project 4: Guiding questions for interviews

Obstetrician and gynecologist

The Situation of Maternal Clinical Care

- How many women do you see for treatment every day? How many of these women are from the Amazigh community? Do you think they receive maternal clinical care services differently from other patients? Can you share a short story about a patient you have helped treat before?

- What are the common ways Amazigh women receive clinical care during pregnancy and childbirth? (Our research shows may include hospitals, traditional midwives, and herbal remedies.) When do women choose to use these methods?

- What is the process for women to receive clinical care during pregnancy and childbirth at the clinic? (What problems might arise during these processes?)

- Before arriving at the clinic: What transportation method do patients usually choose? How much does it cost and how long does it take?

- After arriving at the clinic: How long do patients have to wait in line(assigned to a doctor for consultation)

- Physical exam?

- When undergoing surgery

- After receiving care: Follow-up phone calls or re-diagnosis

- What aspects of the maternal care services provided by the clinic do you think are good? Have you ever experienced poor attitudes from colleagues, or a lack of relevant training, or have they ever been complained about? How do you think this can be improved?

- Do you think the social and religious culture influences the way Amazigh women access to maternity healthcare services? For example, support from their husbands, lack of funds, shame, illiteracy or language barriers etc.

Access to Maternal Clinical Care

- Does the hospital has enough well-equipped ambulances or other transport facilities to transport women to and from the hospital? How many , on time
- How long do patients have to wait after they arrive at the clinic before receiving services?
- Are there any policies of the clinic that is not in agreement with cultural or social norms .
  a. for example, attendants to take care of them or gender of the doctors etc?
- Will the hospital be able to deal with complications such as hemorrhage?
- Is the hospital staffed with enough professionals to ensure that mothers can receive timely treatment and diagnosis? How many
- Is the number of maternity operating tables, surgical equipment sufficient to ensure that women receives timely treatment?
- Are the hospital's wards, professional staff, and medications sufficient to ensure effective post-operative recovery?

Quality of Maternal Clinical Care

- what are the hospital policies and standards to measure the quality of maternity care in the hospital?
- What specific courses have you learned about maternity and delivery?
- Do doctors and nurses have some ongoing training every year to improve their professional ability?
- If any:
- Is there any training on maternity care in the annual promotion?
- What is the specific training form, frequency and content?
- are these trainings optional or mandatory
- If not:
- Do you have any other ways to improve your professional ability?
- If yes, in what way?
- Will the hospital's medical facilities (such as surgical equipment, B-ultrasound equipment) undergo strict quality appraisal and audit, and meet certain standards and specifications?
- In the link of postoperative recovery, what do you think is high-quality service level and facility quality?
- Do you think the hospital's nursing service level and facility quality can make the postoperative recovery of puerpera better?
- After the pregnant woman arrives at the clinic, can the hospital provide high-quality emergency measures as in the case of massive bleeding?
- along with medical surgical care how emotional care is provided to them?
- in your opinion how we can improve the quality of maternal care in the current hospital?

Midwife

- How many women do you see for medical treatment in a month?
- What are the traditional ways for Amazigh women to deal with pregnancy and childbirth? (Research has found hospitals, traditional midwives, and herbal systems, among others.)

- What are the characteristics of each method? Under what circumstances would women choose a specific method?

- Why do patients choose to see you for medical treatment instead of going to a hospital?
  A. What is the process for women seeking medical treatment from you? (What problems might arise during this process?)
  B. Is it a home visit or do patients come to you?
  C. How do you diagnose their condition specifically?
  D. Do you give patients to come in for follow-up examinations to detect any potential problems?

- What tools and medications do you use when treating patients, and where do you get them from?

- Are the tools reused? How do you ensure the cleanliness of the facilities, and do you take disinfection measures?

- What kind of medicine do you use? How effective are the medications used during the delivery process?

- In your past experiences, what difficult or challenging situations have you encountered

- How do you handle complications such as bleeding or preeclampsia during delivery? When do you decide to refer the case to a hospital? How do you deal with complications?

- Besides the improvements mentioned above, what other obstacles do women face in receiving effective care? For example, a lack of transportation, lack of financial resources, shame, illiteracy, or cultural factors such as language barriers. You can provide an anonymous example.

- In how much time do you reach to a patient? And how?

- How do you deal with postoperative recovery? Staff? medicine home visits?

- What specific courses have you taken related to pregnancy and childbirth? Where did you learn other pregnancy-related knowledge?

- During the delivery process, do you provide emotional care to patients?

- Do you personally prefer traditional child birth or hospital services?How do you think we can improve the accessibility and quality of pregnancy and childbirth services?

Government officials

- What are the three or five major challenges that you face to improve the maternal care in your region?

- In past few years, have there been any systematic or policy level changes to address these challenges? (what actions or policies has the government taken to improve access to maternal clinical care for women in your community, especially those from Amazigh communities?) What measures has the government taken to enhance the professional competence of doctors, accesisbility and availability of equipements and medicines, services?

- How much funds are allocated for maternal care espeically of poor and marginalised people like Amazigh? And how it is ensure that people get medical help even if they cannot afford it?

- In your opinion, who should be responsible for improving the maternal care of Amazigh community? And how?

- What is the monitoring and evaluation criterion for maternal healthcare? Does the government have evaluation criteria for medical accessibility? How often do the government visit the hospital for review? Follow-up question: What aspects of hospital quality will you pay attention to when reviewing? Will the government have channels to collect feedback from pregnant women?

