

An Assessment of the Informal Settlements of Palestinian Refugee Camps in Amman Urban Pattern

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Abstract

Palestinian refugee camps were established as a "temporary solution" following the 1948 and 1967 wars displacing more than 700,000 Palestinians, a status that has been ongoing for seventy years and three generations. These conditions led to a transformation of temporary camps into an urban sprawl of informal settlements embedded within the city context. The housing conditions of these camps face physical, environmental, social, and health-related challenges. The study analyzes the camp-built environment based on multidimensional indicators and explores the possible rehabilitation strategies. The paper adopts a case-study method to assess the physical conditions of these settlements through an analysis of two of the oldest and biggest camps located in the centre of Amman; Jabal Al-Husseini camp and Al-Wehdat (Amman new camp). The study establishes an assessment model to evaluate the current situation and explores urban strategies that can be implemented to upgrade these settlements.

Keywords

informal settlements, refugee camps, housing conditions, urban pattern

1 Introduction

The 1948 war on Palestine, referred to as "Al-Nakbeh" (catastrophe or disaster), caused around 250,000–300,000 Palestinians to leave their home and seek refuge in Jordan, Syria, and Lebanon.

Refugee camps in host countries have been established and maintained since 1950 by the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) to deal with the housing crisis. The next wave of refugees resulted from the second war in 1967, referred to as "Al-Nakseh". Refugees sought asylum in the three main host governments and the west bank territories as well, and further emergency camps were established to accommodate the needs of refugees. The aftermath of both wars generated several unrecognized camps and informal settlements. Today, nearly one-third of the registered Palestine refugees, more than 1.5 million individuals, live in 58 recognized Palestine refugee camps in Jordan, Lebanon, the Syrian Arab Republic, the Gaza Strip, and the West Bank, including East Jerusalem (UNRWA). Jordan is considered the most significant host government regarding Palestinian refugees, with ten recognized refugee camps around the country. Although Jordan is a part of the

international human rights instruments concerning refugees (The 1948 Universal Declaration of Human Rights), it has not acceded to the 1951 Convention Relating to the Status of Refugees and its 1967 Protocol and was the only political state to grant Palestinian refugee full Jordanian citizenship (Alnsour and Meaton, 2014).

During the urban expansion of Amman as a modern city, informal settlements or upgrading quarters have grown in the core and around the city's urban centre, leading to the emergence of crucial urban challenges such as housing problems and severe pressure on services. The main forces that caused informal settlements in Amman are mainly economic, social, and political. These settlements can be categorized into two main types: the Palestinian refugee camps and the slums. Both types share common characteristics regarding their physical condition and environment, but what distinguishes one from another is how these quarters developed; the former was a result of the transformation of temporary refugee camps into permanent settlements due to the political situation of the region, while the latter can be linked to the economic situation of high-cost properties on low-income households.

As a result of these situations, Amman has developed various informal settlements mainly characterized by their high density, which can reach over 20,000 inhabitants per square kilometre (Abed et al., 2015). It is argued that informal settlements in Amman are increasingly marginalized due to the growing demand for housing associated with limited access to decent housing units, poor service and infrastructure, and a lack of investment in the architecture and planning sectors.

The housing classification of refugee camps is officially characterized as a "temporary status" (Rueff and Viaro, 2009). The government works with the organizations responsible, such as UNRWA and the Department of Palestinian Affairs (DPA), which plays a vital role in upgrading these settlement conditions.

The poor settlement conditions that face these settlements create a hazard to the city's urban context; after seventy years of urban spread, these camps, which are now transformed into permanent settlements, are facing many challenges, mainly deterioration in the built environment and social polarization.

The research aims to examine, evaluate, and assess the current condition and the challenges that face these settlements regarding the physical condition of the built environment by analyzing two significant camps located in the city centre of Amman. It also explores the definition of paradoxes of terminologies such as Regular-Irregular, Planned-Unplanned, and Order-Disorder. The research's question is, "What are the main built environment challenges that face Palestinian refugee camps in Amman?"

1.1 Literature review

Potter et al. (2009), in the paper entitled "'Ever-growing Amman", Jordan: Urban expansion, social polarization, and contemporary urban planning issues" discusses Amman's urban growth and its expansion since the 1920s, emphasize the growing regional and international geopolitical salience of the city of Amman at the start of the 21st century, aiming to documents the phenomenal expansion of "ever-growing Amman". The paper tackles the physical growth of the urban region of the city in addition to its social structure and what led to the highly polarized character of contemporary Amman.

A study by Rueff and Viaro (2009), titled "Palestinian Refugee Camps: From Shelter to Habitat" analyses the housing condition of Palestinian refugee camps in host countries. The study collected data from recent surveys to provide insight into where intervention is needed in

UNRWA's fields, it narrowed the main sources of housing discomfort to overcrowding, lack of public spaces, humidity, and structural defects. The paper argued that the main obstacle to the refugees' housing development is the incapacity and unwillingness of host countries as well as its restrictions to incorporate refugee camps into their master plans. As a solution for substantial housing improvement, the authors advocate rehabilitation and self-help housing programs, such programs' success depends on the host governments' will to provide UNRWA with authorizations, financial support, and land, as well as on the capacity of involving the refugee communities in projects' planning and implementation.

A paper by Alnsour and Meaton (2014), entitled "Housing conditions in Palestinian refugee camps, Jordan", evaluates the quality of Palestinian refugee camps in Jordan through a survey of the Baqa'a camp, the study findings are based on a questionnaire that was distributed to 186 households' units in Al-Baqa'a camp, it identifies the main problems facing the camp through quantitative survey and field visit, findings indicated that poor structure and maintenance was the key problems. The paper further discusses political and practical challenges that stand in the way of improvements and provide new models of responsibility that need to be taken into consideration by the stakeholders to improve the current statutes.

