Die approbierte Originalversion dieser Diplom-/Masterarbeit ist in der Hauptbibliothek der Technischen Universität Wien aufgestellt und zugänglich.

http://www.ub.tuwien.ac.at

The approved original version of this diploma or master thesis is available at the main library of the Vienna University of Technology.

http://www.ub.tuwien.ac.at/eng

Gaza

— An Experimental Housing Project

Die approbierte Originalversion dieser Diplom-/ Masterarbeit ist in der Hauptbibliothek der Technischen Universität Wien aufgestellt und zugänglich.

http://www.ub.tuwien.ac.at

The approved original version of this diploma or master thesis is available at the main library of the Vienna University of Technology.

http://www.ub.tuwien.ac.at/eng

TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Diplomarbeit

Gaza — An Experimental Housing Project

ausgeführt zum Zwecke der Erlangung des akademischen Grades eines Diplom-Ingenieurs / Diplom-Ingenieurin unter der Leitung von

Univ.Prof. Dipl.-Ing. M.Arch. (AA Dist) Tina Gregoric Dekleva
Institut für Architektur und Entwerfen
E253/1, Abteilung für Gebäudelehre und Entwerfen

eingereicht an der Technischen Universität Wien
Fakultät für Architektur und Raumplanung von

Osama Almughanni
Wien, März 2019

Die approbierte Originalversion dieser Diplom-/Masterarbeit ist in der Hauptbibliothek der Technischen Universität Wien aufgestellt und zugänglich.

http://www.ub.tuwien.ac.at

TU WIEN UB Universitätsbibliothek

The approved original version of this diploma or master thesis is available at the main library of the Vienna University of Technology.

http://www.ub.tuwien.ac.at/eng

The Gaza Strip is swelling with an endless stream of stories, some told and others waiting to be told. The biggest and most visible proportion of those told seems too formidable in the minds of those who do not know it, but the unspoken tales are simple, not too different from those you would find in any small city in the world. Gazans are not reaching for the sky. Their dreams are as humble as them, and yet somehow still seem unreachable.

لدى قطاع غـزّة عدد لا متناهي من القصص،
منها ما رُوي ومنها من ينتظر أن يُروى. أما الجزء
الأكبر والظاهر مما رُوي فزاد كثيراً من حجمه في
عقول من لا يعرفه، والمستور منها فهو بسيط،
ولا يختلف كثيراً عمّا لدى مدن العالم الصغيرة.
إن أمنيات الغزيّين لا تداعب ولا تقتربُ من
السحاب، فهي متواضعة كتواضعهم، لكنّها
وبالرغم من ذلك فإنها لا تزالُ تبدو صعبة المنال.

I
Gaza Strip 2

II
Urban Density 44

III
Housing Shortage 82

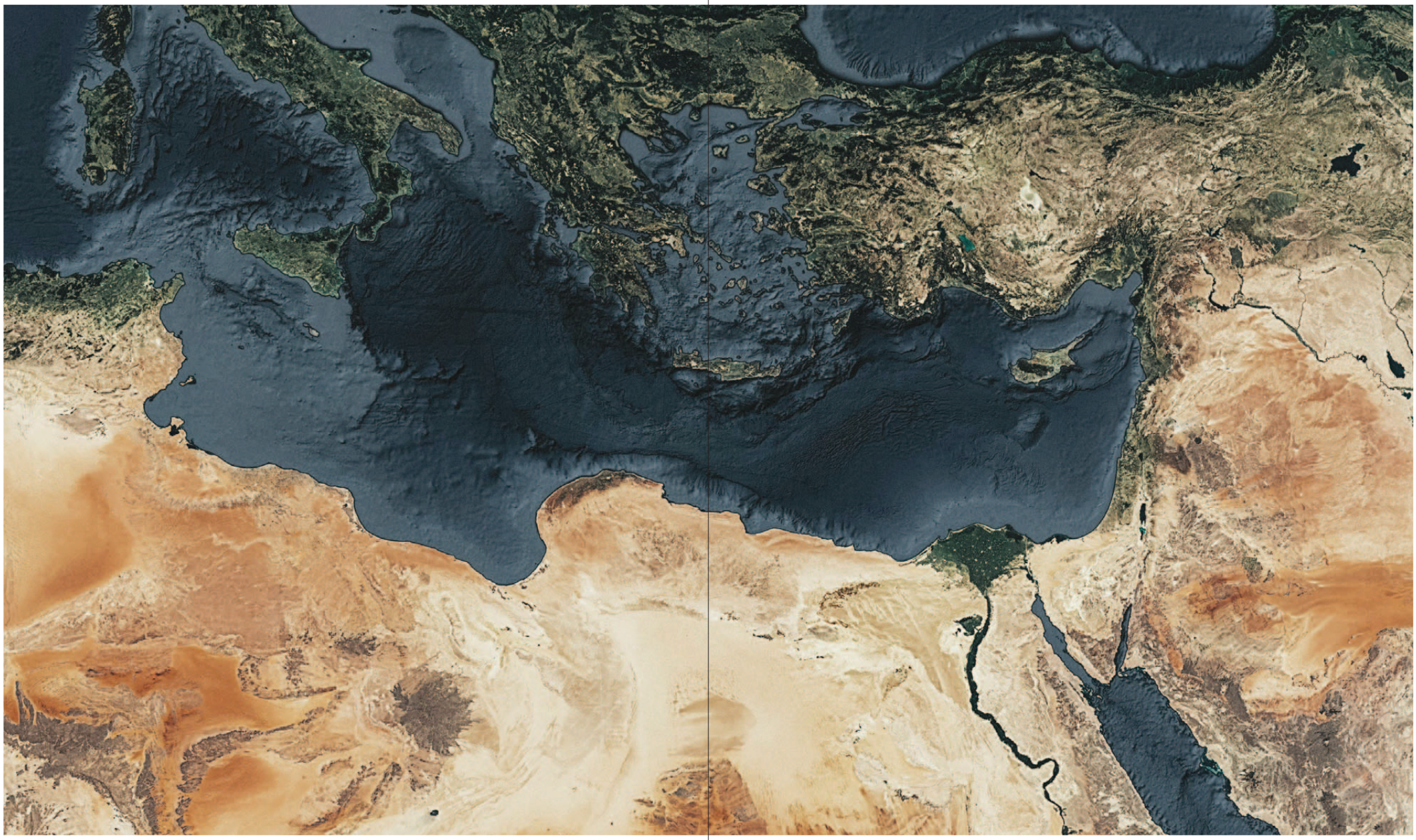
IV
Design Project 132

I

Gaza Strip

In 2012, the United Nations reported that the Gaza Strip will be unlivable by 2020, mainly due to poverty, unemployment, malnutrition, contaminated water and disease. The tightening of the Israeli blockade since 2007, during which three wars have taken place, has aggravated the already dire humanitarian situation in Gaza. Three years after the 2014 war, the UN Office for the Coordination of Humanitarian Affairs, said that Gaza has a housing shortage of around a hundred thousand units, mainly due to natural population growth alongside the conflict-related reconstruction efforts.

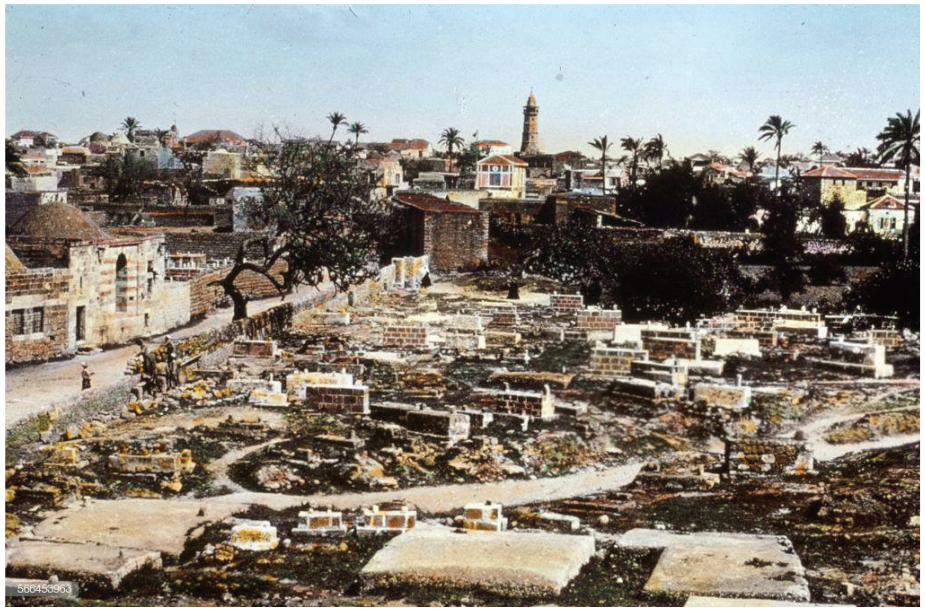
In 2050, the population in the Gaza Strip will more than double, signaling even more serious spatial restrictions ahead for Palestinians. By then, the political and geographical boundaries will make Gaza one of the most densely populated areas on earth, as its area is not naturally expandable. In view of all these challenges, the increasing urban density will continue to be an issue of concern, unless serious answers are given and actions are taken.



Gaza is located on the south-eastern coast of the Mediterranean Sea. It is bordered by Egypt from the south, Israel from the east and the north and the Mediterranean Sea from the West.

The area known now as the Gaza Strip was defined during the 1948 Arab-Israeli War and has a total surface area of 365 km².

0 100km



Gaza City
1930

The term "Gaza" is used today to describe both the city of Gaza and the Gaza Strip. Usually due to its relatively small area.

Gaza's history of habitation dates back 5,000 years, making it one of the oldest cities in the world. Gaza has been dominated by several different peoples and empires throughout its history. The Philistines made it a part of their pentapolis after the Ancient Egyptians had ruled it for nearly 350 years.

Gaza Strip

Stockholm

Berlin

Bangkok

Vienna

Tehran

Havana

London

Cape Town

Seoul

Kiev

Bucharest

Warsaw

Budapest

Ljubljana

Lisbon

Buenos Aires

Amsterdam

Oslo

Dublin

Tunis

Algiers

Barcelona

Kuala Lumpur

Nairobi

Cities Comparison

Gaza Strip shares similar characteristics as many world metropolises, with a population density of around 5,450 persons per km².

Malta

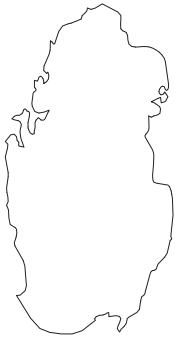
Singapore

Bahrain

Liechtenstein

Hong Kong

Luxembourg



Qatar

Kosovo

Slovenia

Lebanon

Countries Comparison

While being defined through its political and geographical borders, Gaza Strip may be also considered as a separate entity as its borders are not expandable as it is the case with cities.

The Gaza Strip has experienced a rapid population growth in the recent years. From 60,000 in 1948 to around half a million in 1984.

1984

Agriculture used to be the main livelihood of the people before the rapid population growth in the Gaza Strip.

0 5km

Today, around two million people are living in Gaza. The population is expected to reach around five million by 2050.

2016

Gaza has now an annual population growth rate of 2.91% and is the 13th highest in the world.

0 5km

Province		*Municipality*	*Area*	*Inh.*	*pers./km²*
North Gaza	1	Beit Hanun	18.1 km²	53,094	2.93
	2	Beit Lahiya	22.6 km²	89,949	3.98
	3	Jabalya	18.1 km²	230,159	12.72
		Jabalya Camp	1.4 km²	120,268	85.91
	4	Umm an Naser	3.0 km²	3,923	1.31
Gaza	5	Gaza	52.4 km²	628,903	12.00
		Beach Camp	0.52 km²	91,583	176.12
	6	Al Mughraqa	4.4 km²	8,496	1.93
	7	Al Zahra	3.3 km²	4,010	1.22
	8	Wadi Gaza	14.2 km²	3,795	0.27
Deir al Balah	9	Deir al Balah	18.6 km²	80,972	4.35
		Deir al Balah Camp	0.16 km²	23,182	144.89
	10	An Nuseirat	9.2 km²	86,135	9.36
		An Nuseirat Camp	1.4 km²	69,351	49.54
	11	Az Zawayda	6.9 km²	22,530	3.27
	12	Al Bureij	6.2 km²	45,031	7.26
		Al Bureij Camp	0.5 km²	34,817	69.63
	13	Al Maghazi	3.4 km²	30,076	8.85
		Al Maghazi Camp	0.6 km²	26,636	44.39
	14	Al Musaddar	4.4 km²	2,491	0.57
	15	Wadi as Salqa	6.4 km²	6,145	0.96

Province		*Municipality*	*Area*	*Inh.*	*pers./km²*
Khan Yunis	16	Khan Yunis	53.5 km²	234,219	4.38
		Khan Yunis Camp	0.56 km²	75,842	135.43
	17	Al Qarara	14.3 km²	25,675	1.80
	18	Bani Suheila	6.8 km²	41,174	6.06
	19	Abasan al Kabira	12.6 km²	23,914	1.90
	20	Abasan al Jadida	3.3 km²	7,878	2.39
	21	Khuza'a	6.7 km²	11,880	1.77
	22	Al Fukhari	9.2 km²	7,194	0.78
Rafah	23	Rafah	32.6 km²	210,541	6.46
		Rafah Camp	1.36 km²	110,742	81.43
	24	An Naser	6.6 km²	8,495	1.29
	25	Ash Shoka	22.6 km²	14,453	0.64

------- Refugee Camp
Services are provided by United Nations Relief and Works Agency for Palestine Refugees in the Near East – UNRWA

Administrative Map

The Gaza Strip is divided into municipalities under the administration of the Palestinian Authority. Services related to refugee camps are run by the UNRWA.

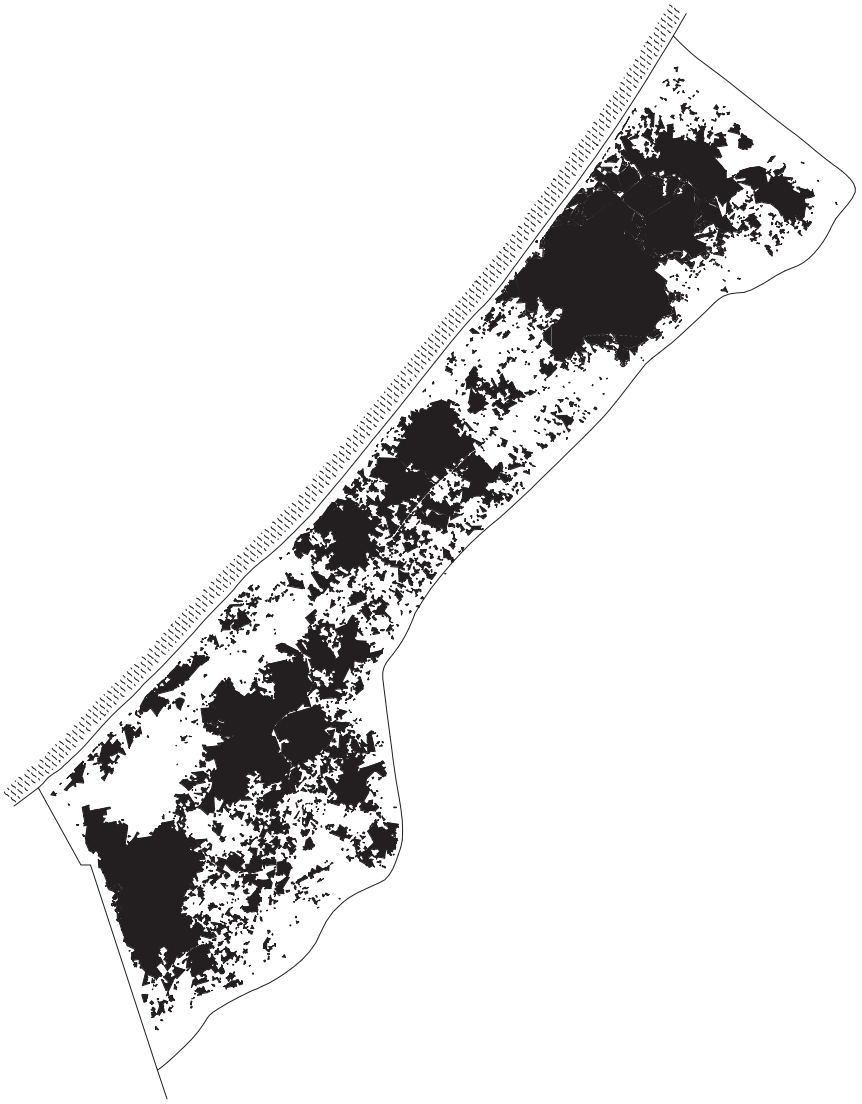
0 2.5km

Slums in the Gaza Strip are often located outside municipal areas and are not provided the basic services due to the lack of necessary infrastructure.

Slums

The area of land in form of slums reached 40 km² or 11% of the area of the Gaza Strip.

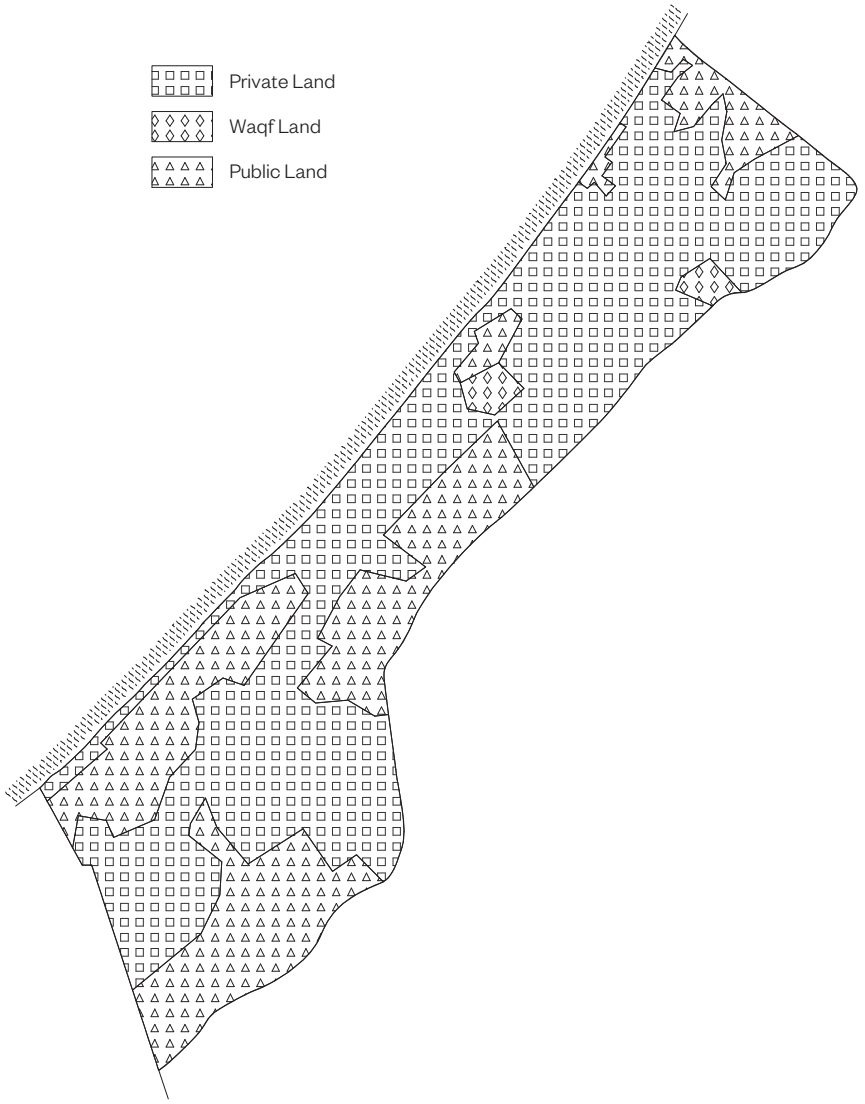
0 2.5km



Urban Areas

Most of the current land is urban. The urban area will reach about 60% of the total area until 2023, or 166 square kilometers of the total area.