Female community representatives

The Situation of Maternal Clinical Care

- How many pregnancy tests did you have during your pregnancy? What kind of methods did you and those around you use each time? For example, going to the hospital or midwife, etc. What is the process, facilities, and personnel of this modality? (before coming to the clinic, after arriving at the clinic, when receiving the doctor's diagnosis, when receiving the procedure, and after receiving the service) Are there any traditional Amazigh practices or beliefs among you or the friends you know that influenced you to seek help from the clinic? For example, herbal medicine.

- Why did you choose this way? Why not choose another way?

- What do you feel is done well and what do you feel needs to be improved? What do you think can be improved?

- What other barriers do you think you face to effective access to better care in addition to the above improvement points? For example, cultural factors such as lack of a vehicle, lack of a husband, lack of funds, shame, illiteracy or language barriers. Can you name one patient that you have helped treat before regarding these areas?

Access to Maternal Clinical Care

- In what ways do you think clinics should help you if they are to have easier access to maternity clinical care? Why should these aspects be considered?

- What are some of the reasons you have observed for maternal reluctance or delay in choosing treatment? Do you think these reasons are due to cultural background, economic conditions, social attitudes, or other factors? What strategies do you think could help mothers choose to receive treatment more quickly?

- What transportation facilities (e.g., roads, ambulances) are available near the hospital to help patients get from the hospital to their homes and back? Can these facilities and tools reach all groups? If not, which groups cannot? What are the reasons? How does it affect their health?

- For some patients in emergency situations, will hospitals have special vehicles to transport them to and from their homes? Can these facilities and tools reach all groups? If not, which groups cannot? What are the reasons? How does it affect their health? What do you think are some ways to reduce delays in arriving at the hospital?

- After a patient arrives at the clinic, how long do they usually have to wait before receiving services? Are there attendants to take care of them during the wait?

- What emergency measures can the hospital provide in the event of an emergency, such as a hemorrhage, after the patient arrives at the clinic?

- Is the hospital staffed with enough professionals to ensure that mothers can receive timely treatment and diagnosis?

- Is the number of maternity tables, surgical equipment, and professional staff sufficient to ensure that the mother receives timely treatment?

- Are the hospital's wards, professional staff, and medications sufficient to ensure effective post-operative recovery?

Quality of Maternal Clinical Care

- In what ways do you think clinics should help you if patients are to receive higher quality maternity clinical care? Why should these aspects be considered?

- Did you receive adequate explanation and discussion of your disease diagnosis and treatment options?

- are you receiving adequate attention and support, such as psychological and emotional support?

- do you have enough information so that you can continue your treatment and recovery at home?

- Is the medical facility sufficiently clean and sanitary to avoid infection and other health risks?

- Are the facilities of the clinic inclusive enough? For example, are there accessible pathways for pregnant women with disabilities?

- Do you know what medications you are taking? Are the names, uses, and dosages of the medications clear and unambiguous?

- Have you had any adverse reactions or side effects? Did your doctor explain the possible adverse effects and how to deal with them?

- Did you feel that the doctor or nurse was friendly, professional and trustworthy?

Annex 4

Project 5: Survey questionnaire

Close-ended Survey on Water Inequality and Urban Health in Akrich

Demographic Questions

1. What is your age? (Numeric response)
2. What is your sex? (Male, Female, Other, Prefer not to say)
3. What is your marital status? (Married, Single never married, divorced/separated)
4. What is your household size (including yourself)? (Numeric response)
5. Water Access
6. Are you satisfied with the quality of your water? (Scale of 1 to 5)
7. Are you satisfied with your access to water? (Scale of 1 to 5)

Water and Health

1. Have you or anyone in your household ever experienced a waterborne illness?
2. Do you use any additional methods to treat your water at home? (such as boiling or filtering) (Yes, No, Sometimes)
3. Have you ever missed school or work due to water related health issues? (Yes or no)
4. Economic Factors
5. What is your household's average monthly income? (Numeric response)
6. What is the source of your household's income? (Text response)
7. How much does your household spend on water per month? (Numeric response)
8. Have you ever had to prioritize water payments over other household expenses? (Yes or no)
9.Have you ever experienced financial hardship due to high water bills? (Yes or no)

Community and Infrastructure

1. Do you participate in community meetings related to water access or quality? (Yes or No)
2. Have you ever reported a water issue to local authorities? (Yes or No)
3. If yes, please explain (text box)
4. How satisfied are you with the response of local authorities to water issues? (Very dissatisfied, Somewhat Dissatisfied, Neutral, Somewhat Satisfied, Very Satisfied)

Open-ended questions

1. What does water mean to you? What does water conservation mean to you?
2. What is the source of your drinking water? Irrigation water? Washing water?
3. Have you ever needed to travel to access drinking water?
4. Do you ever worry about where your water will come from?
5. Do you every worry about the quality of your water?
6. How did you access drinking water before the well was drilled?
7. Do you feel that water is expensive to access?

8. How does your household pay for water?
9. Has your water ever been shut off or become unavailable?
10. Has poor irrigation water (scarce or polluted) ever impacted your harvest?
11. Has the well project impacted your community? Has it impacted you personally? How?

Health in Urban Development
The Bartlett Development Planning Unit, UCL