2 Formal/Informal settlements

Urban Fabric is the infrastructure that establishes the ways cities concentrate populations and buildings, the ways they mix different people and practices, and the ways they enable access between them. Informal urbanism, which ranges from informal settlements to informal transport, has become one of the critical urban global issues. Many developing countries are facing the challenge of informal settlements spread, and the fact that it is becoming integral to the structure of the cities as it houses a substantial amount of people.

The formation of such settlements is often conditioned by economic and political context, which forces such structures to develop within the city. The way informal settlements can be distinguished from the formal city brings out the impact on both the image and the city's structure (Dovey and King, 2011). With formal city development, the street layout comes first, forming the city into blocks which then are divided into plots for the buildings to be constructed according to the relevant codes. Conversely, the informal settlement process is reversed; buildings are

constructed first, followed by streets, plots, and blocks that emerge over time with no regulation or codes as a reference (Dovey and Kamalipour, 2017).

The key criterion that distinguishes and defines a formal order in urban design is to what extent the structure of the city street network and plots shows order and hierarchy. In contrast, informal urban design morphology will show indications of self-organization, inconsistency, randomness, and chaos, as well as a main street network characterized by various widths and a lack of order (Dovey and King, 2012). In general, informal settlements have high land coverage with minimal open public and private spaces and often generate narrow networks that are barely visible from an aerial photograph (Kamalipour and Dovey, 2020). What defines "informal settlements" is their morphological consistencies: small building increments, usually self-built and irregular narrow networks. These settlements can be defined as incremental, unauthorized, and self-organized production of new urban neighbourhoods (Dovey et al., 2020).

The terms "slum", "squatter", and "informal" are not synonymous; what distinguishes them is that a slum is defined in terms of poor sanitation and low-income inhabitants; squatting is defined in terms of legality of tenure, and informality describes practices that fall outside state control (UN-Habitat, 2006). Most of these settlements develop on a larger-scale incorporating retail and community functions becoming large mixed-used districts. In this manner, such settlements that developed over a long period cannot be considered an intrusion or encroachments; they became an upgrading site where the informality is a part that can be infiltrated and integrated with the formality of the city.

3 Informal settlements of Amman

3.1 Urban development of Amman

Amman is the capital of the Hashemite Kingdom of Jordan; the city is considered relatively modern rather than an ancient metropolis. Amman currently is an urban centre with a population exceeding four million, but in 1924 Amman's urban scenes consisted of a collection of dwellings with 2000–3000 inhabitants (Potter et al., 2009). Modern-day Amman, which spreads over seven hills, is divided through socio-spatial polarization between its upscale neighborhoods on one hand and its poorer quarters on the other. In general, Amman appears as a metropolitan centre, although, at the local micro-level, its traditional and informal characteristics are distinct



Fig. 1 Image of Amman (source: Rania Matrouk)

(Abu-Dayyeh, 2004). The main typology of Amman consists of four to six storied lime-stone residential buildings, build on steep topography (Fig. 1).

The increase in Amman's population resulted from drastic growth spurts over the years rather than incremental growth. Mainly caused by continuous migration due to political conflicts and general re-urbanization in a rural-urban relationship to reduce poverty and better conditions (Fig. 2). Since its independence in 1946, Jordan's population has increased eleven-fold, this is due to both high rates of natural growth (more than 4% in the 1950s-1960s, and 2.2% in 2009) and immigration waves (Ababsa, 2010). Such factors impacted the city's spatial organization and development; therefore, Amman's urban scene can be preserved as chaotic and the reason is that the city did not develop more naturally concerning its needs (Alnsour, 2016).

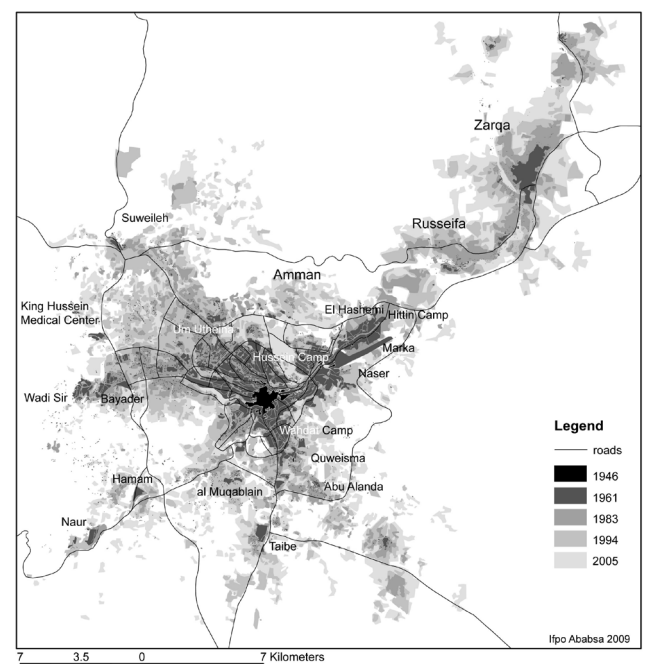


Fig. 2 Map of Amman expansion from satellite images (source: (Ababsa, 2010) Myriam Ababsa (ed.) atlas of Jordan Ifpo Amman)

3.2 Formation of informal settlements

In the aftermath of the 1948 and 1976 wars in Palestine, informal settlements impacted Amman's urban growth. Besides the organized refugee camps, the increasing rise of demand in residential and services sectors caused the emergence of unregulated settlements primarily occupied by refugees.

There are so many informal areas inhabited by Palestinian refugees that the definition of informality is unique in Jordan (Ababsa, 2010). The term refers almost exclusively to areas inhabited by Palestinian refugees while "poor areas" is used for informal habitats with rural or Bedouin populations. Nevertheless, some vagueness remains in defining informality, it could be classified either by its physical forms, which comes under two morphological criteria: one is based on the road structure and the accessibility of the area, and the other is the type of construction itself, or by its legal statues regarding the type of ownership. Note that the legal status of a property can alone define it as informal since the lack of inalienable and exclusive rights of a transfer renders a property informal (Ababsa, 2010).