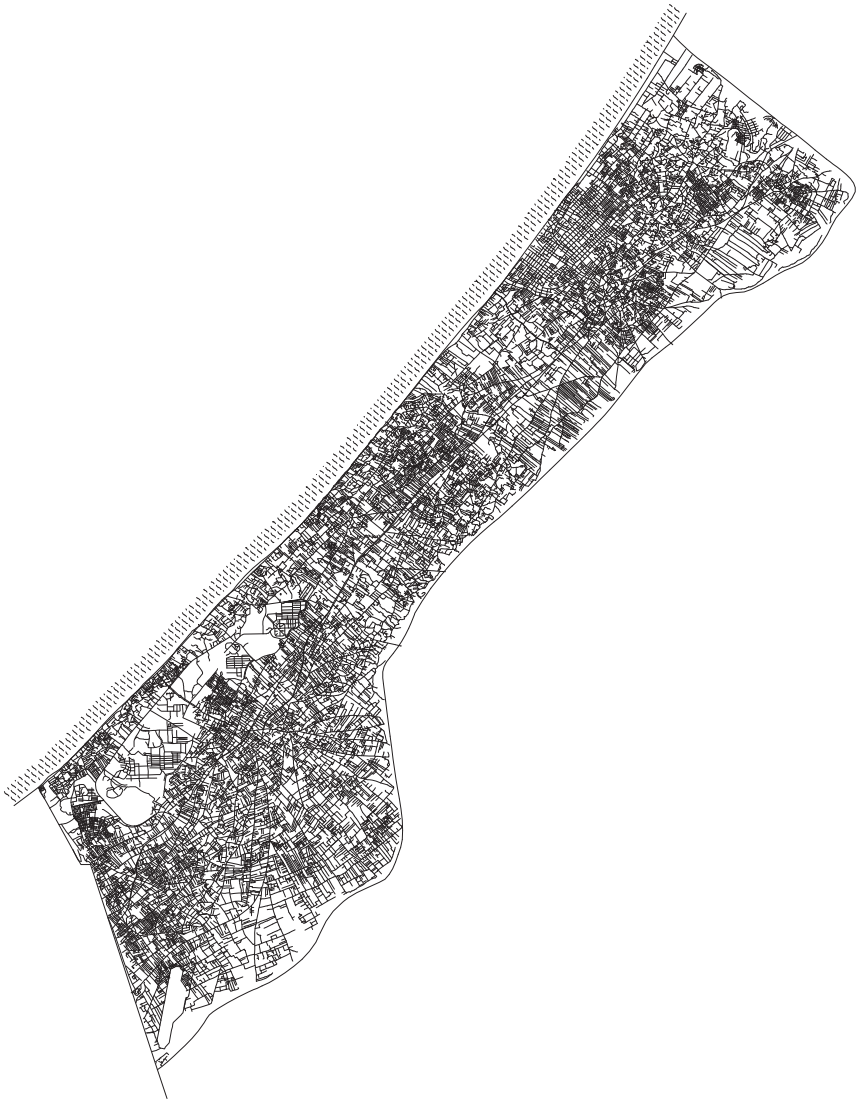
0 5km



Land Ownership

Most of the land in Gaza is private land. Public land is administrated by the Palestinian Authority while Waqf land is an inalienable charitable endowment under Islamic law.

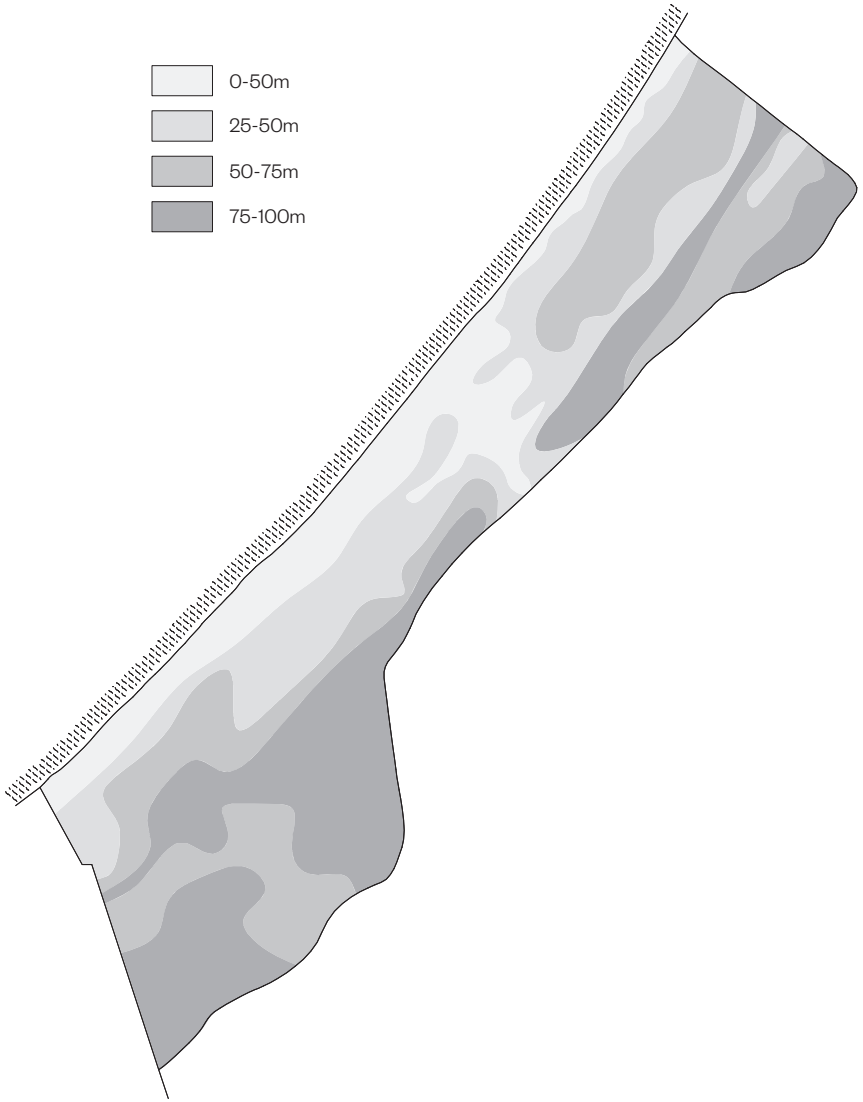
0 5km



Road Map

There was no real urban planning in Gaza in general. The current road network is the result of the spatial development of residential areas.

0 5km

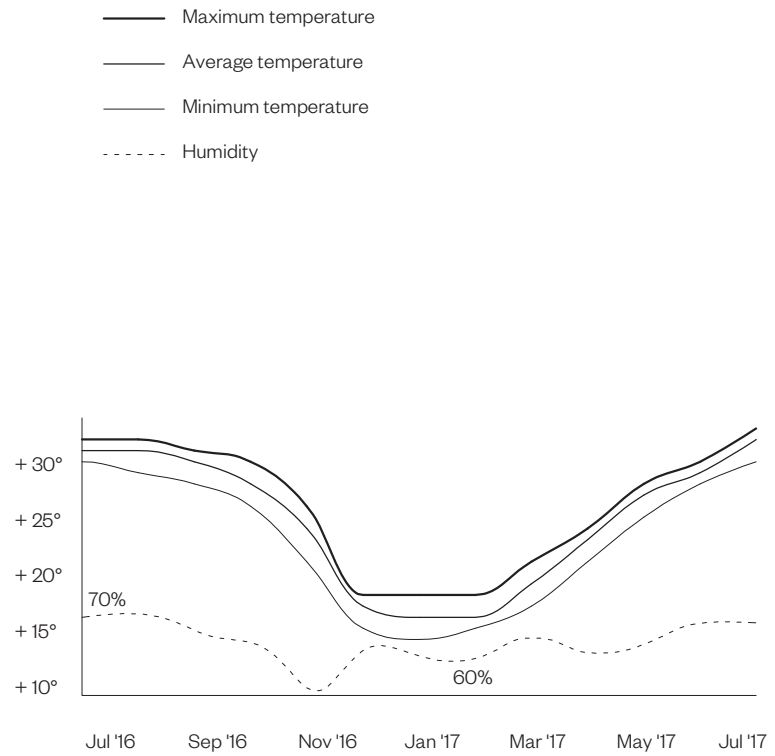


Topography

The topography of coastal and near sea level has made the Gaza Strip a fertile agricultural land that is now threatened by desertification due to population growth.

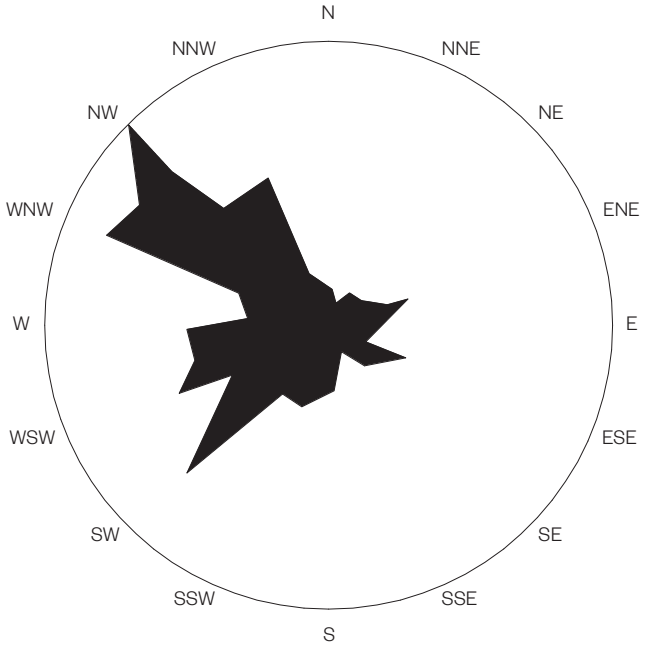
0 5km

The average daily mean temperature ranges from 25° in summer to 13° in winter. The daily relative humidity fluctuates between 65% in the daytime and 85% at night in the summer, and between 60% and 80% respectively in winter.



Temperature

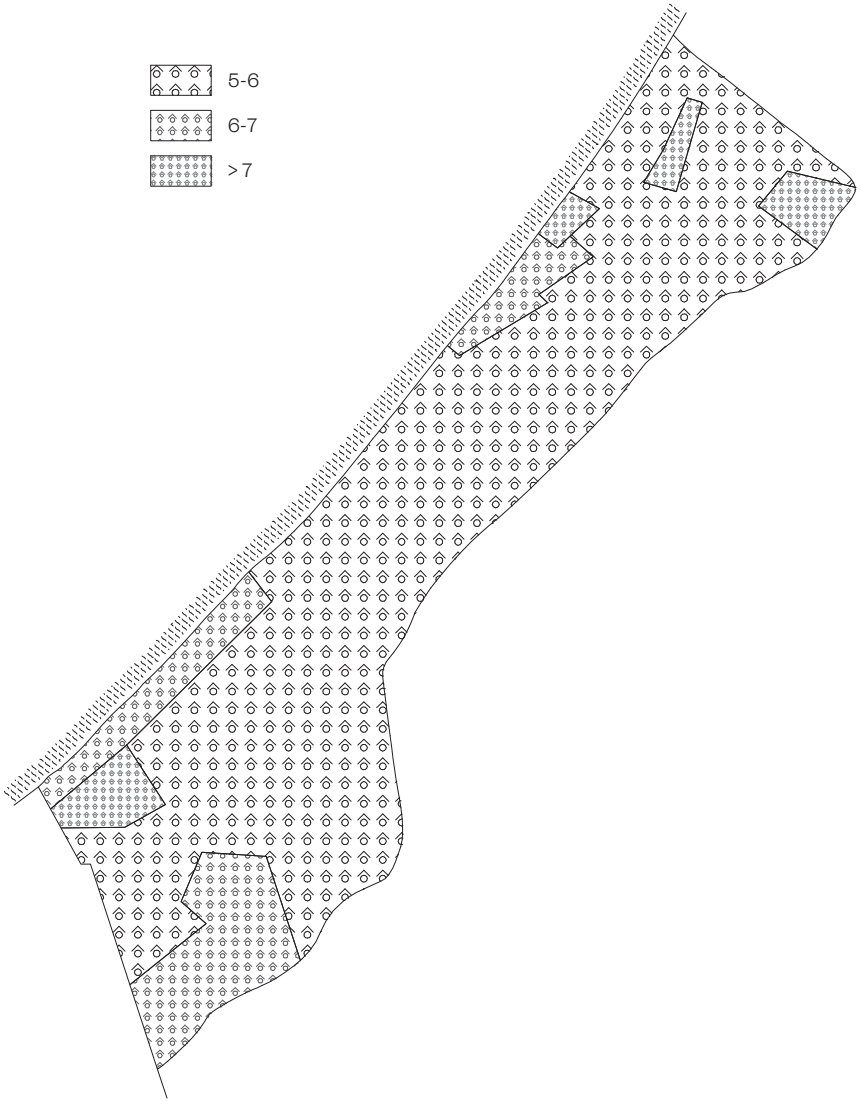
Gaza has a typical Mediterranean climate with dry and hot summers, followed by mild and wet winters. Rainfalls occur only during winter season which is from November to March.



Wind Direction

The north-west wind is favored during the Summer, while the south-west wind is much avoided during the winter days.

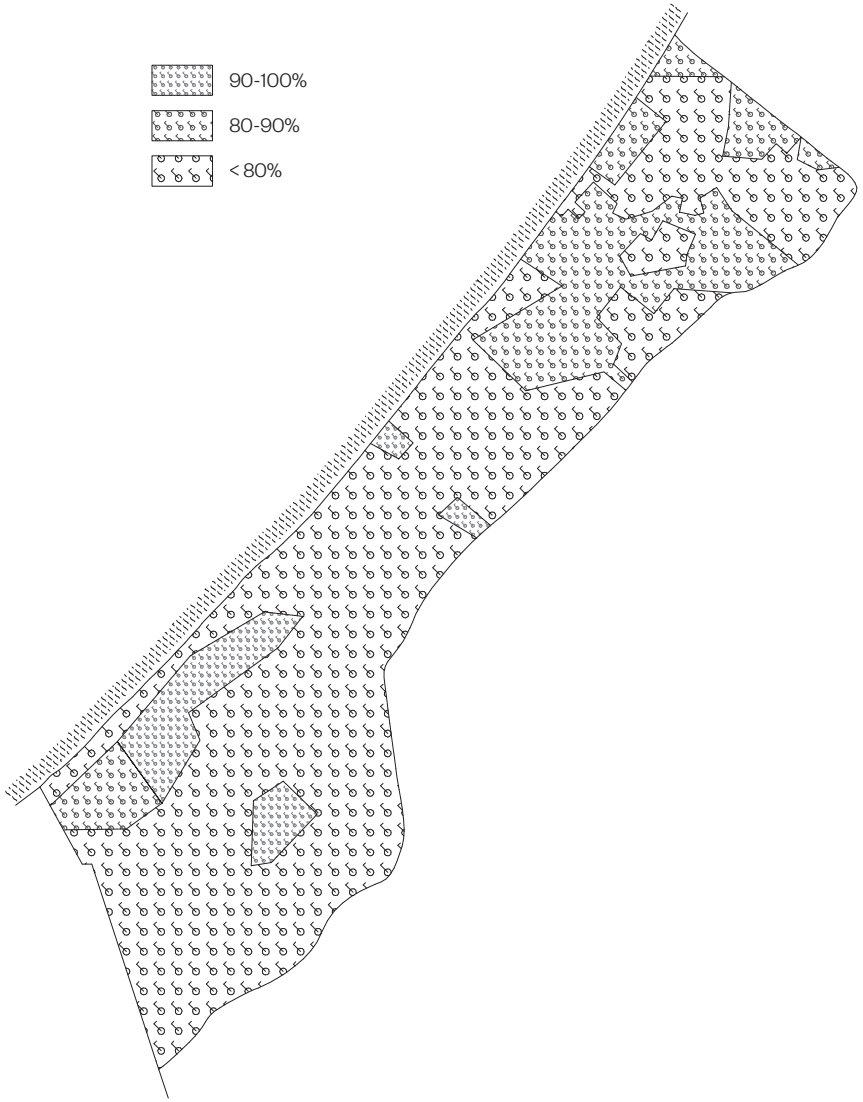
The wind directions are common most months of the year in Gaza. Mainly north-west, except the months of December, January and February, where it was recorded as south-west. The average monthly wind speed was recorded as 3.75 m/s, and the maximum wind speed recorded as 18 m/s.



Family Size

Most families in the Gaza Strip are relatively large, with family members ranging from five to seven per household.