In 1986 the Urban Development Department identified 16 sites within Greater Amman occupied by slum and squatter settlements (Ababsa, 2010). The main difference between established refugee camps, slums, and squatter is that the former was under the administration of the United Nation, while the latter appeared in an unorganized manner, to accommodate low-income populations including refugees. Slum areas are defined as areas that accommodate housing units, in a form of an apartment or traditional units which are often characterized as older, low maintenance with poor infrastructure and services structures. Squatter, on the other hand, appeared more recently and it is the areas that do not conform with legal regulations, uncertain tenure, or different ownership of land and building. The total area occupied by slum and squatter settlements was 1,224 dunums, with sites varying in size from five to 293 dunums, with a total population of 51,145 people, in 7,320 households. Average densities were 55 persons and 7.7 households per dunum¹ (Municipality of Greater Amman, 1993).

One of the multi-layered reasons that are causing the slums in Jordan to grow out of control can be linked to the high cost of properties, poor distribution of residential plot size, which is remarkably large for low-income groups to be able to afford, and the straining financial support for low-income households.

This housing demand reflects the regional political and financial crisis which has been a direct effect on Jordan's urban scene. As a result, Amman has developed several crowded informal settlements characterized by their high density which can reach over 20,000 inhabitants per square kilometer (Abed et al., 2015). Furthermore, due to the decentralized nature of Jordanian cities, several residents relocate from the countryside to the capital to find jobs which generated more constraints on the city infrastructure and made matter worse regarding the housing sector. Alongside the political, economic, and social forces that are causing the rapid spread of slums, governmental and non-governmental organizations (NGOs) are working on projects and initiatives to improve and rehabilitate these neighborhoods.

3.3 Palestinian refugee camps

After the 1948 war "Nakbeh" which was the first displacement movement of the Palestinians, 100,000 Palestinian refugees were placed in Jordan, four camps were created as a solution to the housing and humanitarian crisis that have arisen mainly situated near the three major cities in Jordan Zarqa, Irbid, and Amman. These camps have been administrated by the United Nations Relief and Works Agency for Palestinian Refugees (UNRWA) since 1950. The 1967 war brought the second wave of Palestinian refugees, generating more informal settlements, and leading to the establishment of several unrecognized camps, which are areas not recognized as camps but have access to a basic package of UNRWA service.

The issue that dignifies the case of Palestinian refugees is that the conflict that caused the displacement has been going on for more than seventy years and remains unaddressed until now. The land the refugees were forced to leave no longer exists as an administrative and political entity which means they are not allowed to go back (Albanese and Takkenberg, 2021). These factors are important to comprehend the challenges that face Palestinian refugees and their stay in the refugee camp is considered a permanent stay rather than temporary.

Currently, Jordan hosts 21 Palestinian refugee camps, only ten of them are recognized by the UNRWA, three of them are recognized by the Jordanian government, and 8 are not recognized by any organization (UNRWA). All camps can be considered informal settlements scattered throughout the cities of Jordan. According to a 2010 UN-Habitat report on the State of the World's Cities, one in four of the two million-plus residents of Amman today are refugees, the highest proportion of refugees of any city in the world (Pilder, 2011).

¹ 1 km² = 1,000 dunums

The inhabitants of these camps first started living in shelters and tents as a temporary or emergency state, these conditions lasted for almost fifteen years until the 1970s. Then Jordanian government started working with UNRWA in order to improve their living conditions, which lead to the evolution of these settlements into vertical and horizontal sprawls of houses built according to the dwellers' needs and assets. The land allocated for these camps was initially located in rural areas and the outskirts of the city, however, after the city's urban growth and development over the years some of these camps became embedded within the city context.

The patterns of house occupancy inside camps often mirror refugees' social organization: relatives and neighbors who were living in the same villages before the exile have tended to recreate the community (Rueff and Viaro, 2009). These over-crowded camps have been built on limited perimeters with specific plots and land areas, at the same time additional structures need to be added to accommodate the growing population. As a consequence of this and the fact that these camps are neglected led to the deterioration of the built environment, which is often the case of unprivileged, unstable, and unsettled communities.

In 1980, a quarter of Amman was occupied by informal settlements, inhabited by Palestinian refugees (Ababsa, 2011). These settlements became a national urban problem due to their location within the heart of the city which made them highly visible in its urban pattern. Currently, these settlement faces physical, economic, political, and social challenges, because of the sensitive situation and the administrative regulation guarding them. Throughout the years governmental and non-governmental organizations tried to establish rehabilitation plans. Often the point in the question of these projects is the funding, governments lack the financial capacity to fund such projects, nevertheless, multiple attempts to rehabilitate the camps were achieved such as the reconstruction after the 1970 conflict (which led to the destruction in some parts of the camps). In 1980, at the instigation of the World Bank, the Urban Development Department (UDD) was created within the Greater Amman Municipality to develop an urban renewal project of informal settlements located in the east of Amman (Ababsa, 2011). Hitteen camp renovation the renovation of the housing units is implemented by UNOPS (operational arm of the United Nations) and funded by the Italian Agency for Development Cooperation (Al Daly, 1999).

The discourse of research on the housing condition of Palestinian refugees indicates that the factors responsible for the poor housing condition of the camps are first that the UNRWA did not conduct a program for permanent housing, it aimed to provide shelters as the status of the refugees was provisional. Second, the role of host governments and the levels of restrictions for the development of such settlements in specific terms of extension is an issue that caused overcrowding within the houses. Third camps often remained isolated as an entity even when embedded within the urban structure. In most cases, municipalities, or urban authorities, in general, did not integrate the camps into their master plan of the city. The infrastructure and all admirative issues of the camps are being thought out separately from the city itself, having two separate urban infrastructures has often hindered efficient urban planning and management (Rueff and Viaro, 2009).

4 Research methodology

By adopting a descriptive-analytical method, it is possible to establish an assessment model that can inform stakeholders of the possible development of policies and interventions that are better suited to the specific needs and conditions of these settlements. The paper will analyze two case studies Al-Hussein and Al-Wehdat camps. The analysis is based on multidimensional indicators that are used to assess the different aspects of urban morphology. These indicators are diversity, density, connectivity, and housing units. The analysis will help understand the urban spatial pattern, functional relation, and social structure of refugee camps and how these settlements work within the urban morphology of the city context.

The case studies were chosen based on the historical importance, location in relation to the city centre, and the development of the settlement within the city's urban context. Both Al-Hussein and Al-Wehdat camps are considered the main camps in the capital Amman, established in the 1950s and under the administration of the UNRWA. The camps were initially established on the outskirts of the city and due to the city's growth through the years now they are embedded in the city's urban fabric. Both camps are relatively located in the centre of Amman the areas surrounding the camps are often characterized to be poor and sometimes belong to slums, nevertheless, the camps still can be recognized because of their unique urban fabric.

4.1 Refugee camps background

4.1.1 Jabal Al-Hussein

Jabal Al-Hussein camp is one of four camps established in Jordan after 1948 to accommodate refugees who were displaced from Palestine as a result of the war. The camp was set up in 1952 for 8,000 refugees on an area of 0.445 square kilometers, northwest of Amman (Fig. 3). The camp has since grown into an urban-like quarter and has become

part of Amman (Fig. 4). As with other camps in Jordan, Jabal Al-Hussein camp faces severe overcrowding with no space for further building. UNRWA runs 12 installations to provide services for camp refugees.

4.1.2 Al-Wehdat camp (Amman new camp)

Amman New camp, known locally as Al-Wehdat, was one of four camps set up after 1948, it is located in the Hay Al

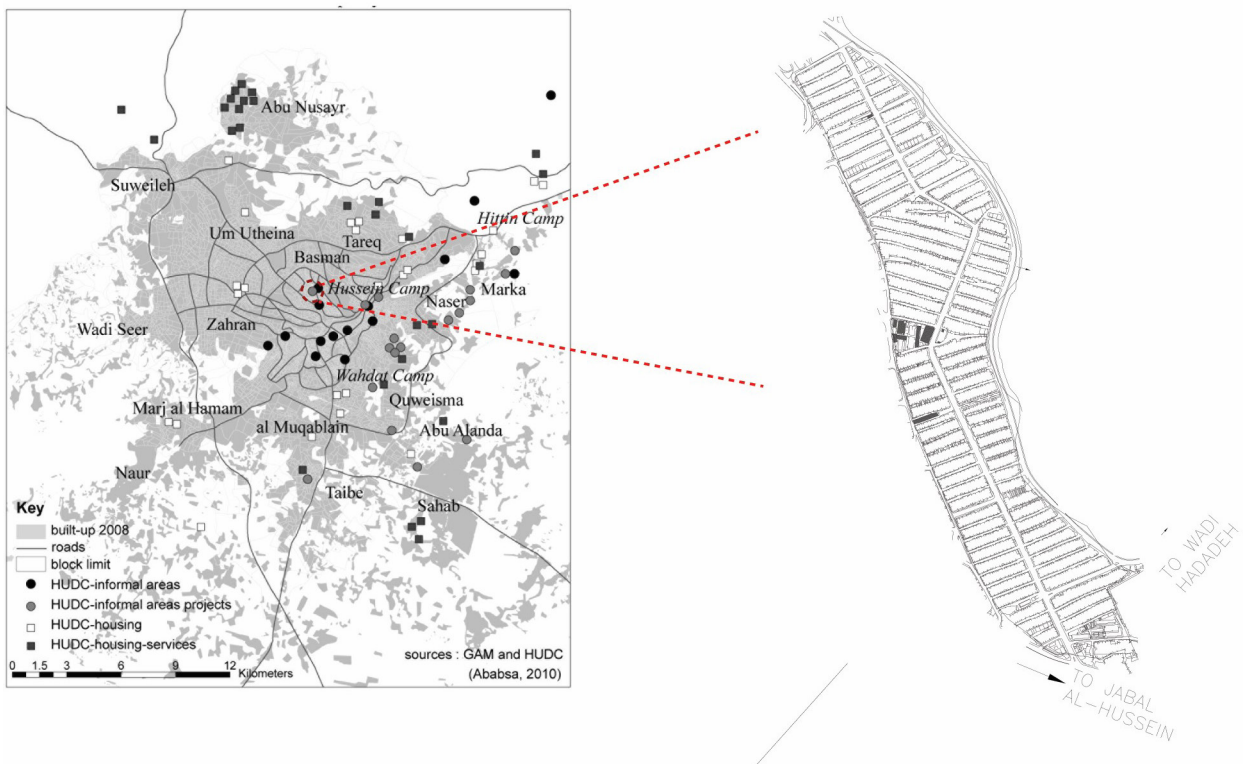


Fig. 3 Location of Al-Hussein camp (source: adapted from Ababsa (2010) and DPA (2022a) modified by Rania Matrouk)



Fig. 4 Satelliet image of Al-Hussein camp (source: obtained from Google Earth Pro 7.3.6.9345 (64-bit) (2022a))

Awdah neighborhood which means (the return), in south-east Amman (Fig. 5). Al-Wehdat camp by time became a symbol of Palestinians in Jordan, the camp occupies 0.48 km², and it is the second largest camp of the ten recognized Palestinian refugee camps in Jordan (Fig. 6). Al-Wehdat is a maze of densely stacked concrete houses that struggle to accommodate numerous families living in each building. Overcrowding in the camp affects the living conditions of refugees to the point where families of six or more often have to share two rooms.