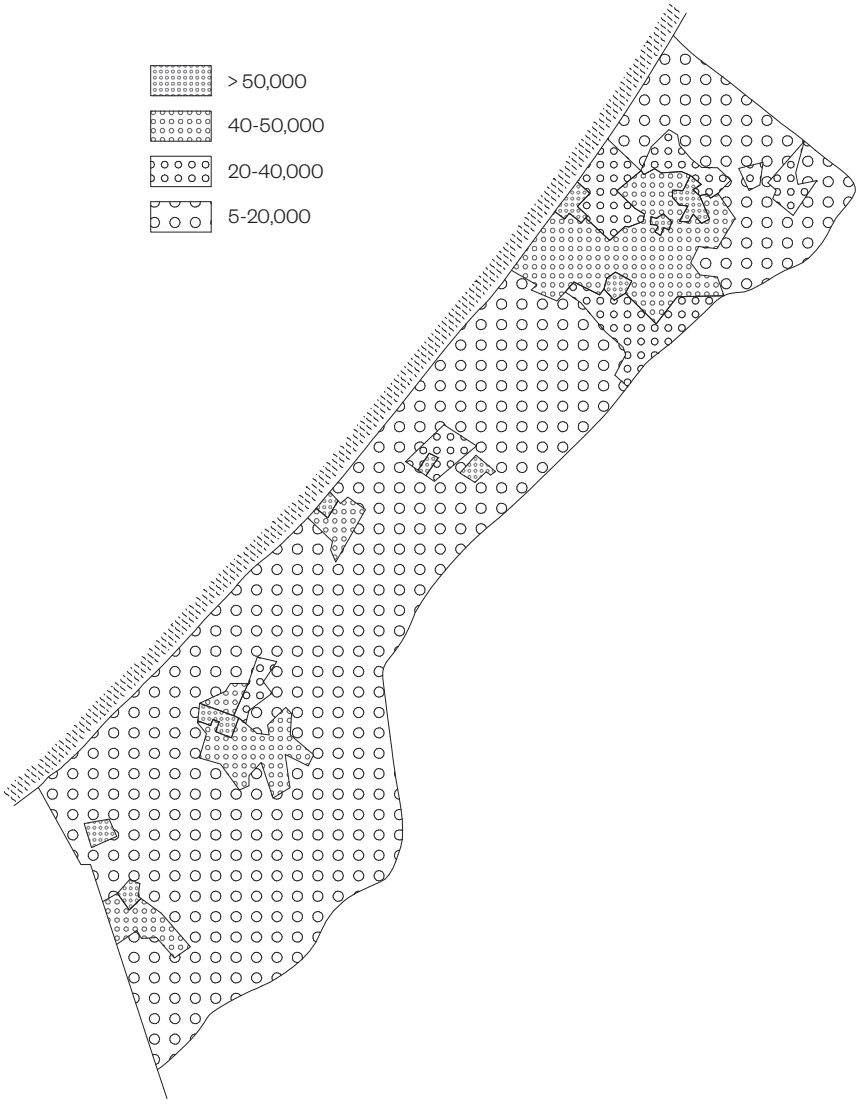
0 5km



Owned Units

Most of Gaza's families also live in homes they own, as many families have inherited the land from their forefathers.

0 5km



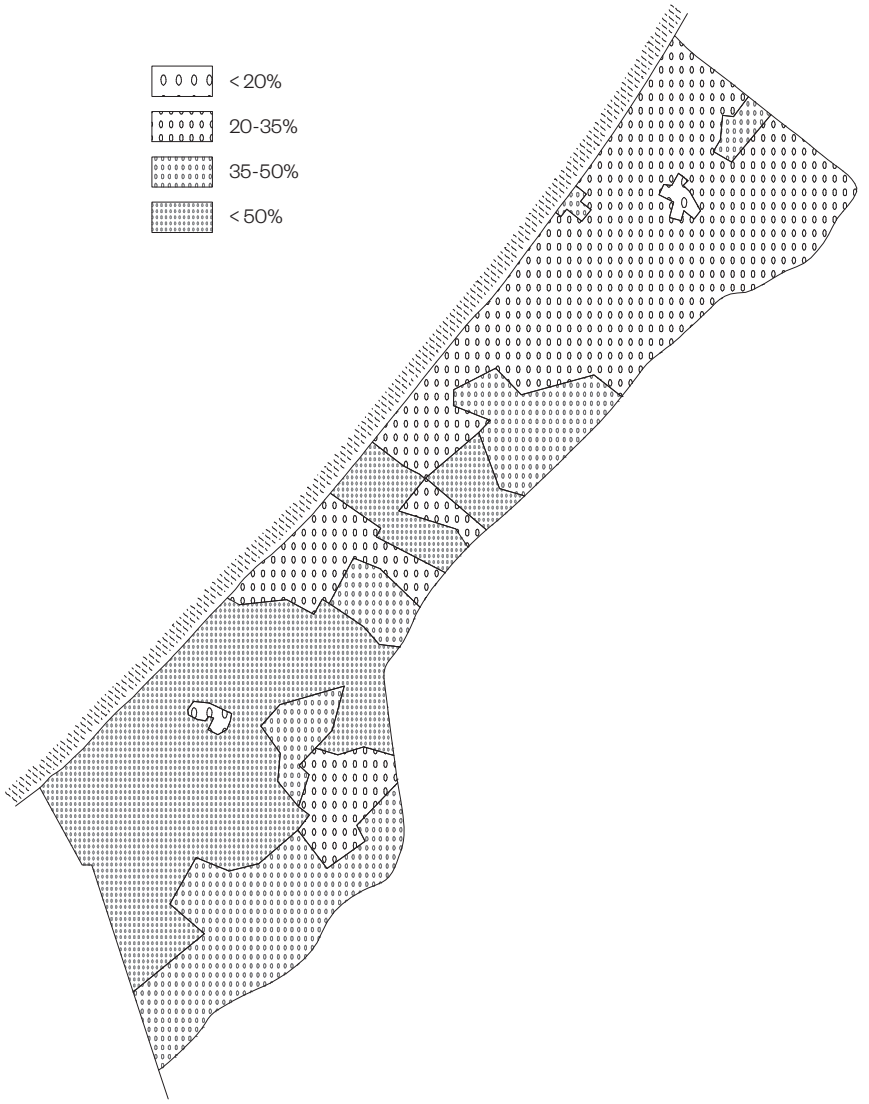
Population Density

The population density reaches in most of the refugees camps around 50,000 persons per one km² or more.

0 5km

The Gaza Strip has a high population density, at 5,500 people per km², with around two million people; half of them children and a birth rate of 160 babies per day or one every 10 minutes.

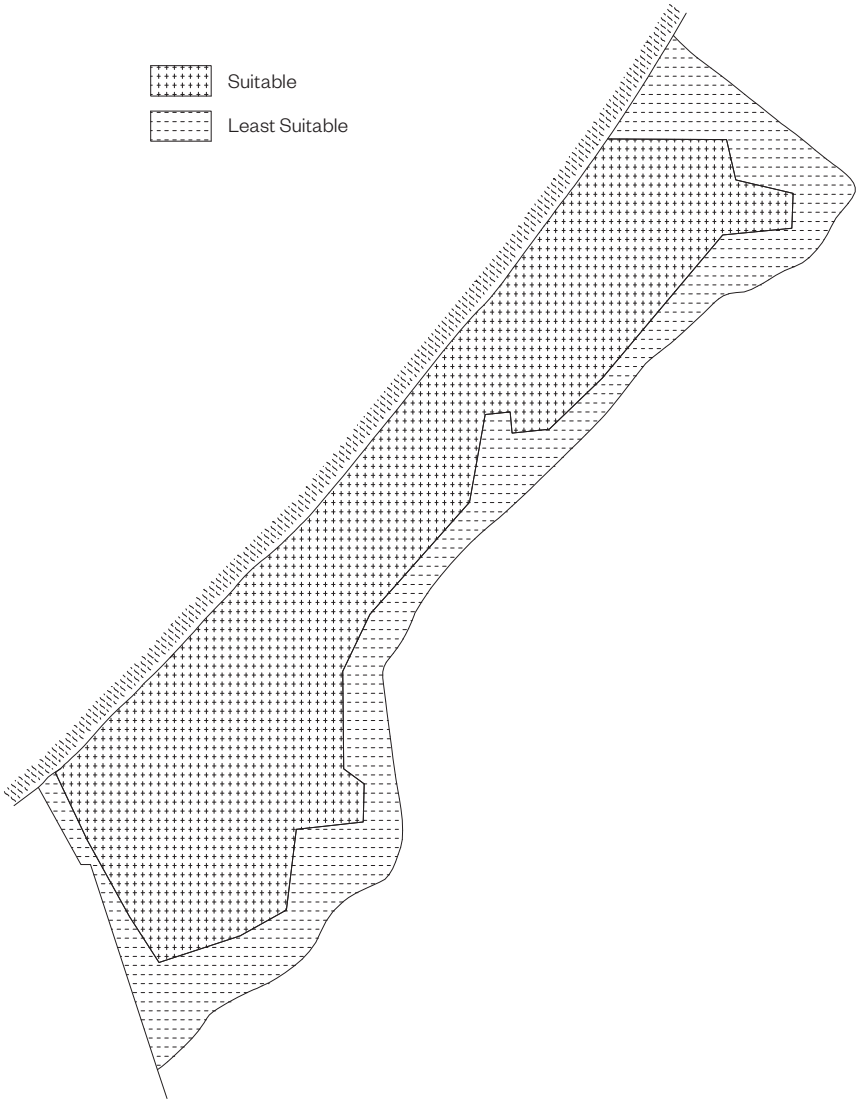
Over half of Gaza residents suffer from poverty. This high poverty rate has mainly resulted from the ongoing Israeli blockade on the Gaza Strip since 2007.



Poverty Rate

Poverty among individuals in Gaza Strip was 38.8% in 2011 while it jumped to 53.0% in 2017 with 14.2% increase.

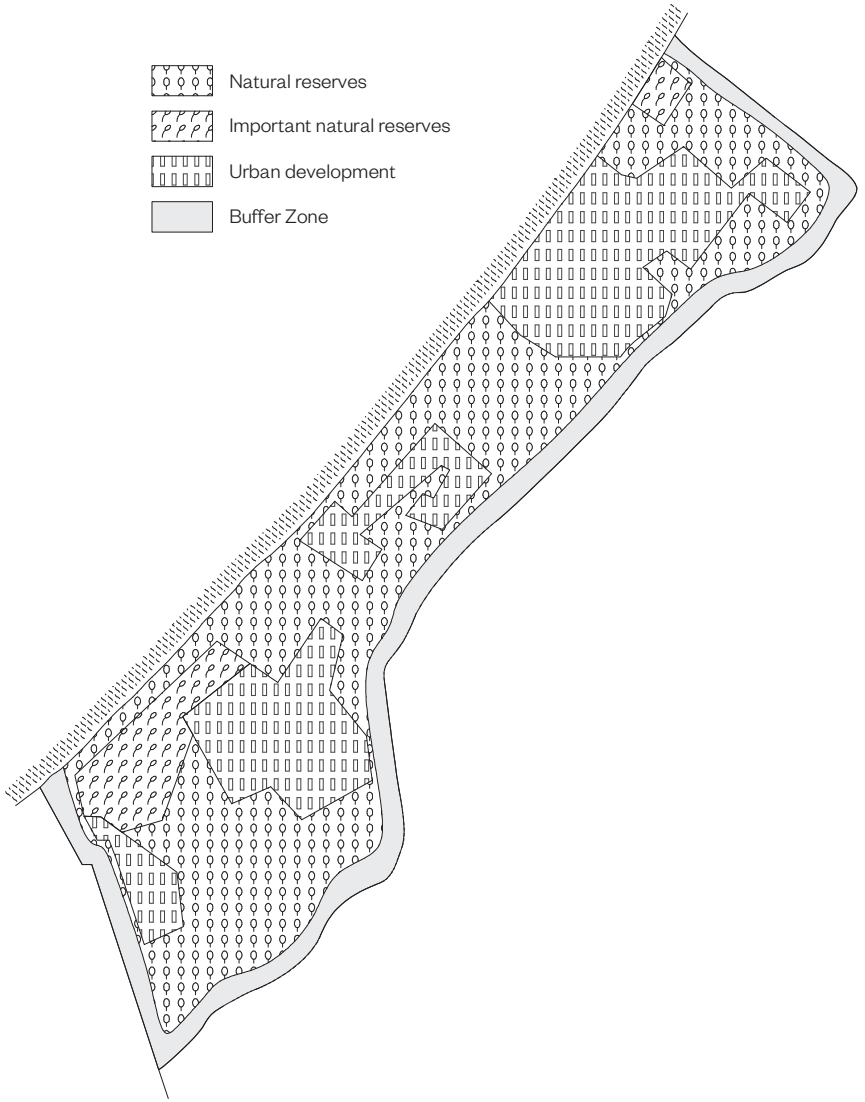
0 5km



Land Suitibility

The border areas in the Gaza Strip are considered very dangerous and less secure areas for Palestinian civilians during Israeli incursions.

0 5km

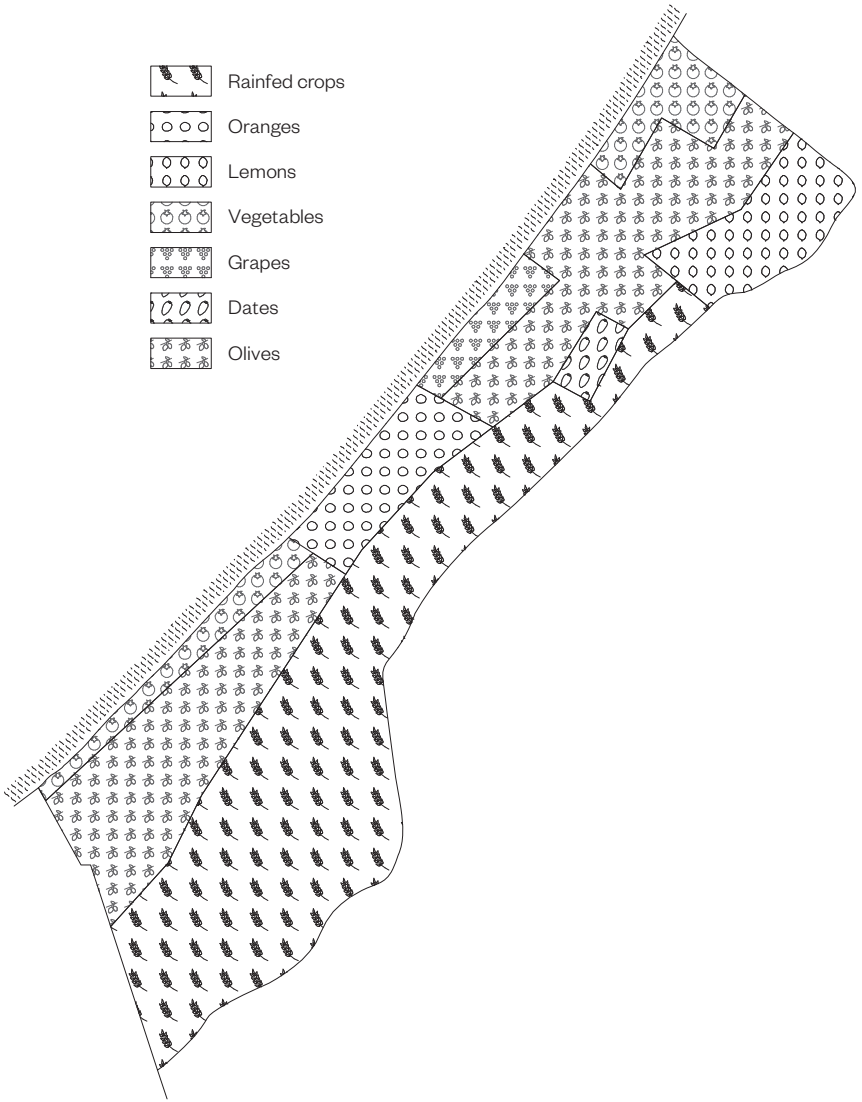


Land Usage

Gaza's most arable land is also its most dangerous. More than a third of Gaza's agricultural land is part of a buffer zone defined by Israel.

0 5km

Buffer Zones A picture showing Beit Lahyia on the Palestinian side and Ashkelon on the Israeli side. Palestinians are subject to direct fire from the Israeli army if they approach border areas.



Planting in 1984

The Gaza Strip was known for its agricultural production of citrus, olives and dates. Through the recent years, the agricultural export-oriented industry has suffered hugely.

Historically, the agriculture sector has been the largest economic sector in the Gaza Strip and still plays an important role in the economy. This role, however, has declined also by the urban sprawl and increasing conversion of agricultural land for housing.

Urban agriculture has come to be seen as incorporating important potentials for the future of Gazan agriculture, due to a yearly population growth rate of more than 3% and an urbanisation rate of 6% over the last 10 years.

Urban Agriculture

Almost all agriculture in Gaza can be considered now to be urban agriculture. Large-scale, export-oriented agricultural production becomes more difficult over time.

II

Urban Density

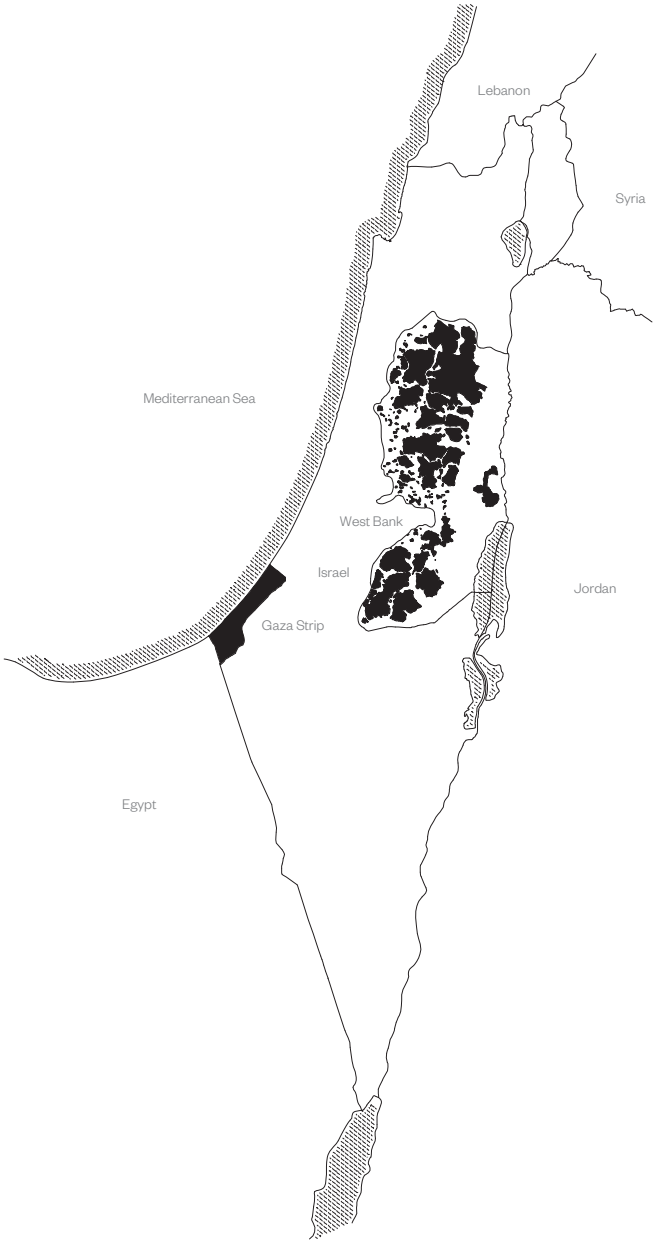
"It is neither death, nor suicide.
It is Gaza's way of declaring
that it deserves to live."