Al-Hussein and Al-Wehdat camps are considered two of the largest camps in the city centre of Amman. Both occupy approximately the same area except the population of Al-Wehdat is almost double.

As shown in Table 1, Al-Wehdat camp covers an area of 479 km², accommodating a population of 51064 people in 4524 dwellings, while Jabal Hussein camp covers an area of 445 km², with 29560 inhabitants, in 3726 dwellings. The resulting densities of both camps are 106.6 persons per km² in Al-Wehdat, and 66.4 persons per km²

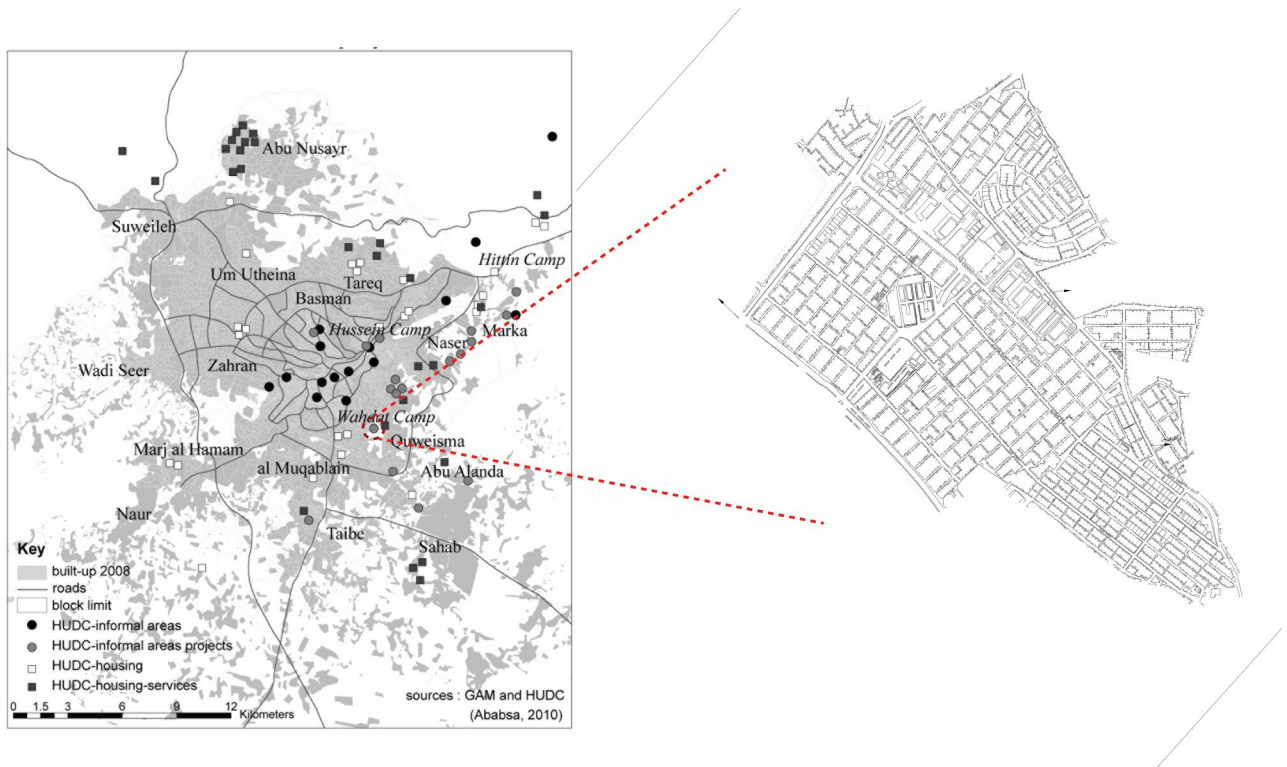


Fig. 5 Location of Al-Wehdat camp (source: adapted from Ababsa (2010) and DPA (2022b) modified by Rania Matrouk)

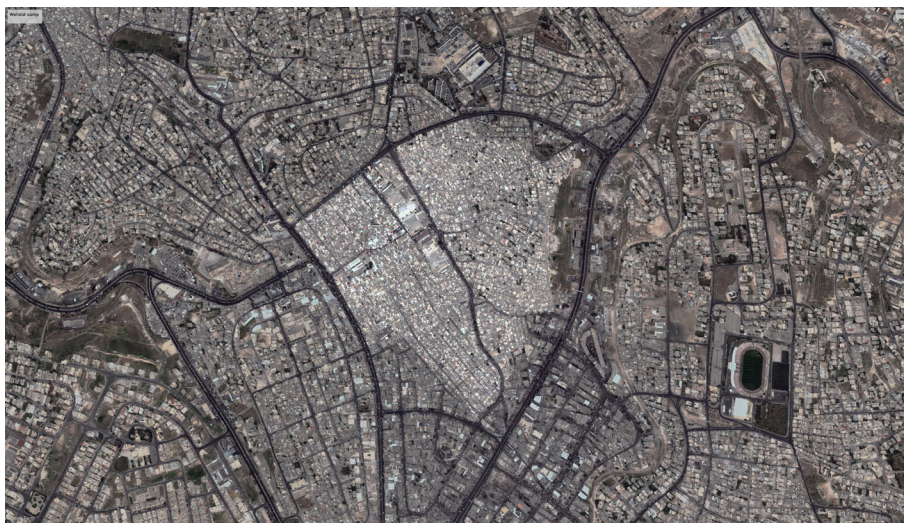


Fig. 6 Satelliet image of Al-Wehdat camp (source: obtained from Google Earth Pro 7.3.6.9345 (64-bit) (2022b))