— Mahmoud Darwish

Mahmoud Darwish (13 March 1941 – 9 August 2008) was a Palestinian poet who gave voice to the struggles of the Palestinian people.

Population Growth

The very rapid population growth within a limited and non-expandable space, next to conflict-related aspects, could make Gaza a not livable place in the future.

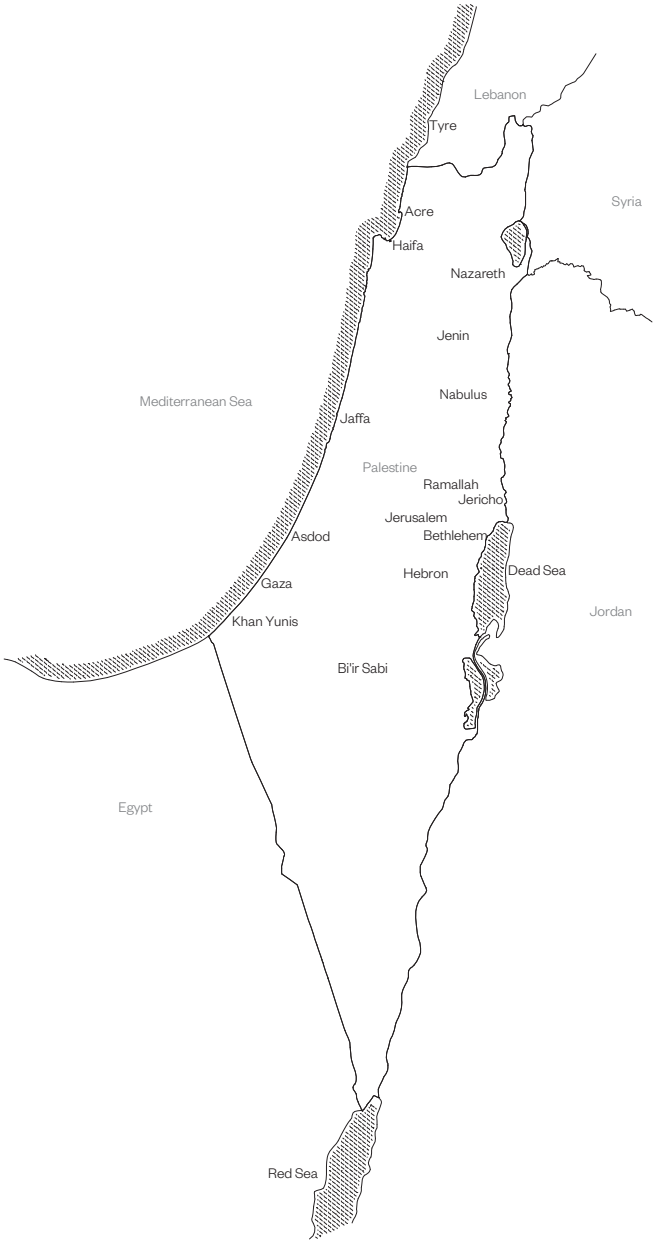


Palestinian terretories 2005

Palestinians live now within 15% of the size of the historic Palestine before 1948 while 85% of the land is now controlled by Israel.

0 50km

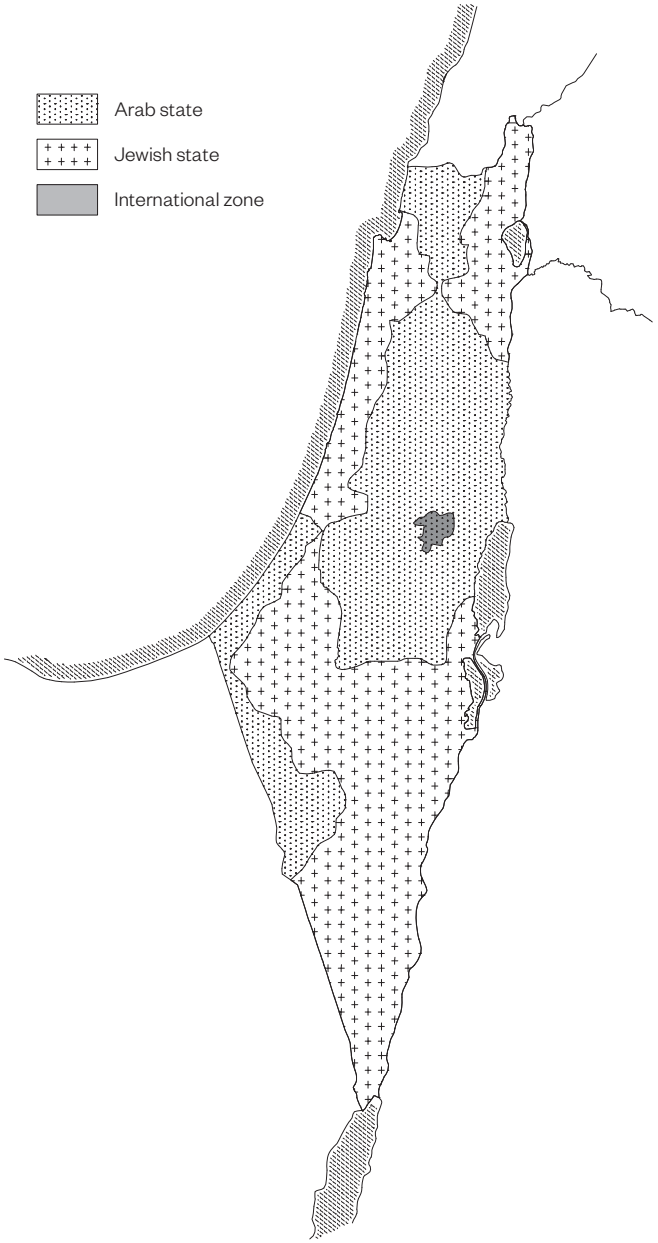
The Arab-Israeli conflict since early 20th century is one of the main causes for the demographic imbalance in the Gaza Strip. The historic area in which Palestinians have been living has shrunk dramatically since 1948.



Palestine before 1948

During their mandate for Palestine, the British promised the Jewish people to establish their own state on the historic land of Palestine.

0 50km



U. N. Partition Plan 1947

The United Nations partition proposal was accepted by the Jewish Agency for Palestine, despite its perceived limitations. Arab leaders and governments rejected it.

0 50km

1948 War

Hundreds of Palestinian towns and villages were depopulated and destroyed by the Zionist paramilitary groups.

More than 70% of the Palestinians in Gaza are refugees, expelled from their homes in other parts of Palestine in 1948 and now living just a few kilometers away from their original towns.

1948 Palestinian exodus

Palestinians left their villages to the safer areas. Back then, it seemed as if they could return to their villages within weeks, months or when the war ends, but they did not return to this day.

In 1948, the population of the Gaza region was 60,000 to 80,000. By the end of the year, at least 200,000 refugees had flooded what became now the Gaza Strip. Most of the Palestinian refugees in Gaza are unable now to return to their villages of origin or even move to live in the West Bank.

Refugees Number

Gaza transformed from a minor port and agricultural hinterland into one of the most overcrowded places on earth.

0 50km

If you can't come to town,
please telephone 4607
Lighting, Heating, Cooking, Refrigeration
CARL MARX
3 PRINCESS MARY AVE., JERUSALEM

THE PALESTINE POST
JERUSALEM
SUNDAY, MAY 16, 1948
PRICE: 25 MILS
VOL. XXIII. No. 6714

THE PALESTINE POST
THE SUBSCRIPTION DEPARTMENT
has returned to The Palestine Post
offices, Hassolel Street,
Jerusalem, Tel. 4233.

STATE OF ISRAEL IS BORN

The first independent Jewish State in 19 centuries was born in Tel Aviv as the British Mandate over Palestine came to an end at midnight on Friday, and it was immediately subjected to the test of fire. As "Medinat Yisrael" (State of Israel) was proclaimed, the battle for Jerusalem raged, with most of the city falling to the Jews. At the same time, President Truman announced that the United States would accord recognition to the new State. A few hours later, Palestine was invaded by Moslem armies from the south, east and north, and Tel Aviv was raided from the air. On Friday the United Nations Special Assembly adjourned after adopting a resolution to appoint a mediator but without taking any action on the Partition Resolution of November 29.

Yesterday the battle for the Jerusalem-Tel Aviv road was still under way, and two Arab villages were taken. In the north, Acre town was captured, and the Jewish Army consolidated its positions in Western Galilee.

Most Crowded Hours in Palestine's History

Between Thursday night and this morning Palestine went through what by all standards must be among the most crowded hours in its history.

For the Jewish population there was the anguish over the fate of the few hundred Haganah men and women in the Kfar Etzion bloc of settlements near Hebron. Their surrender to a fully equipped superior foreign force desperately in need of a victory was a foregone conclusion. What could not be known, with no communications since Thursday morning, was whether and to what extent the Red Cross and the Truce Consuls would secure civilized conditions for prisoners and wounded, and proper respect for the dead. Doubts on some of these anxious questions have now been resolved.

On Friday afternoon, from Tel Aviv, came the expected announcement of the Jewish State, and its official naming at birth, "Medinat Yisrael"—State of Israel, with the swearing in of the first Council of Government. The proclamation of the State was

der of Jewish settlements in North-Eastern Galilee.

The Security Council met yesterday in a special session to consider action on the invasion of Palestine by member states of the U.N.

In the afternoon, Jerusalem

JEWS TAKE OVER SECURITY ZONES

The Battle for Jerusalem, which began when the British forces withdrew on Friday morning, continued all day Friday and yesterday. The crackle of small-arms fire and explosions of mortar shells were still being heard in the early hours of this morning as the battle entered its third day.

Repeated efforts on Friday evening and again on Saturday by the U.N. Truce Commission to bring about a "cease fire" were brought to nought when the Arab representatives failed to agree within the specified time limit.

On Friday morning, Jewish forces entered the Russian Compound and Zone C to reoccupy the buildings requisitioned from Jews last year. This operation was almost bloodless, but beyond the

Egyptian Air Force Spitfires Bomb Tel Aviv; One Shot Down

Kol Israel, the Tel Aviv broadcasting station, reported at 2 o'clock yesterday afternoon that Tel Aviv had been bombed three times in the previous evening and morning, and that one plane had been shot down and its Egyptian pilot taken prisoner.

In the first raid, four planes attacked from a height of 300 feet. Two dropped bombs, while the others strafed the city. Little damage was caused. In the second attack two hours later, the airport to the north of the city was bombed, and an Air France plane parked there was damaged. The third raid was launched shortly before midday, but the planes were driven off without causing any damage.

Two settlements in the Negev had also been attacked from the air, the radio reported.

A country-wide blackout was ordered by Air Raid Precaution Headquarters in Tel Aviv.

Mr. David Ben Gurion, the Prime Minister, broadcast from Tel Aviv to the people of America yesterday morning. As he spoke, Egyptian planes were bombing the city.

In the north, the settlements of Ein Gev and Shaar Hagolan and Dan had been shelled, but no further details were available.

Kalandia airfield was taken by the Jewish army on Friday morning, shortly after the High Commissioner had left there by plane for Haifa. The field was evacuated, together with the neighbouring settlement of Ataroth, on Friday night. The settlement itself was burnt by Arabs yesterday.

U.S. RECOGNIZES JEWISH STATE

WASHINGTON, Saturday.—Ten minutes after the termination of the British Mandate on Friday, the White House released a formal statement by President Truman that the U.S. Government intended to recognize the Provisional Jewish Government as the *de facto* authority representing the Jewish State.

The U.S. is also considering lifting the arms embargo but it is not known whether to Palestine only or the entire Middle East, and the establishment of diplomatic relations with the Jewish Provisional Government.

The White House press secretary, Mr. Charles Ross, told correspondents today that reaction so far to the recognition had been

Proclamation by Head Of Government

The creation of "Medinat Yisrael", the State of Israel was proclaimed at midnight on Friday by Mr. David Ben Gurion, until then Chairman of the Jewish Agency Executive and now head of the State's Provisional Council of Government.

David Ben Gurion, Prime Minister

The first act of the Council of Government, as announced by its head, was to abolish all legislation of the 1939 White Paper of the late Mandatory Power, particularly the Ordinances and Orders relating to immigration and land transfer.

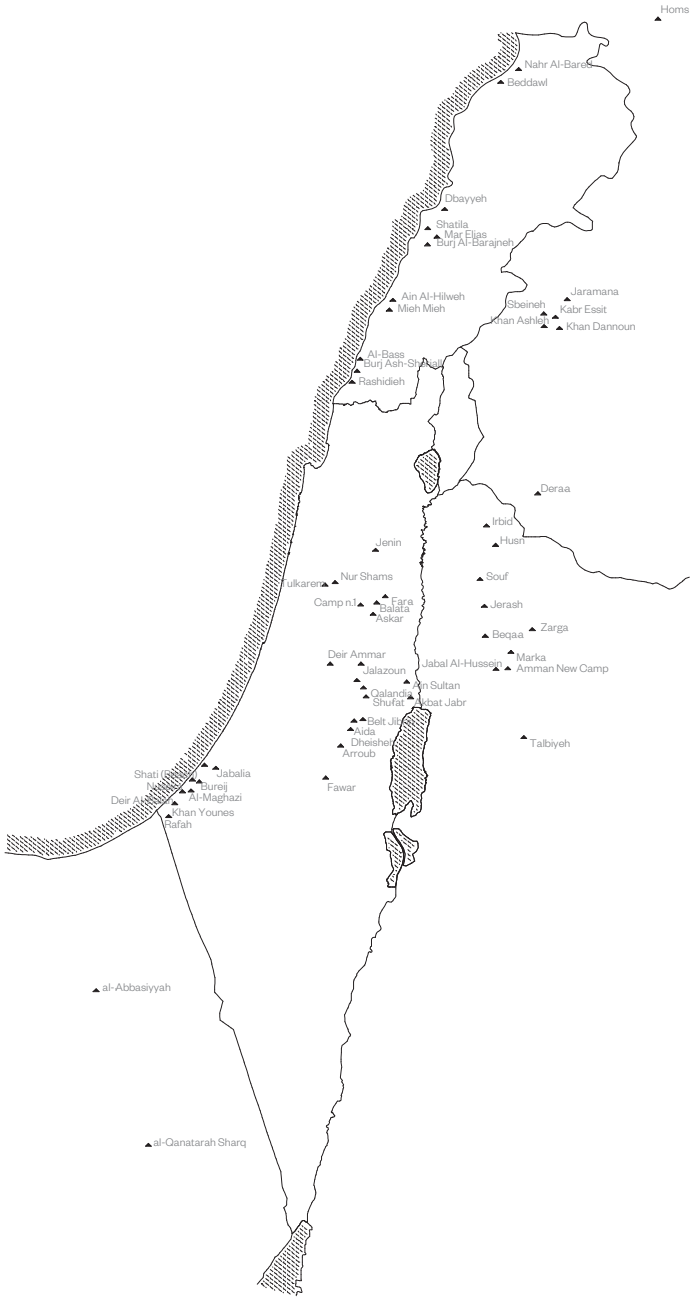
In the declaration of independence, Mr. Ben Gurion called on the Arabs of Palestine to restore peace, assuring them full civic rights and full representation in all governmental organs of the State.

Mr. Ben Gurion prefaced the declaration with a review of the historic connection of the Jewish people with the Land of Israel and of their

Al-Nakba The Israelis celebrate the establishment of the State of Israel on May 14 every year, while Palestinians mark this day as the day of the catastrophe or Al-Nakba.

Balata Camp
1950

A picture showing Balata refugee camp in the city of Nablus, West Bank, in its early days, where all the families were living in temporary tents.



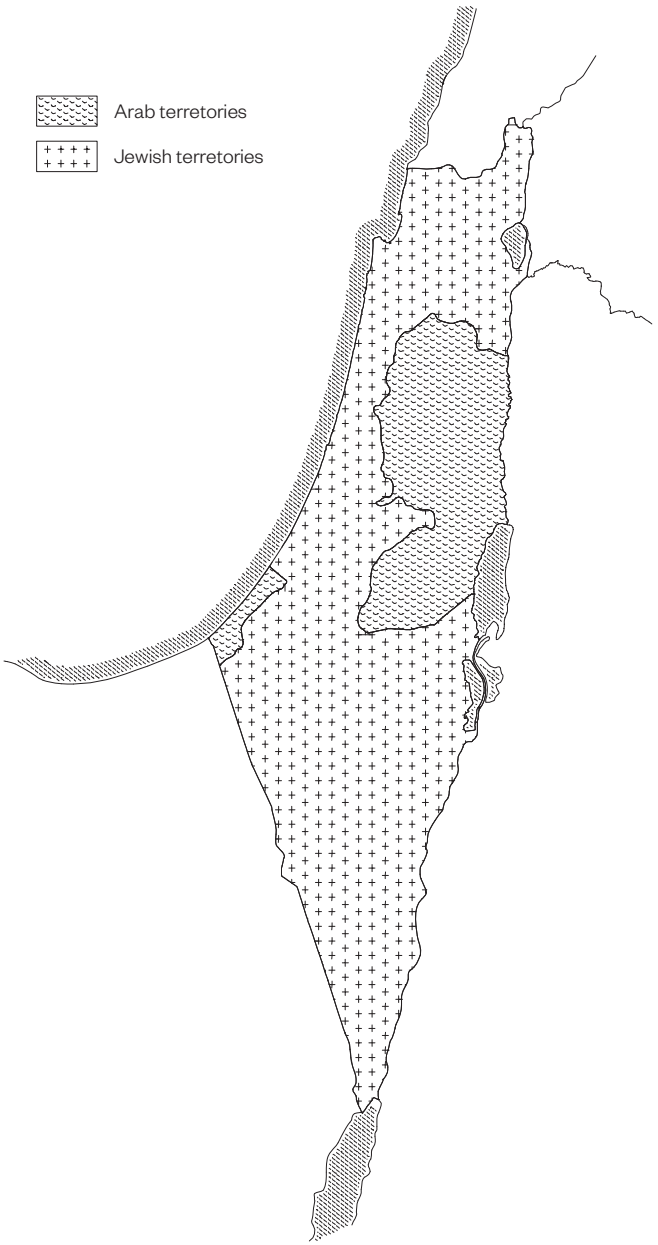
Refugee
Camps

Palestinian refugee camps spread since 1948 within the current Palestinian territories or in neighboring Arab countries.