Table 1 Statistical data (source: DPA (2011))

		Al-Hussein	Al-Wehdad
Date of establishment		1952	1955
Area		445.241 dunam/0.445 km ²	479.164 dunam/0.479 km ²
Inhabitants	Population	29560 (2008)	51064 (2008)
	No. of families	5811	9834
	Hardship cases	1320	2044
Housing	No. of units	2488	2130
	No. of dwellings	3726	4524
	Area per unit	100 m ²	100 m ²
Services	Paved roads (Streets)	18000 m ²	72925 m ²
	Paved Footpath	9126 m ²	24402 m ²
	Length of pipes for drainage system	645 m	6097 m
	No. of illuminated poles	636	542
	Percentage of house connection to water supply	98%	98%
Commerce	Percentage of house connection to sewer system	98%	98%
	Commercial shops	751	2500
	Bakeries	5	10
Others	Pharmacies	5	8
	Private clinics	11	21
	Mosques	5	7
	Police stations	1	1
Schools	Health centre	1	2
Youth club	Schools	4	16
	Youth club	1	1

in Jabal Hussein Camp, these density rates are among the highest in Amman. Occupancy rates are also high, with an average of approximately four persons per room, and the camps have the lowest standards of infrastructure services. In addition to housing, the camps also contain commercial areas, schools, youth clubs, health, and cultural centres which also serve refugees living outside the camps. Table 1 demonstrates in numbers the population and services in each camp.

4.2 Multidimensional indicators

Table 2 displays the primary and secondary indicators that form the basis of the assessment analysis of the camps. These indicators are intended to evaluate the urban and physical conditions of the settlements. The numerical and

descriptive values obtained through these indicators provide an understanding of the urban fabric and conditions of the camps, which can be utilized to propose appropriate solutions and strategies.

4.2.1 Diversity

The main land use sectors assigned in refugee camp planning are residential and services. Which then developed with the same allocation into the informal settlements, in addition to the commercial sector which emerged due to the inhabitants' needs and urban development of the area.

As Figs. 7, 8 show approximately both camps hold the same ratio. Around 75% of the settlement area is taken up by housing units, making the residential sector the dominant land use. The commercial sector, which makes

Table 2 Assessment indicators (source: Rania Matrouk)

Indicator	Sub-indicator	Value	Urban fabrik
Diversity	Land use map	Residential to service ratio	Hetrogenous\Homogenous
Density	Covrage ratio\Floor area ratio	Building footprint\Built-up ratio	Dense\Fragmented
Connectivity	Nodes and links	Numirical value of links	Connected\Detached
Housing units	Housing untis' quality	Catagorizing housing units	High quality\Low quality



Fig. 7 Land-use of Al-Hussein camp (source: Rania Matrouk)

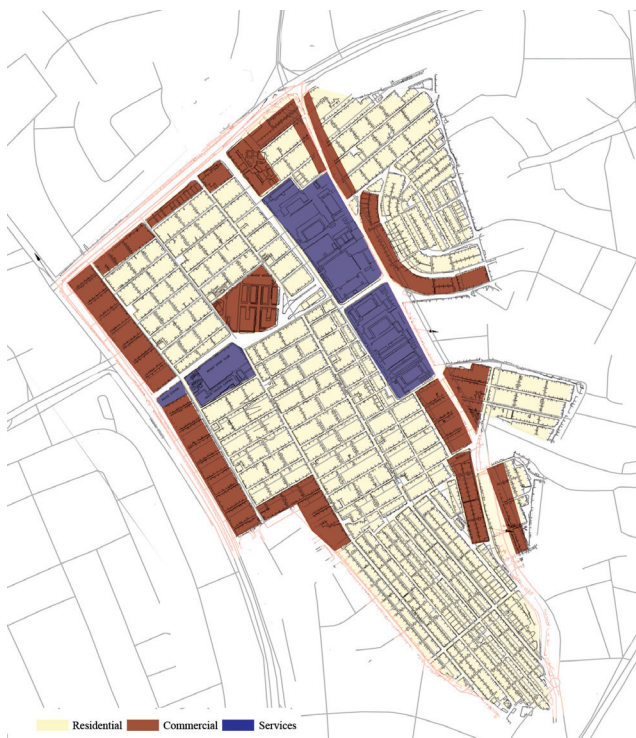


Fig. 8 Land-use of Al-Wehdat camp (source: Rania Matrouk)

up about 15% of the total area, is primarily concentrated along the main street strip. On the other hand, services account for approximately 5% of the settlement area.

Despite the UNRWA's effort to provide basic services such as schools, health centres, police station, youth centres, and commercial facilities, the current physical and

operational conditions of these services are inadequate to meet the needs of the camp's inhabitants. Due to the continuous increase in the population, subsequently, the demands increase on multiple service sectors, and refugee camps' services which once were a temporary solution are no longer capable of providing sufficiently (Figs. 9, 10).



(a)



(b)

Fig. 9 Service in Al-Hussein camp, (a) a school, (b) a youth center (source: Rania Matrouk)



(a)



(b)

Fig. 10 Service in Al-Wehdat camp, (a) Girls school building 1, (b) Girls school building 2 (source: Rania Matrouk)

In conclusion, the settlements themselves represent a self-contained homogeneous community with all its basic categories planned within. However, it is segregated from its surrounding, on urban and architectural levels, creating a heterogeneous urban fabric. Although the camps are economically vital to its surrounding community with the markets, their overcrowding and conditions create a hazard. The existence of these heterogeneous settlements can create strain on the function of the city.

4.2.2 Density and urban context

Plot allocation of refugee camps was planned as an average of 100 sqm per plot. When the camp structure morphed into a permanent structure the size of the plots remained unchanged. And with no to minimum building regulation there were no setbacks determined, causing the housing units to be adjacent to each other with no ventilation and with maximum building footprint.