0 50km

Balata Camp
2014

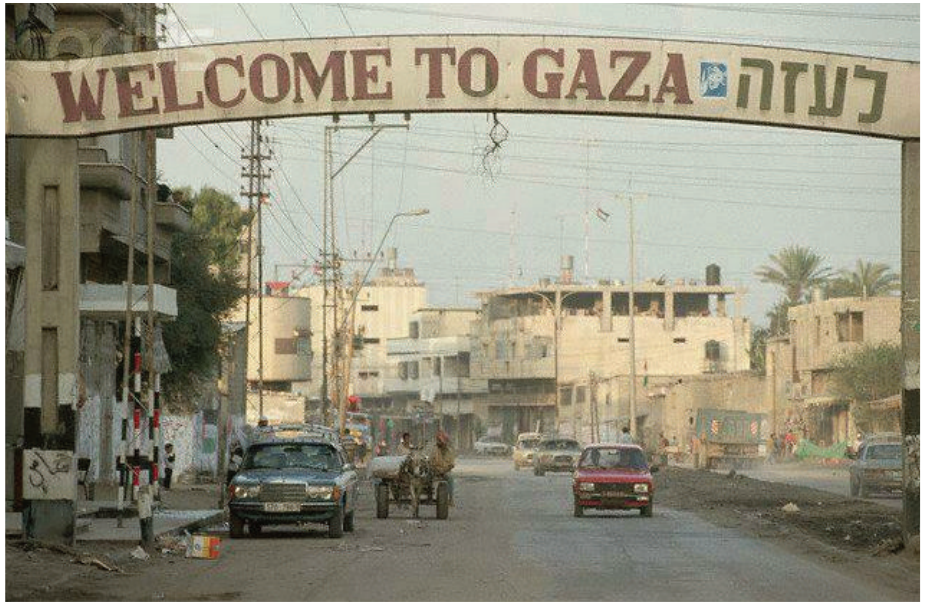
Over the years, Palestinian refugee camps became densely populated residential blocks within Palestinian and Arab cities.



Green Line — Following the 1948 Truce, the United Nations defined the borders known as the Green Line between Arab and Israeli areas that lasted from 1949 until the Six-Day War in 1967.

In 1967, Israel has occupied the Sinai Peninsula, Gaza Strip, West Bank, Old City of Jerusalem, and the Golan Heights; the status of these territories subsequently became a major point of contention in the Arab-Israeli conflict.

Six-Day War — A picture of Israeli soldiers inside Gaza City after being taken over during the Six-Day War between Israel and the Arab armies of Egypt, Syria and Jordan.



Gaza under Occupation

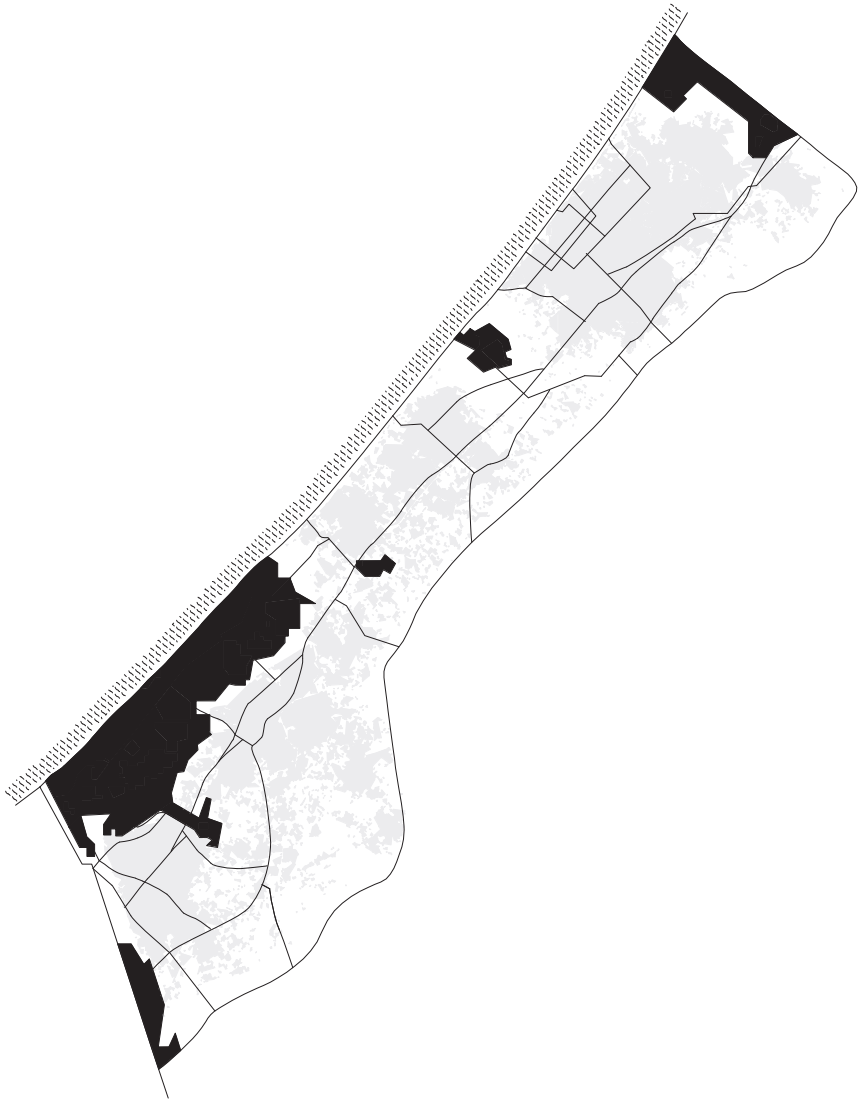
Israel controlled the Gaza Strip through a series of military and administrative orders that affected economy, education and health sectors.

"What occupied territories? If you mean Judea, Samaria, and the Gaza Strip, they are liberated territories. They are part, an integral part, of the Land of Israel."

— Menachem Begin
May, 1977

Menachem Begin (16 August 1913 – 9 March 1992) was an Israeli politician, founder of Likud party and the sixth Prime Minister of Israel.

In addition to the administrative and military control, Israel has seized vital areas within Gaza and built settlements for Israeli citizens.



Israeli Settlements

Israeli settlements were systematically isolated from the Palestinians, while being connected through road networks to Israeli cities.

0 5km

The settlements were isolated areas surrounded by a buffer zone, barbed wire fences and military observation towers that used to shoot at any Palestinian approaching.

Netzarim An aerial photo taken from 2004 showing the Israeli settlement of Netzarim alongside the Mediterranean Sea in the central Gaza Strip.

Israel has set up checkpoints along the Gaza Strip on security grounds and to protect settlers' security.

Checkpoints Israeli checkpoints between settlements were a hard reality that affected each Palestinian.

Gazans were often forced to use other paths to reach other Palestinian areas inside Gaza.

Roads Closure Many Gazans, of whom employees and workers, used to cut off the coast of the Gaza Sea in the morning to reach other parts of the Gaza Strip.

Ganei Tal,
Gush Qatif

Until 2005, around 8,000 Israeli settlers have lived and worked next to one and a half million Palestinians inside the Gaza Strip.

Palestinians and Israelis lived in the same geographical area but in completely different spatial parameters.

Gush Katif

Beach Camp

"We are disengaging from Gaza because of demography."

— Shimon Peres
August, 2005

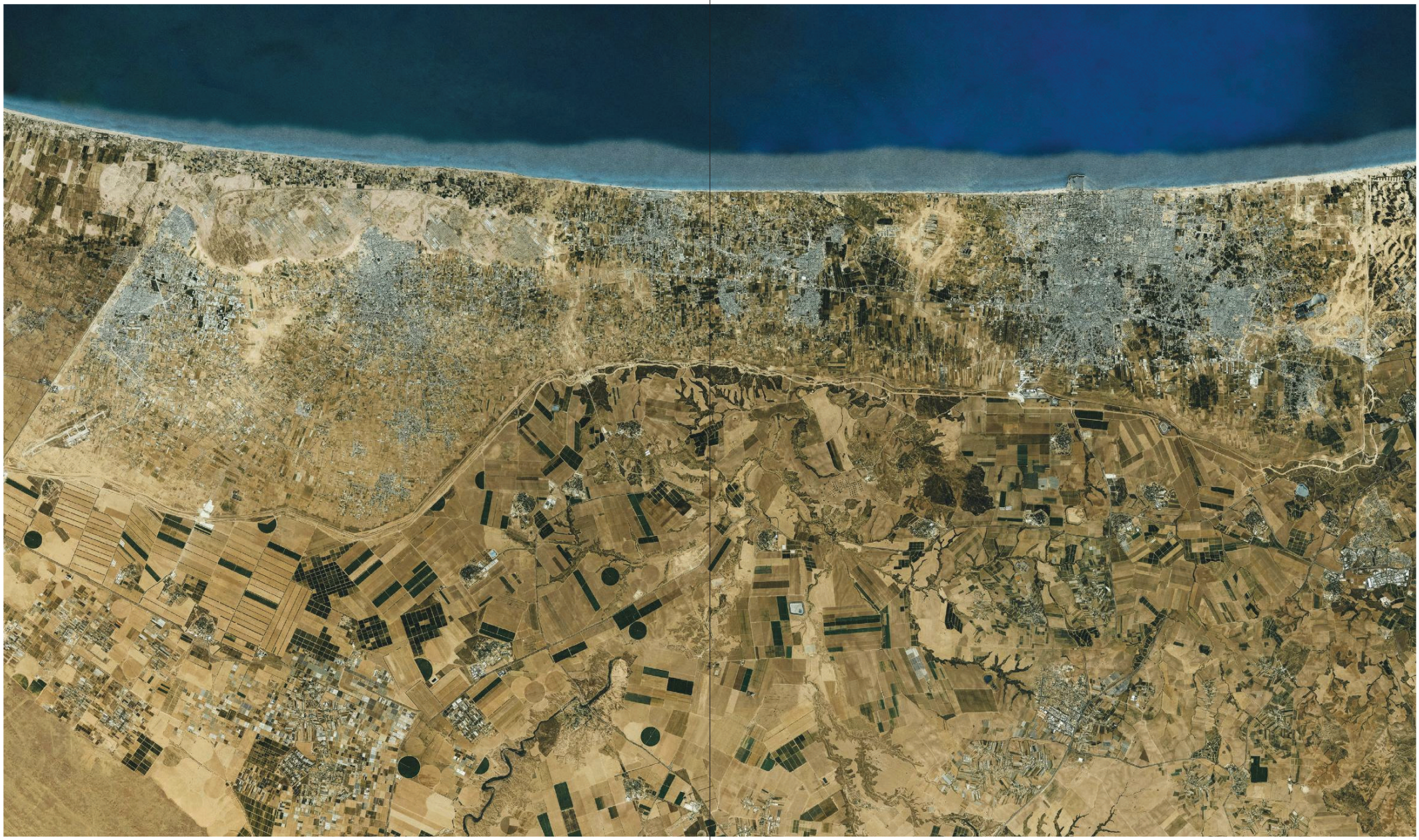
Withdrawal

Shimon Peres (2 August 1923 – 28 September 2016) was an Israeli politician who served as the ninth President of Israel and was considered the last link to Israel's founding generation.

In May, 2005, the Israelis decided to leave due to the demographic imbalance between the Israeli and Palestinian populations living inside the Gaza Strip.

Settlements Demolishing

Israel has systematically demolished all structures within the settlements, including settler homes and synagogues.



Gaza Strip after Israeli Withdrawal

An aerial picture of the Gaza Strip after the Israeli withdrawal in 2005 showing the demolished areas of the former Israeli settlements.

Withdrawal Two Palestinian boys look at a demolished Synagogue as they celebrate the Israeli withdrawal in Netzarim Settlement.

A whole generation of the Palestinians in Gaza saw new parts of the Gaza Strip for the first time in their lives, since it was occupied in 1967.

III

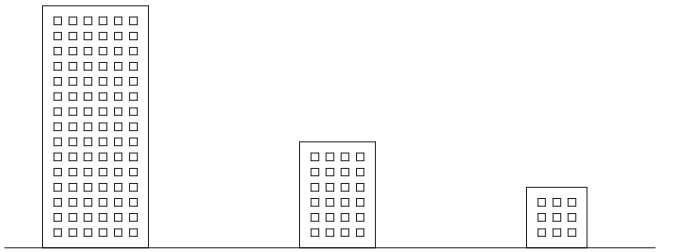
Housing Shortage

"The housing shortage in Gaza continues to be an issue of concern. The housing shortage has increased from 71,000 housing units in 2012 to 120,000 today, mainly due to natural population growth alongside the conflict-related reconstruction efforts."

— United Nations Country Team in the occupied Palestinian territory
July, 2017

A project of 120,000 housing units is a city of almost half a million inhabitants where 13,000 housing units are needed to be built per year in order to meet the population growth.

Until 2050, with a population of five million, around 500,000 housing units are needed to be built in Gaza.



4,000
High-Rise
15 Floors
150 Units per Building

18,000
Mid-Rise
6 Floors
30 Units per Building

170,000
Low-Rise
3 Floors
3 Units per Building

Gaza 2050

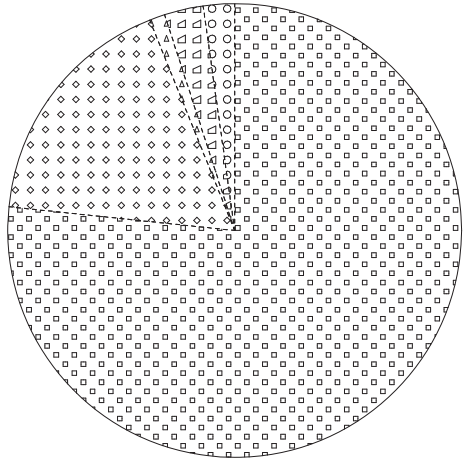
High-rise housing seem logical due to the lack of space, however, these types of buildings are not very common in the Gaza Strip.

Al-Dar

70% of the Gazans live in the so-called "Dar" which is a private family house that ranges from 1-4 apartment floors, that are typically similar.

The fast spread of this housing typology has shaped over the last decades the urban form of the Gaza Strip.

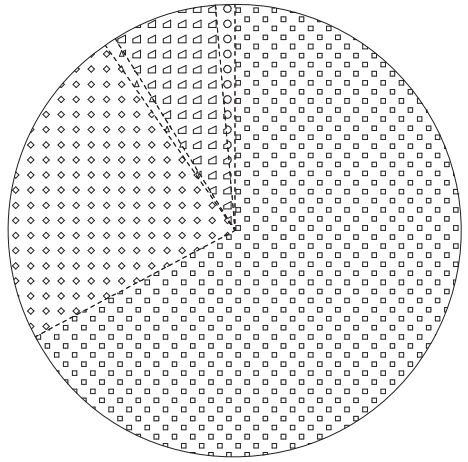
House – 76.7%
Collective Housing – 17.3%
Villa – 1.2%
Facility – 2.7%
Other – 2.1%



Typologies
1997

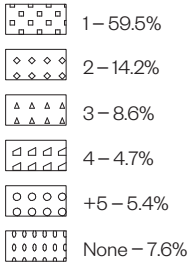
In 1997, Around 77% of the structures in Gaza were single-family houses.

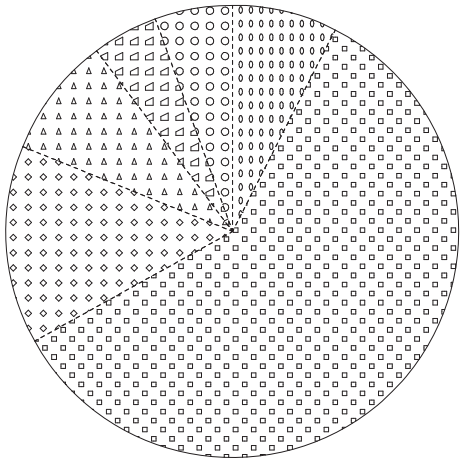
House – 67.3%
Collective Housing – 23.2%
Villa – 0.7%
Facility – 7.6%
Other – 1.2%



Typologies
2007

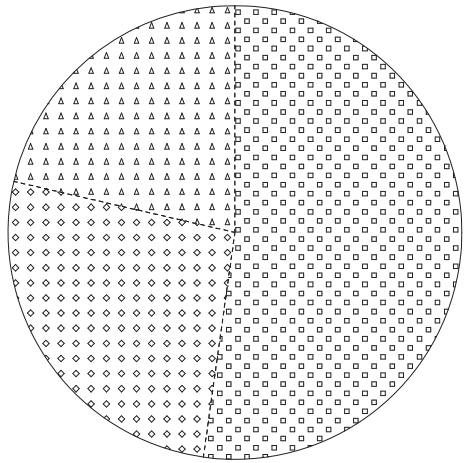
This typology has transformed with time to a form of multi-family houses.





Units per Building 2007

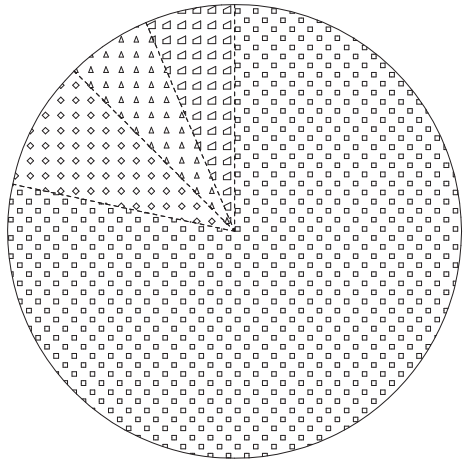
The typology is usually built for one single-family, even though many related families share the same house.



Stories per Building 2007

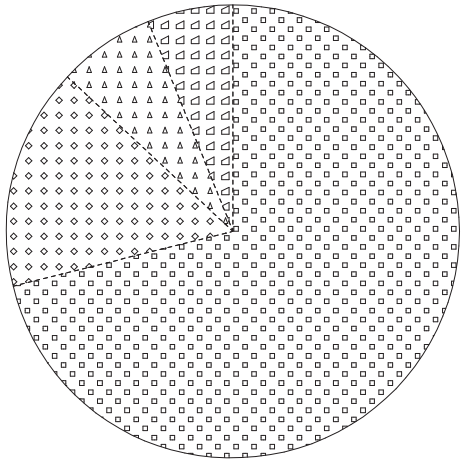
The number of floors varies between 1-3, mainly because of the family financial status and structural limitations.

Residential – 78.4%
Mixed Use – 9.3%
Work – 6.1%
Other – 6.2%



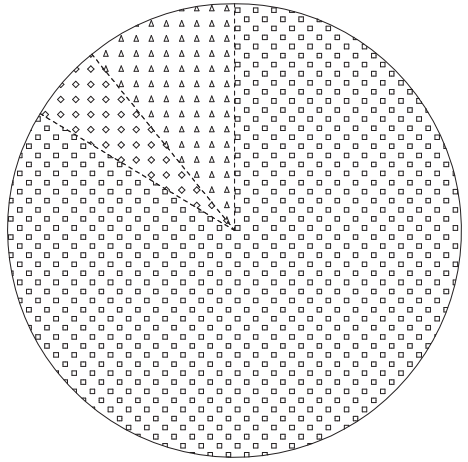
Usage 1997 In urban areas, ground floors were usually used or rented for commercial purposes.