The average coverage ratio (BCR) is building footprint/plot area – $90/100 = 0.9$. A coverage ratio of 0.9 means that 90% of the lot area is covered by the building's foundation.

The average building high is two stories, therefore the floor area ratio (FAR) is building built-up area/plot area – $190/100 = 1.9$. A floor area ratio of 1.9 means that the total floor area of the building is 1.9 times the area of the lot it sits on.

In terms of density, both of these ratios are indicators of high-density development. The 0.9 footprint building ratio suggests that the building is built close to the lot's boundaries and takes up a large portion of the available land. The 1.9 floor area ratio indicates that the building has a high degree of floor area efficiency, maximizing the use of available space. Which can cause pressure on infrastructure and result in reduced open space.

Due to the nature of refugee camps, open and recreational areas were never a part of the planning, and through the transformation, it was never a priority. This caused an urban pattern in which open areas do not exist. An issue that creates multiple urban challenges for the inhabitants.

The highly dense urban fabric of the settlement separated them from the surrounding. Both camps share a unique urban pattern that distinguish them. There are two main elements that can be identified as the segregation elements, in terms of order and hierarchy: plot sizes and street widths. The nature of these elements goes back to the origin of the camps which were planned as an area designated for tents, therefore, the development of concrete buildings created overcrowded hard-to-reach districts (Figs. 11, 12).

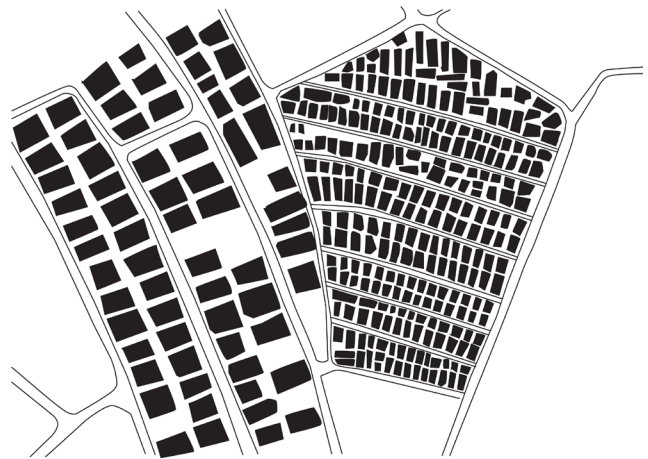


Fig. 11 Urban pattern comparison Al-Hussein (source: Rania Matrouk)



Fig. 12 Urban pattern comparison Al-Wehdat (source: Rania Matrouk)

Jabal Al-Hussein's physical appearance consists of mostly two to three-story buildings either built with concrete material, the pattern of the camps is more regulated according to the original layout of the camp, Although no fence or wall separating the camp from its surroundings, it is quite distinguishable. The deteriorated physical condition, building materials, and lack of organization of the settlement are the main features that differentiate its urban typology (Fig. 13).

On the other hand, parts of Al-Wehdat's surroundings can be categorized as slums, nevertheless, the condition of the settlement can be quite distinguishable. When Al-Wehdat camp introduced the concrete structure as the design of a unit which gave the camp its name in Arabic (wehdat = units), the overgrowing created a haphazard organization which resulted in an irregular, chaotic urban form with a narrow, maze-like network. Al-Wehdat is considered one of the most densely populated districts in the capital. Furthermore, the growing commercial sector adjacent to the settlement edges became vital for the area which caused the chaos in which the district now operates (Fig. 14).



(a)



(b)

Fig. 13 Al-Hussein context, (a) the camp, (b) the surrounding
 (source: Rania Matrouk)



(a)



(b)

Fig. 14 Al-Wehdat context, (a) the camp, (b) the surrounding
 (source: Rania Matrouk)

4.2.3 Connectivity

The connectivity assessment is based on the links and junctions' analysis of Al-Hussein and Al-Wehdat, as well as a hierarchical analysis. Fig. 15 illustrates Al-Hussein camp, with a total of 241 links, 93 of which (38%) are classified as T-junctions and 52 (21%) as X-junctions. While

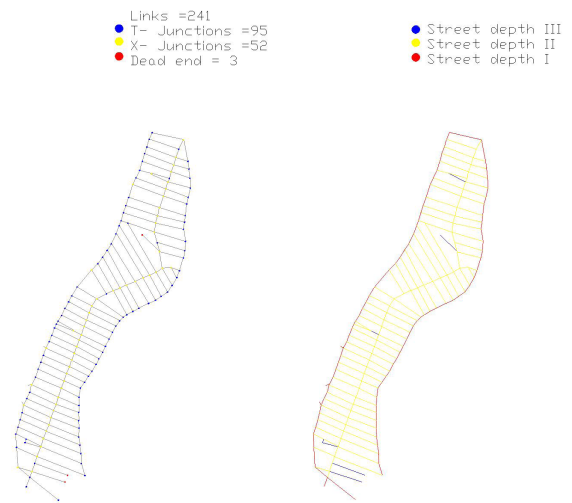


Fig. 15 Al-Hussein connectivity analysis (source: Rania Matrouk)

this is considered a reasonable ratio; the concentration of junctions along the main streets, creates limited accessibility to the unit situated in the middle plots. The street hierarchy consists of main streets (street depth I) these street surrounds the settlement and one main street run through it. Secondary streets (street depth II) are distributed from them into the inner plots.

Fig. 16 shows Al-Wehdat camp which has a significantly larger number of links with a total of 943 links, 453 of which (48%) are T-junctions and 126 (13%) are X-junctions. This indicates that the camp is well-connected with distributed junctions throughout the settlement. The street hierarchy consists of a main street (street depth I) that surrounds the settlement and distributes to secondary streets (street depth II, III) to reach the inside plots.

Despite the well-planned network and connectivity, the streets face multiple challenges due to their origin as a refugee camp network, which is based on pedestrian-only

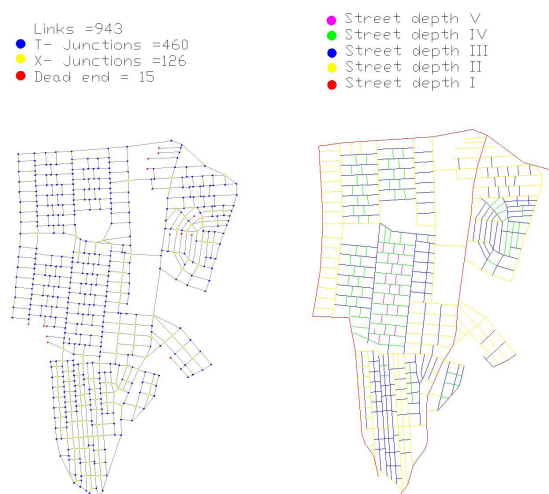


Fig. 16 Al-Wehdat connectivity analysis (source: Rania Matrouk)

mobility that is not suitable for modern transportation needs. Furthermore, the poor quality of these streets is due to the lack of maintenance. As the result, the camps consist of narrow and poorly managed street networks, most being inaccessible to cars. This chaotic nature of cars entering without following established rules resulted in confusion and disorder in mobility and accessibility (Fig. 17).

4.2.4 Housing units

The camps face major health issues related to indoor and outdoor environmental conditions, starting with poor infrastructure and waste management, which leads to polluted wastewater in the streets, and trash all over the side streets. On the other hand, overcrowding and density create a hazard to health and a healthy environment (Fig. 18).

Since both settlements share the same physical characteristics of the built environment, housing units can be categorized into three categories based on their building

material and maintenance. The condition of the units depends mainly on their inhabitants, their socioeconomic statuses, and their ability to maintain the building in good condition. Therefore, these categories are based on the quality of different housing units in the settlements:

- High-quality units
 Some housing units in the settlements are relatively in good shape. These units are constructed using durable materials such as stone cladding, concrete structures, and brick. In addition, the doors and windows of these units are made from aluminum and steel (Fig. 19).
- Medium-quality units
 Medium quality units use a combination of durable material such as concrete, but it incorporates low-cost material such as metal sheets, unfinished brick walls, and fragile materials for doors and windows (Fig. 20).
- Low-quality units
 Units of low quality are frequently constructed using low-coast and provisional materials, such as corrugated metal sheets and plastic, to create the roof. Certain openings in the units may not be properly sealed or may be sealed using inadequate materials (Fig. 21).

To summarize, while some housing units may require more attention than others, there is a need for a comprehensive plan to improve the overall living conditions and reduce risks for the inhabitants. Despite the efforts of both governmental and non-governmental organizations to implement rehabilitation plans for the housing units, they remain in poor physical conditions and have yet to achieve a suitable living environment.



Fig. 17 Street views (source: Rania Matrouk)



Fig. 18 View from Al-Wehdat camp (source: Rania Matrouk)



Fig. 19 Example of high-quality units (source: Rania Matrouk)



Fig. 20 Example of medium-quality units (source: Rania Matrouk)



Fig. 21 Example of low-quality units (source: Rania Matrouk)

5 Discussion

This paper presents an overview of the history of Palestinian refugee camps in Amman and their transformation into informal settlements within the city. To further understand the situation analysis and evaluation of two cases of refugee camps situated in the city centre of Amman were conducted. The analysis focused on defining the current physical conditions and challenges that face the Palestinian refugee camps in Amman by analyzing multidimensional indicators and their sub-indicators to assess the various layers of the built environment.

In conclusion, the main challenges that face the settlements can be summarized according to these indicators:

- The settlements create a heterogeneous urban fabric within the city context, which can pose constraints on the city's functionality and infrastructure.

- The services provided are no longer adequate for the inhabitants' needs. Though the market plays an economically vital role in the community.
- The settlements have high-density rates regarding the building coverage and volume ratio, which creates problems to the health and well-being of the inhabitants and lack of open and recreational spaces.
- Mobility and accessibility face major issues due to the quality and the size of the street network. The lack of regulated circulation causes chaos and disorder.
- Housing units' quality varies based on the material and maintenance of the household. Nevertheless, the overall building condition is deteriorating and in need of a comprehensive plan.

Based on the assessment model these urban intervention strategies can be the first step into rehabilitating and upgrading such settlements:

- Agreements between the governments, NGOs, and the UNRWA to raise the issue of housing in refugee camps and seek funding from multiple organizations.
- A potential solution to address, overcrowding and settlement density, is to strategize a scheme to remove some housing units and relocate the inhabitants. However, it is crucial to approach this strategy with caution, taking into consideration the community's needs and perspective.
- Put a plan to rehabilitate the physical condition of the housing units, with low-cost housing strategies that provide minimum comfort for the inhabitants. The rehabilitation plan should prioritize urgent repairs and upgrades, the use of low-cost materials, and construction techniques.
- Propose a comprehensive plan to improve the physical condition of housing units by replacing low-quality and deteriorated materials with durable and solid building materials that are easier to maintain and provide better living conditions for the inhabitants.
- While services for the camps are available, the quality of these services is under question. Additionally, there is a need for a development plan to improve the physical condition of the buildings and the services provided.
- Develop a transportation plan that includes improving the quality of streets and designating separate pedestrian and vehicle zones to ease the mobility of both cars and pedestrians. This can also include improving public transportation options within and outside of the settlement.

- Improving the basic infrastructure and waste management systems are crucial for enhancing the living condition of the inhabitant. A comprehensive plan should be developed, with consideration of the key

areas which include improving the water sanitation system, waste collection and disposal, electricity supply, and road infrastructure.

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