Residential – 71.3%
Mixed Use – 15.7%
Work – 7.1%
Other – 5.9%



Usage 2007 This usage of mixed-used spaces has increased slightly in the recent years.

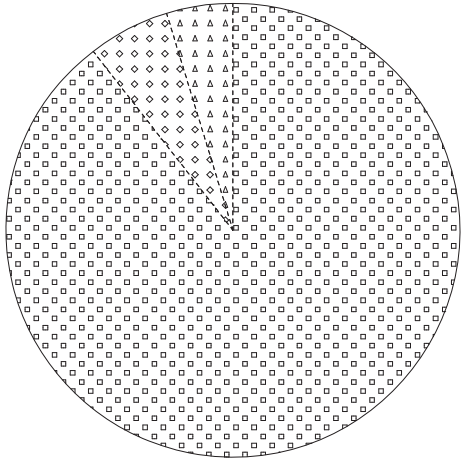
Private – 83.7%
Rental – 5.6%
Granted – 10.7%



Units
Ownership
1997

Most of the families own the unit they live in. Rental units are less common in Gaza.

Private – 89.5%
Rental – 5.8%
Granted – 4.7%

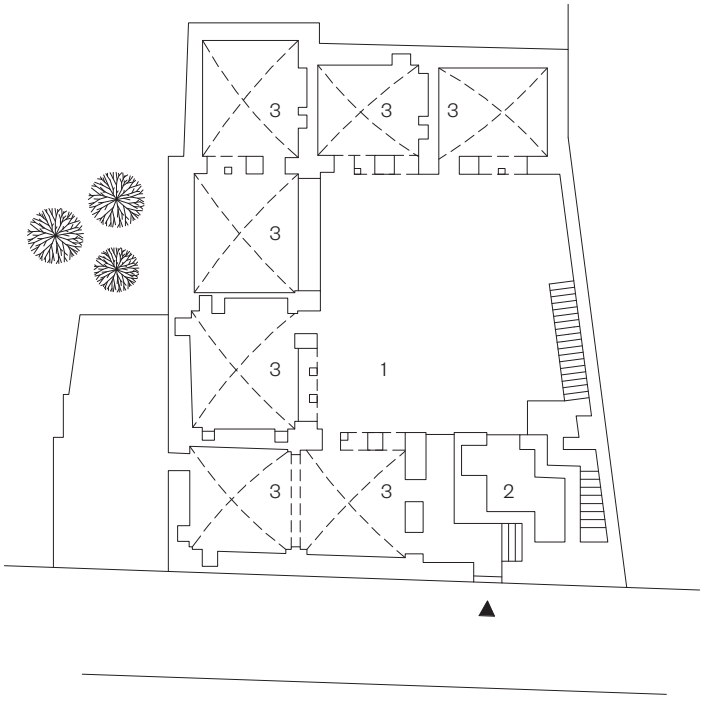


Units
Ownership
2007

Owned units have also increased in the past years. Most families tend to own the unit they live in.

The house typology went through many developing stages in the history. One of them is the traditional Arab house.

This typology was characterized by its inner courtyard, which used to be the central space in the house.



1 Courtyard
2 Kitchen
3 Multifunctional Room

1800s

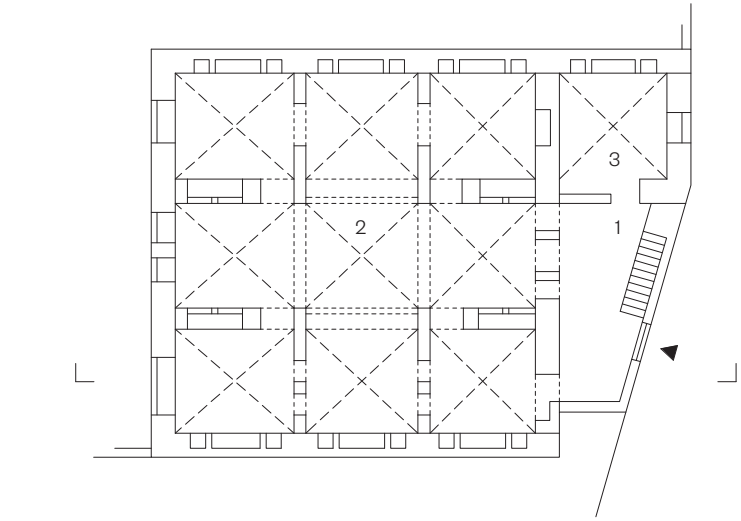
The traditional Arab house was a common typology during the Ottoman rule of Gaza until early 1900s.

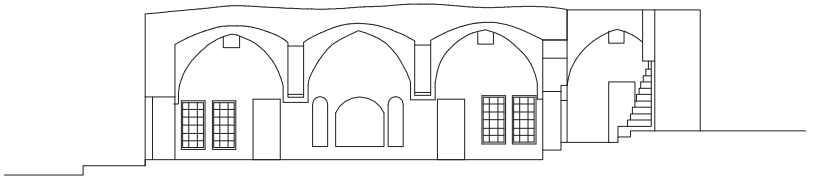
Inner Courtyard

The courtyard was used as an extended space to all other rooms in the traditional Arab house.

0 5m

Early 1990s, central architectural spaces were more likely to be roofed. This has allowed more flexibility in the usage of space.





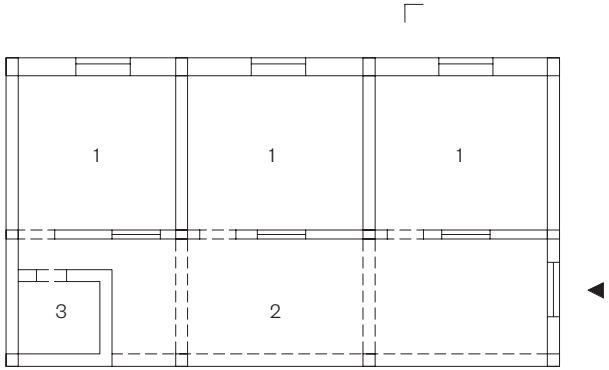
1 Courtyard
2 Liwan
3 Kitchen

Liwan House

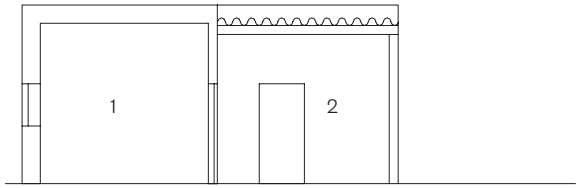
Liwan is a long central narrow-fronted hall, which is typically opened to a courtyard.

0 4m

Extendable space within the house was also found in other simple typologies in Gaza.



Floor Plan



Section

1 Room
2 Living Area
3 Secondary Room

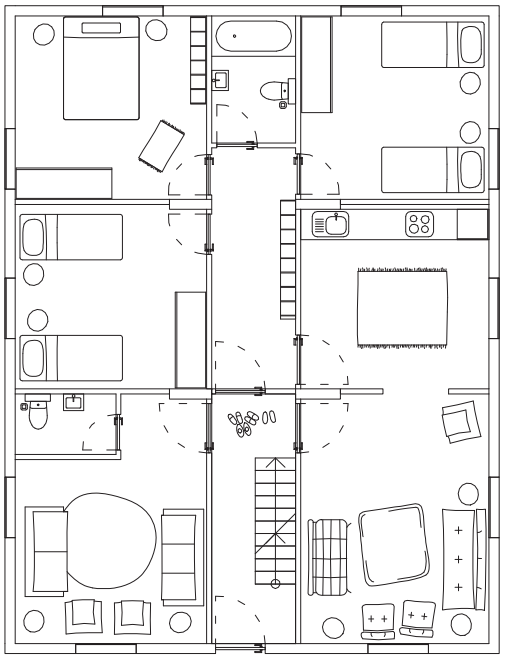
1940-1980 Many Gazan families tend to build simple house forms, as these allowed more variations of the space definition.

0 4m

Living spaces were less defined by an explicit function. The central position of these spaces has allowed them to become multifunctional.

Extended Space All rooms were usually opened to a semi-open space, that served as a multifunctional living area in the house.

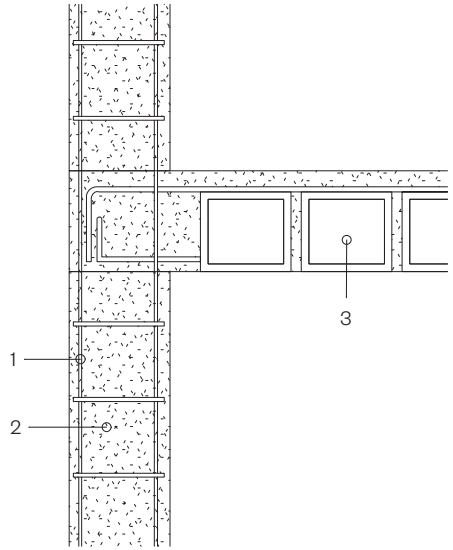
Since early 1990s, a new typology has become the most popular housing form in Gaza. A stairwell as a new element has allowed growing families to extend their living space vertically.



1990

A stairwell, a specified definition of all functions and two separate living rooms were the most noticeable changes in this typology.

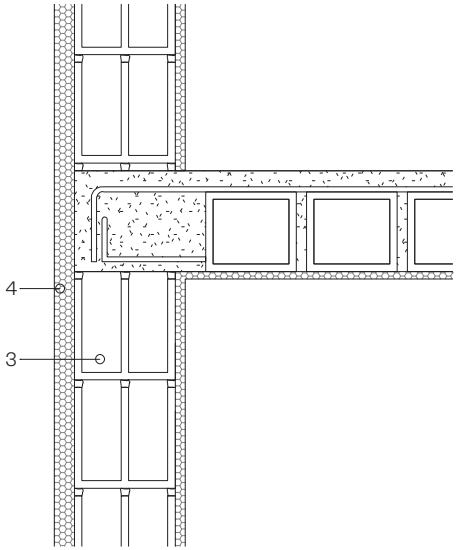
0 2m



1 Steel
2 Reinforced Concrete
3 Concrete Blocks

Cast-in-situ

A reinforced concrete support structure is built first with the help of a wood framework. This is typically done by local construction firms.

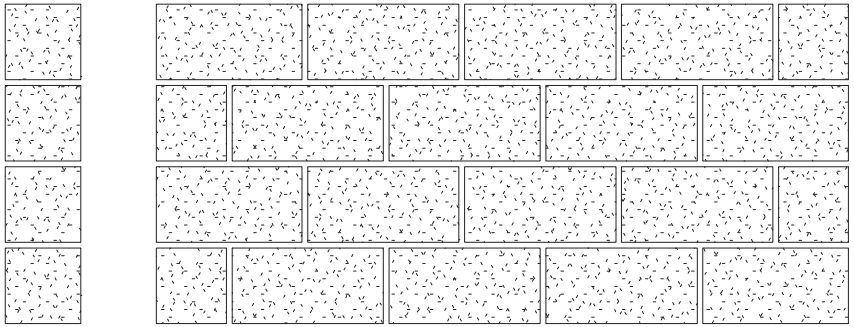


3 Concrete Blocks
4 Plaster (Optional)

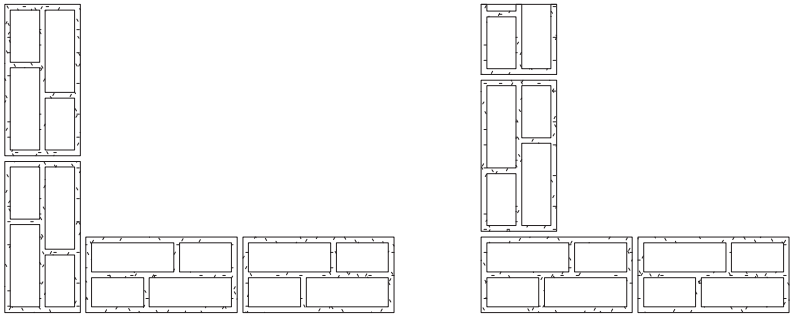
Bearing Walls

Concrete blocks are placed later for the creation of load-bearing walls. To some extent, this is usually done the users themselves.

The running bond pattern is the most used one today in Gaza. This pattern system is consisted typically of 40x20cm blocks.



Side View



Horizontal
Cut

Gazans became very familiar with this type of construction, as this is used in most of structures found in Gaza.

Multi-floor Houses

Families start with a basic one-level concrete frame structure, which allows later for an extend number of floors.

Concrete is produced mostly by local factories, while the basic materials are imported through Gaza's border crossings with Israel.

Building Materials

Cement is considered as the main construction element, however, this essential building material is now hard to get in Gaza.

Since 2007, Gaza has been living under a blockade, where people and goods are prevented from freely entering and leaving Gaza by land, sea or air. This severely limits basic necessities like food, medicine and building materials from getting into Gaza.

"The closure of Gaza suffocates its people, stifles its economy and impede reconstruction effort, it is a collective punishment for which there must be accountability."

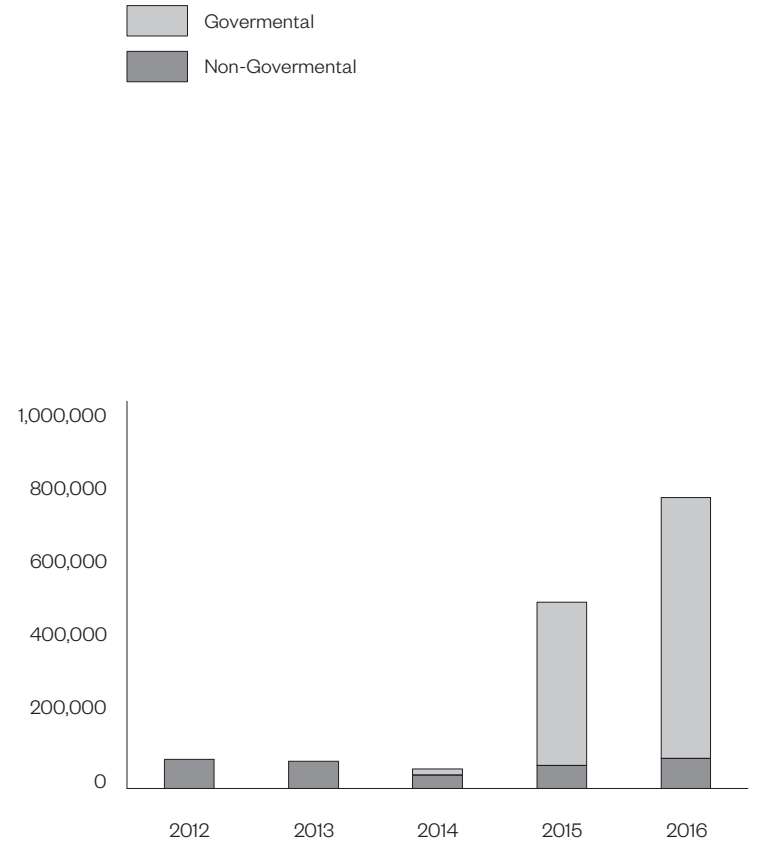
Ban Ki-Moon
June, 2016

Ban Ki-moon (13 June 1944 –) is a South Korean diplomat who was the eighth Secretary-General of the United Nations from January 2007 to December 2016.

Israel has denied also the free entry of building materials into Gaza since 2009, while accusing certain movements in Gaza of using cement and steel to build military tunnels towards Israeli areas.

Building Materials

Palestinians smuggling construction materials from Egypt through tunnels into the Gaza Strip.



Cement Import

After 2014 war, Israel allowed the entry of building materials, but only through international institutions and organizations, in cooperation with Palestinian governmental institutions.

2014 War

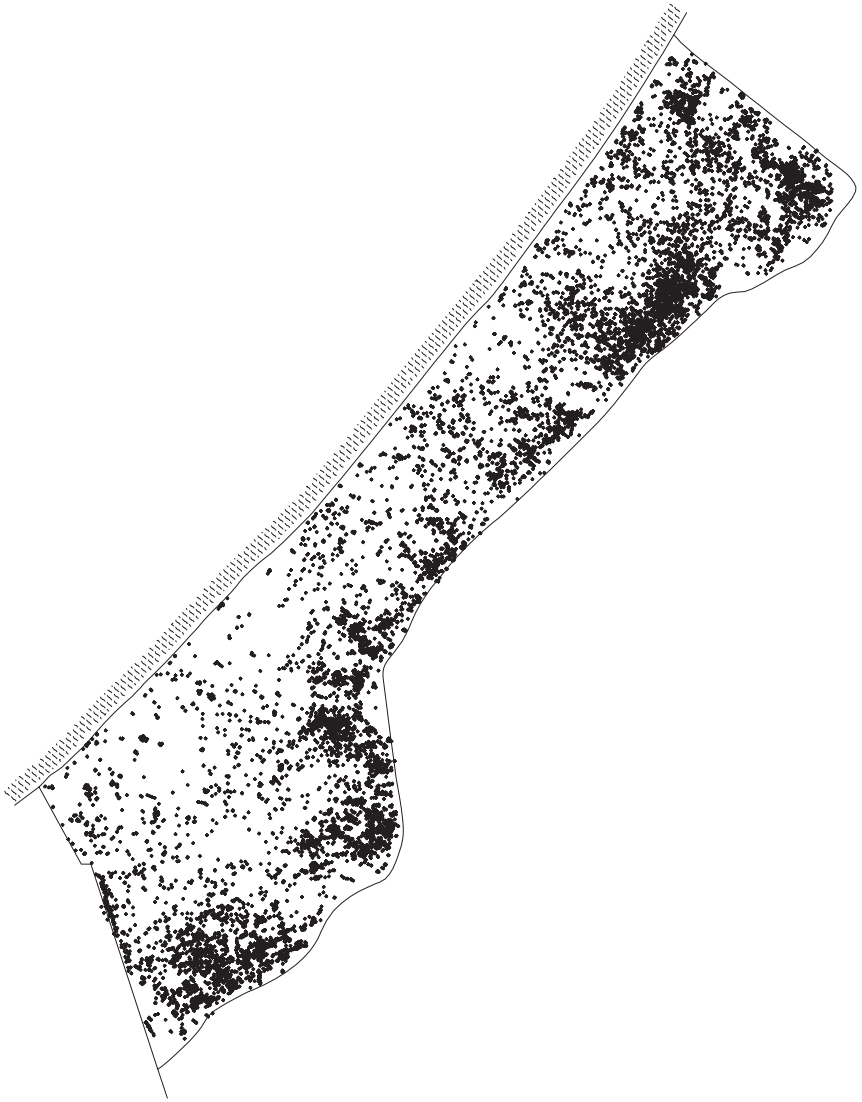
In July 2014, Israel launched its third and most massive military action in a period of less than six years on the Gaza Strip.

The United Nations has accused Israel of using disproportionate force during the 2014 Gaza war.

Shuja'iyya
Neighborhood

2009
Damage

22 Days, more than 3,400 Palestinian families had their homes completely destroyed.



2014
Damage

6,000 airstrikes in 51 days, many of which hit residential buildings. 24,000 housing units were destroyed in whole or part and other 150,000 had minor damages.

High-Rise Despite the few high-rise housing towers in Gaza, the war had a major negative impact on many of them, while their reconstruction required mostly an external financing from other countries.

Some countries have implemented new housing projects in Gaza. Around 18,000 housing units were built since 2009. However, these have achieved 15% only of the needed units.

Hamad City A Qatari-funded housing project has provided 2,500 units for displaced families by the war, as a part of a rehabilitation program for Gaza.

The project was built on a public land in the areas of former Israeli settlements and relatively far from overcrowded urban areas.

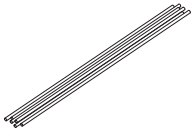
Low-Rise

Houses were the most effected building type during the wars in Gaza, mainly due to the high urban density, in which houses are about 70% of the structures.

Most of the affected structures during the 2014 war were however low-rise houses. The close proximity of the houses made them more vulnerable to Israeli airstrikes.

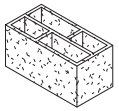
A large part of these houses were also targeted during Israel ground operations, as they were located next to border areas.

Adaptation After the war and during the first days, families had no choice but to use their destroyed houses and adapt to their condition.



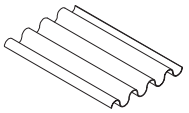
Steel Rods

Cement Bags



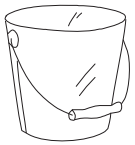
Precast Cement Blocks

Sand

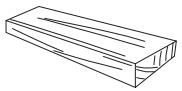


Roofing sheets

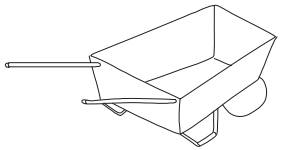
Aggregate



Buckets



Wood Panels



Wheel Barrows

Construction Elements

UN and other international organisations have handed building materials to the families to rebuild their own houses.

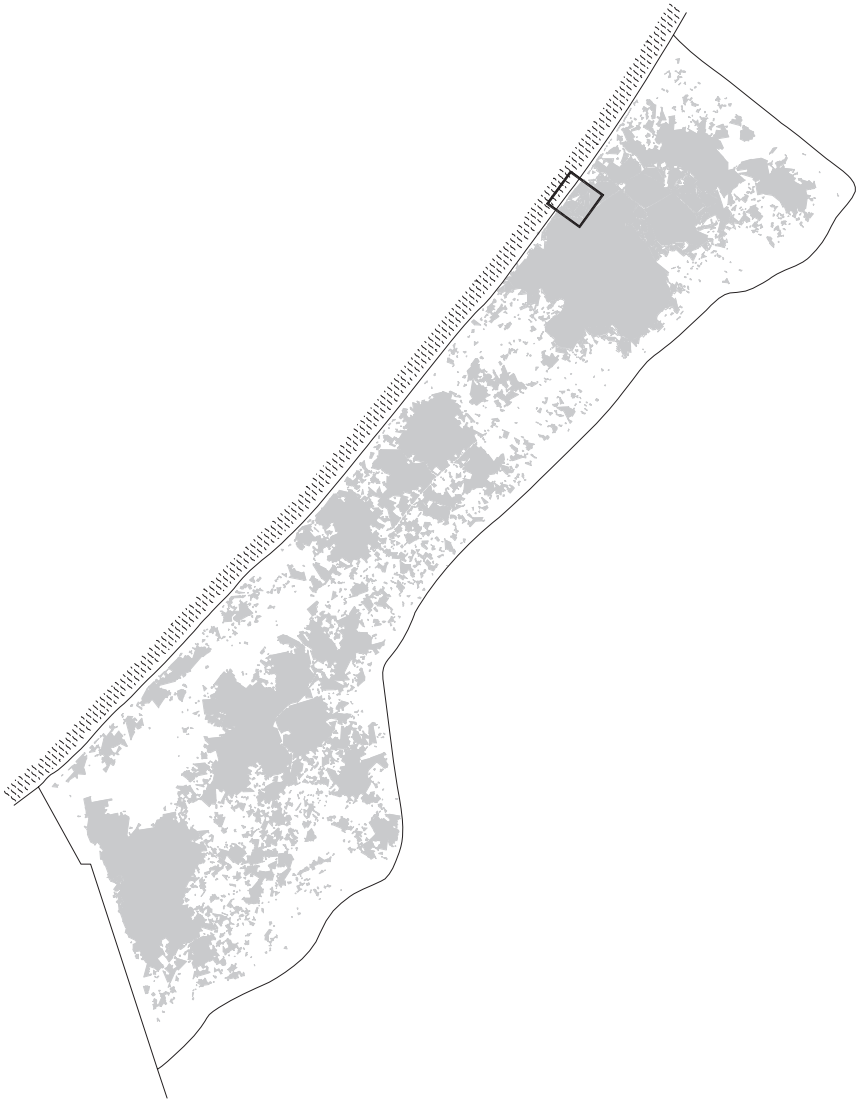
The Palestinian Minister of Public Works and Housing announced in February 2019, that 90% of the reconstruction of the completely destroyed houses from the 2014 war was completed.

Despite the uncertainties around the speed of reconstruction. Most families managed to rebuild their houses within a short period of time.

IV

Design Project

Many Palestinians in Gaza are living today in difficult circumstances. 120,000 units are still needed to be built and other 13,000 units must be provided annually. Above all, the Gaza Strip is facing new forms of urban density, part of which are already existing.



Beach Camp

Al-Shati Camp, also known as Beach camp, is a Palestinian refugee camp located in the northern Gaza Strip along the Mediterranean Sea coastline in the Gaza City.

Beach Camp is one of eight Refugee Camps in the Gaza Strip. The urban density of the Beach Camp is an example of what the future living space in many areas in Gaza might be transformed into.

Today, the Beach Camp is a home to around to 90,000 Palestinians, who fled the cities of Jaffa, Lod and Beersheba as well as surrounding villages of Gaza in 1948.

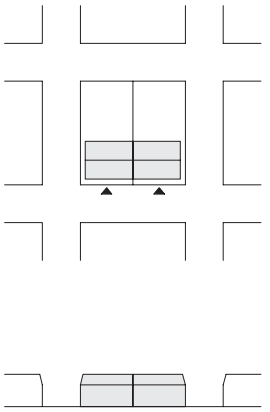
Within an area of 0.52 km², Beach camp is one of the most densely populated areas worldwide according to UNRWA.

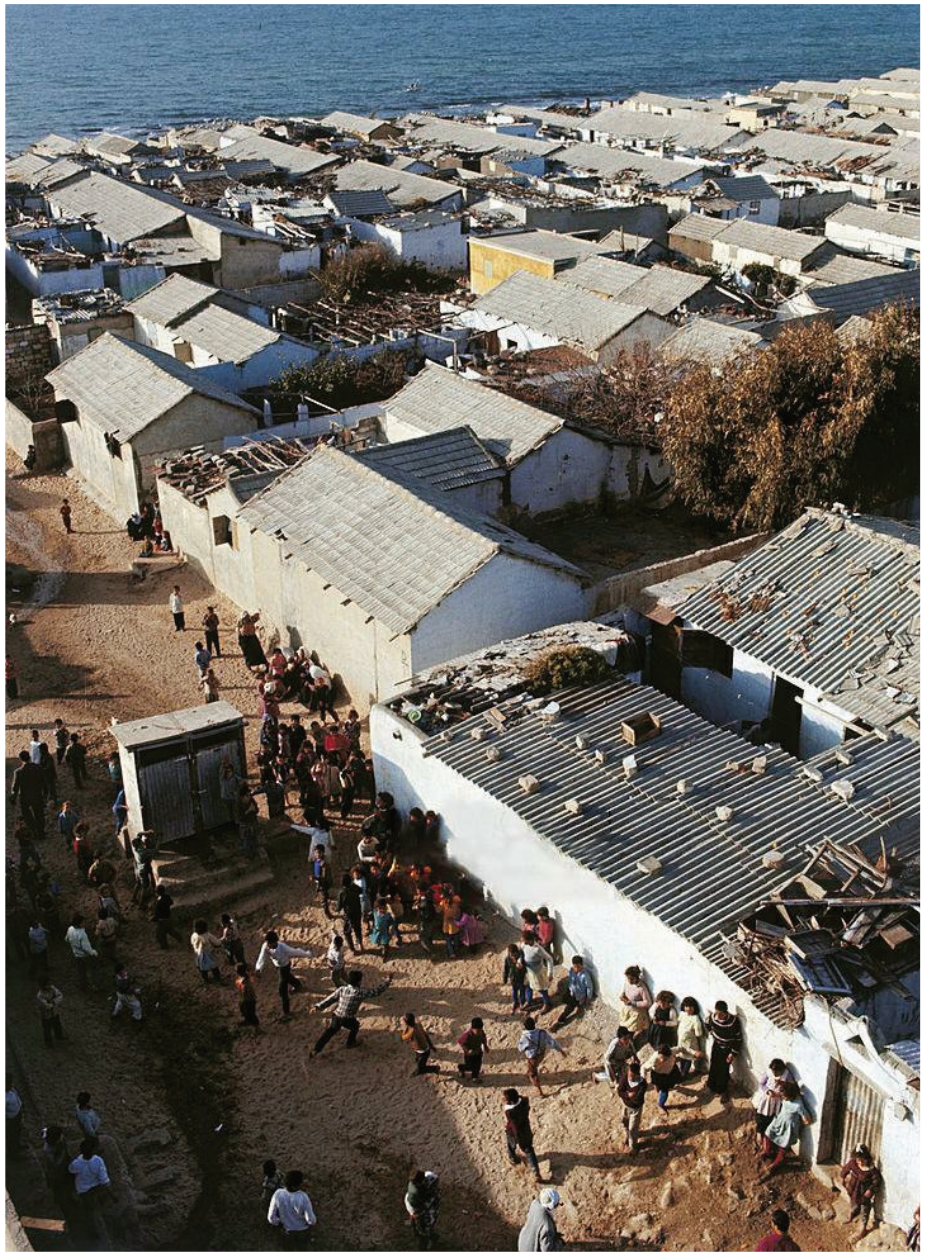
The story of the Beach Camp began in 1948, when it was established for about 23,000 Palestinians fleeing the surrounding villages of the Gaza Strip during the 1948 Arab-Israeli War. One year later, the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) was established.

1948 The refugees first lived in tents and received aid from relief organizations such as the International Committee of the Red Cross (ICRC), until UNRWA was later established.

1950s UNRWA provided brick-roofed houses instead of tents in the early 1950s. A typology that was not common in Gaza.

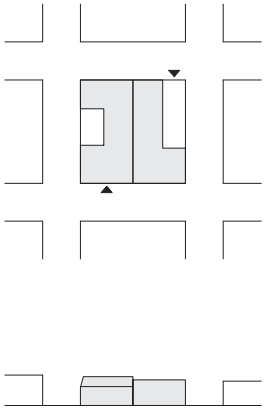
Throughout the 1950s, UNRWA has built for each family a plot of 80-100m². The walls were made of bricks and cement with asbestos roofing.





1970s The families started later to extend their space within their plots and also investing in upgrading their houses.

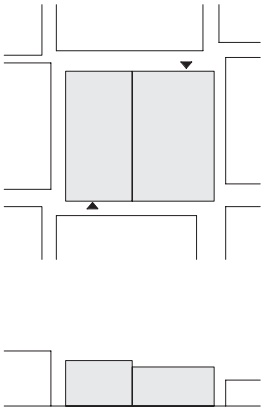
Gradually, refugees extended their shelter with new rooms in mud or concrete to fit the needs of their growing families. Boundary fences started to appear, defining pathways between the properties.



1950-1970

1980s Even if formally prohibited by the local authorities, there was no choice but to opt for the vertical expansion of the camps.

To underline the temporary character of the refugee camps, no additional floors were allowed to be built. After building on the whole plot, the families expanded it beyond the pathways, producing a spider network of narrow paths, dead-end alleys, and irregularly shaped houses.



House Typology

Extra floors were later built on top of existing units, resulting in multi-level housing accommodating extended families.

Beach Camp is consisted today of multiple low-rise high-density superblocks. In the last decades, this city form has spread in the Refugee camps and also in other areas in Gaza.

The Superblock

Different forms of superblocks have developed in the Beach Camp, while most structures have encroached on public spaces as a result of the high urban density.

Openings

The spatial qualities vary within each superblock. Some houses have a clear view or a direct connection to the sea, while most of others do not.

Encroaching on main streets have resulted later in defining differentiated spaces that are now used as multi-functional public spaces.

Public Space

Most houses in the camp are detached from each other. This has created a large number of narrow paths that ranges from 40 centimeters to 2 meters width.

Narrow
Paths

Direct Sun

Many families in the camp suffer from poor ventilation and lack of exposure to the sun, which make them vulnerable to different types of diseases.

Living Space A family might live in one room only, as multiple families could be sharing the same house or unit.

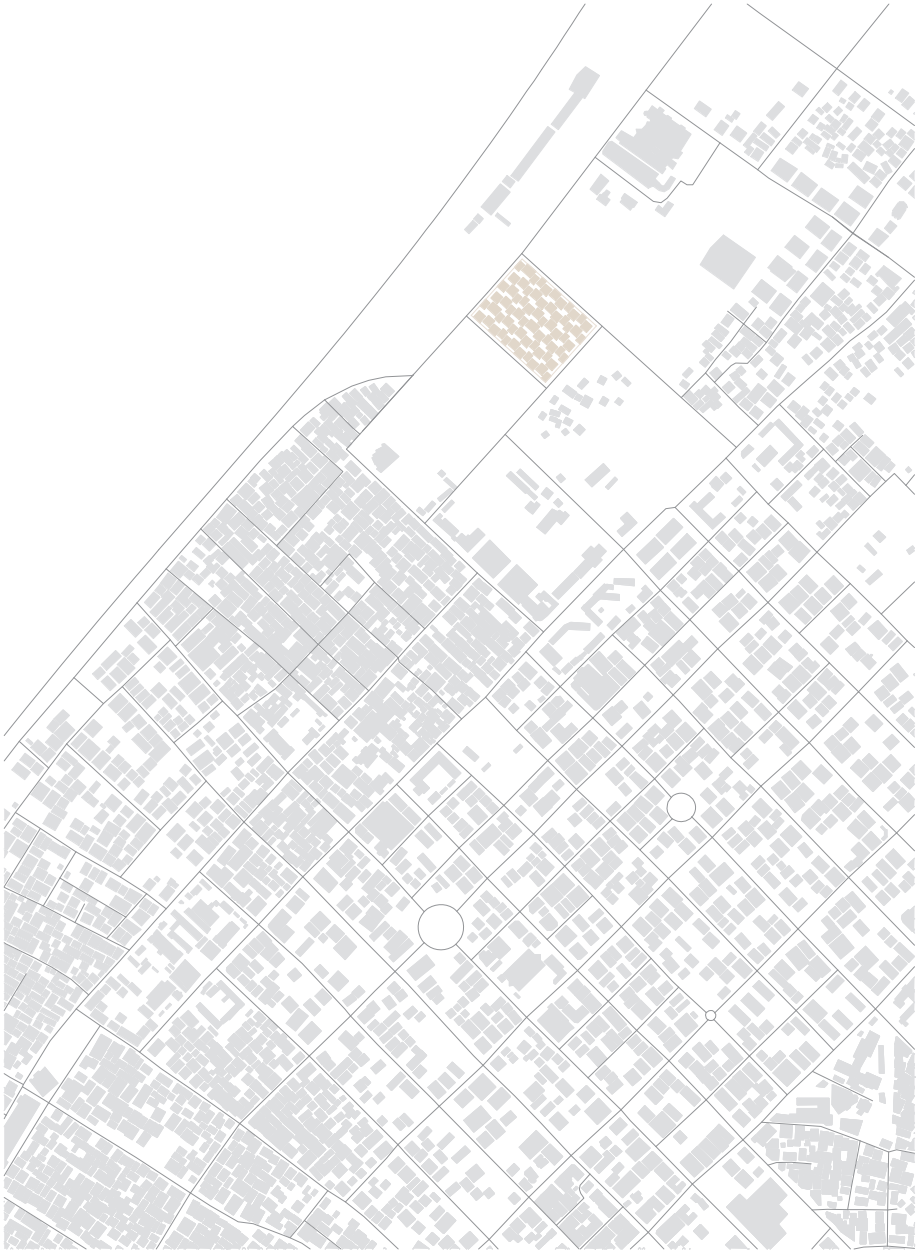
While the current housing shortage is still unsolved, the question of the current and future living quality within the high urban density in Gaza remains unaddressed.

Site Plan

Building next to very dense urban areas in Gaza is the first step to challenge this type of urban density and improve it.

0 150m

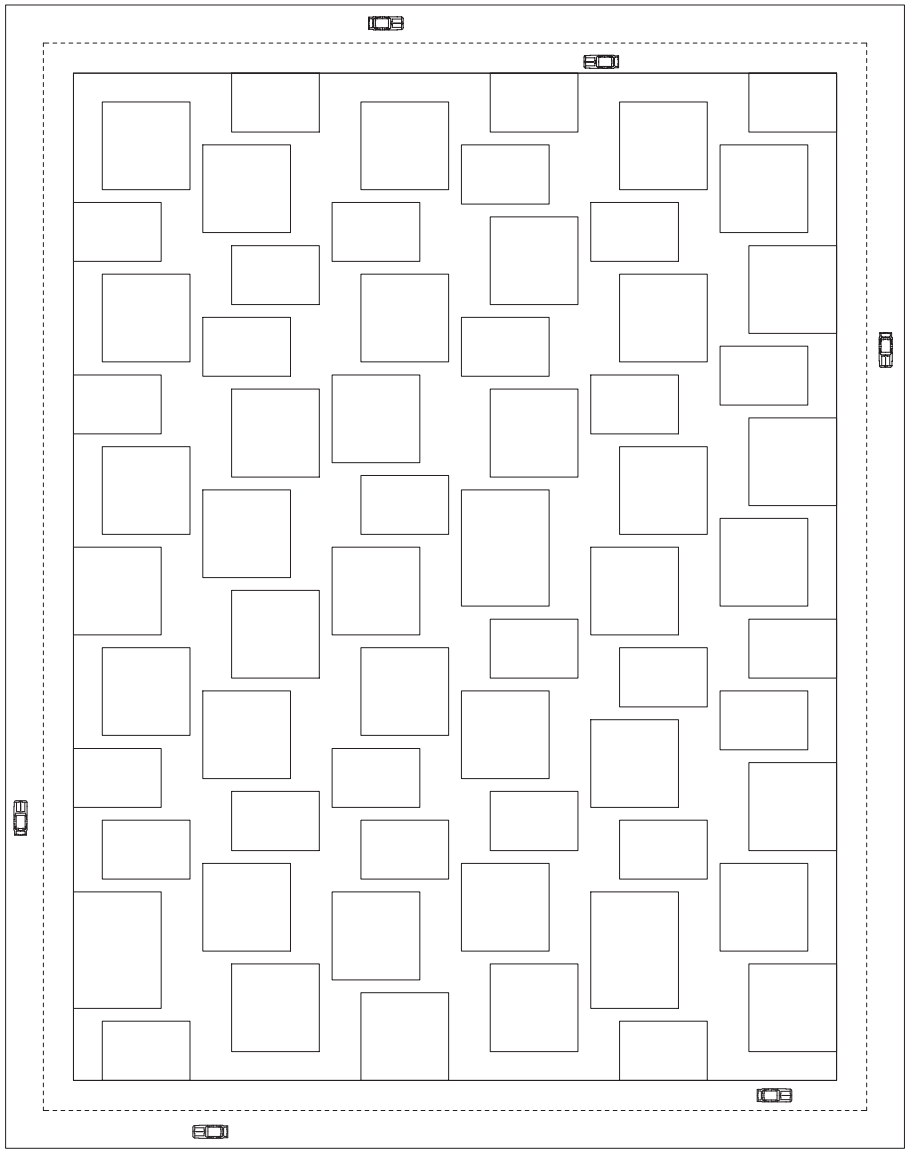
By building similar but improved dense urban forms next to existing ones, a new building culture can emerge and evolve in Gaza.



Site Plan

Building new improved spaces in the context of the camp is a way to communicate a new understanding of density.

0 150m



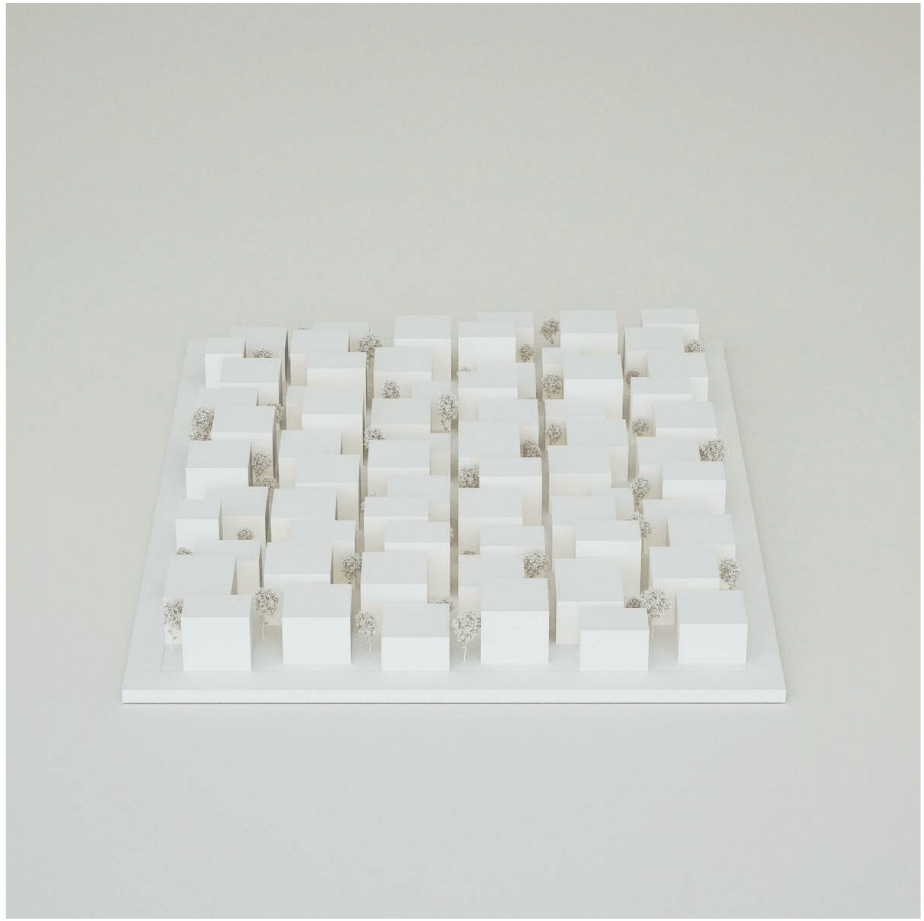
Superblock Planning a new superblock allows specific design decisions to be considered in advance.

0 16m

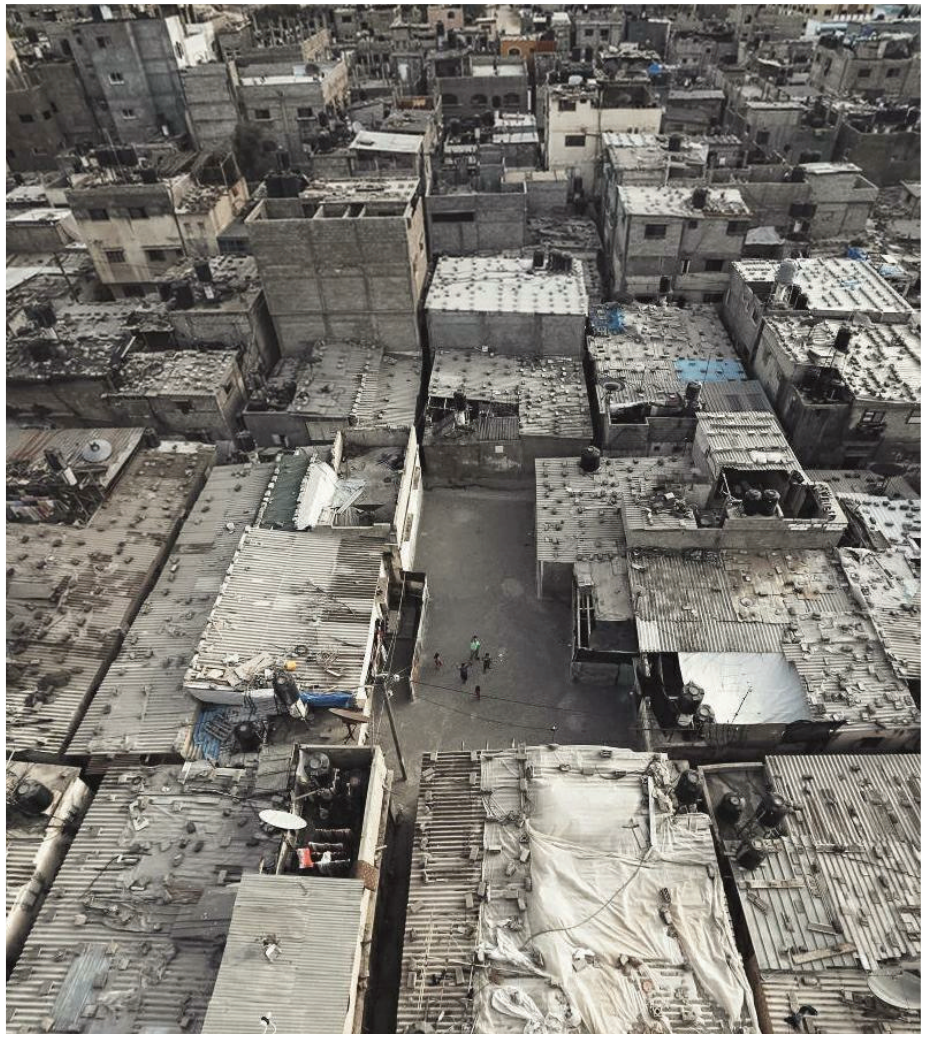
The idea of a superblock must be designed and planned to enhance social interaction between residents with a variety of public space.

By using comparable forms, a new spatial understanding could be communicated to the inhabitants through similar spatial relations.

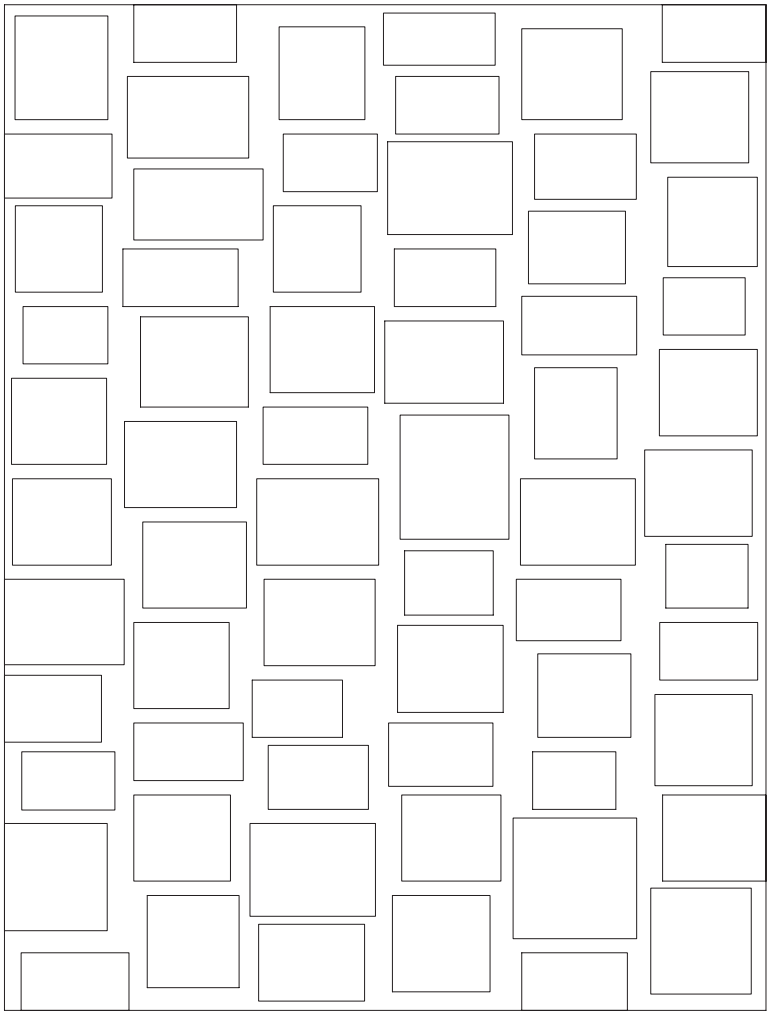
The urban pattern must be however defined by certain design principles to ensure its quality and viability.



Despite the structural changes in the recent decades, the impact of previous design decisions is still present in the camp. Questioning the current form is a way to re-think density within a new design project.



Urban form The existing urban form of the Beach Camp is the starting point of a new design project and a way to re-define existing spaces in the camp.

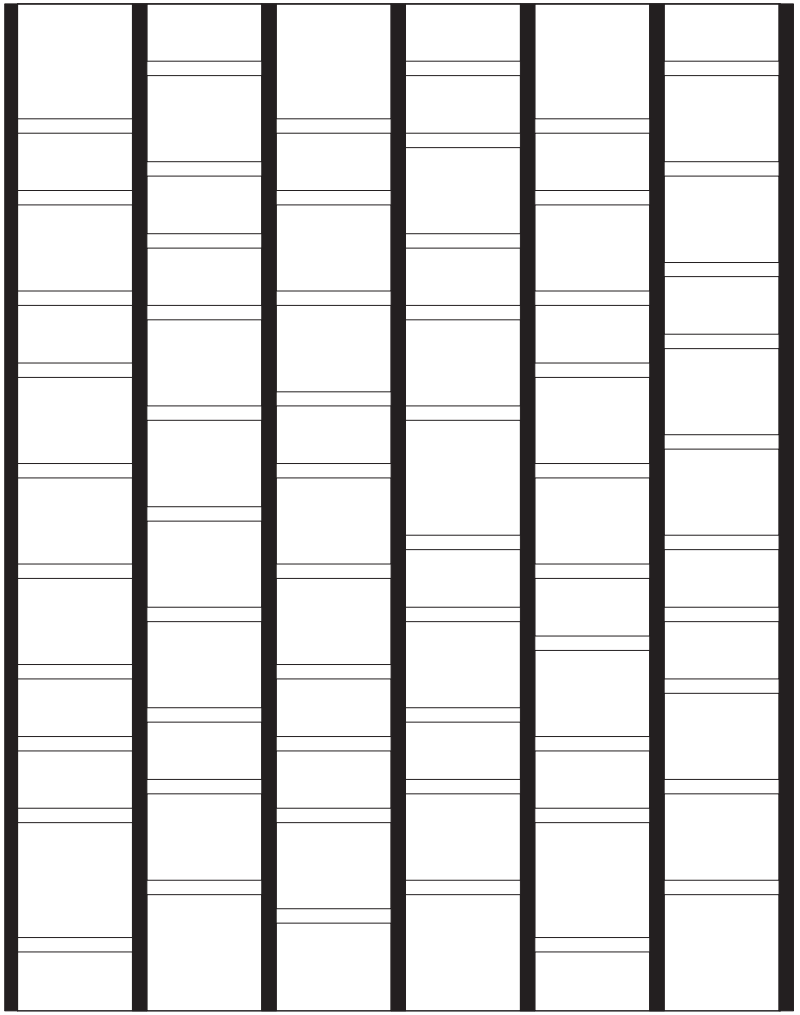


Camp Pattern

The current irregular pattern of each superblock affects the overall spatial perception and differentiates living qualities between the houses.

0 16m

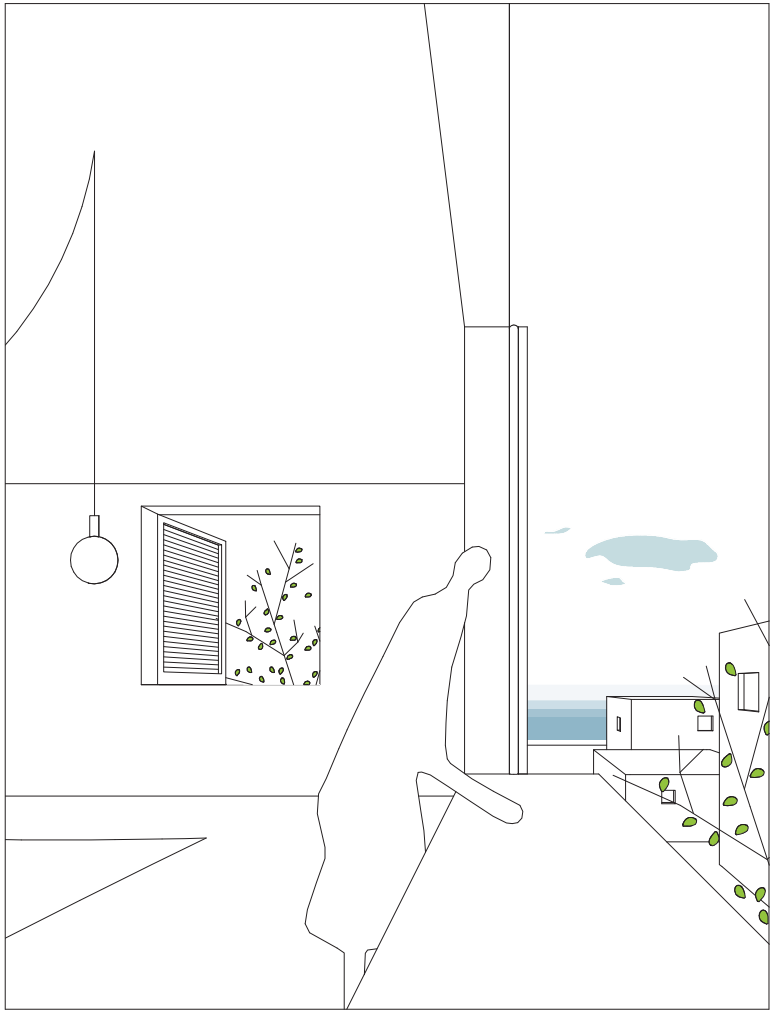
Existing spatial relations in the Beach Camp present specific space qualities that can be retained and embedded within a new design project.



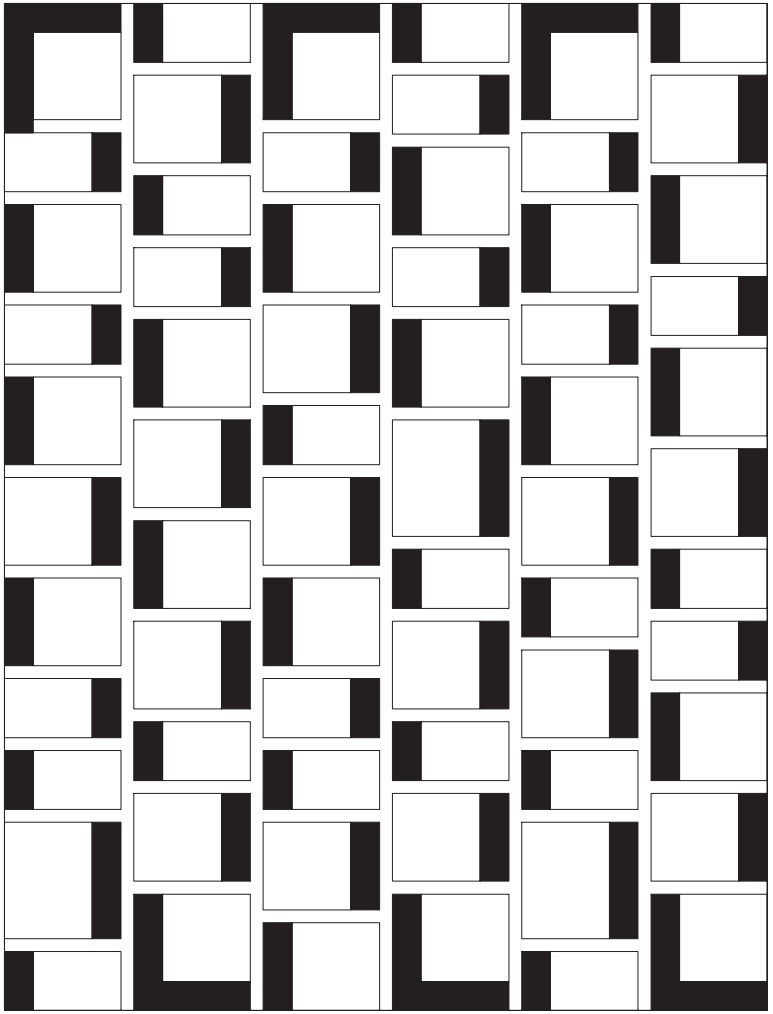
Sea View

The direct connection to the sea from all houses allows a spatial orientation in the urban context and provides the ability of users to read complex urban space.

0 16m



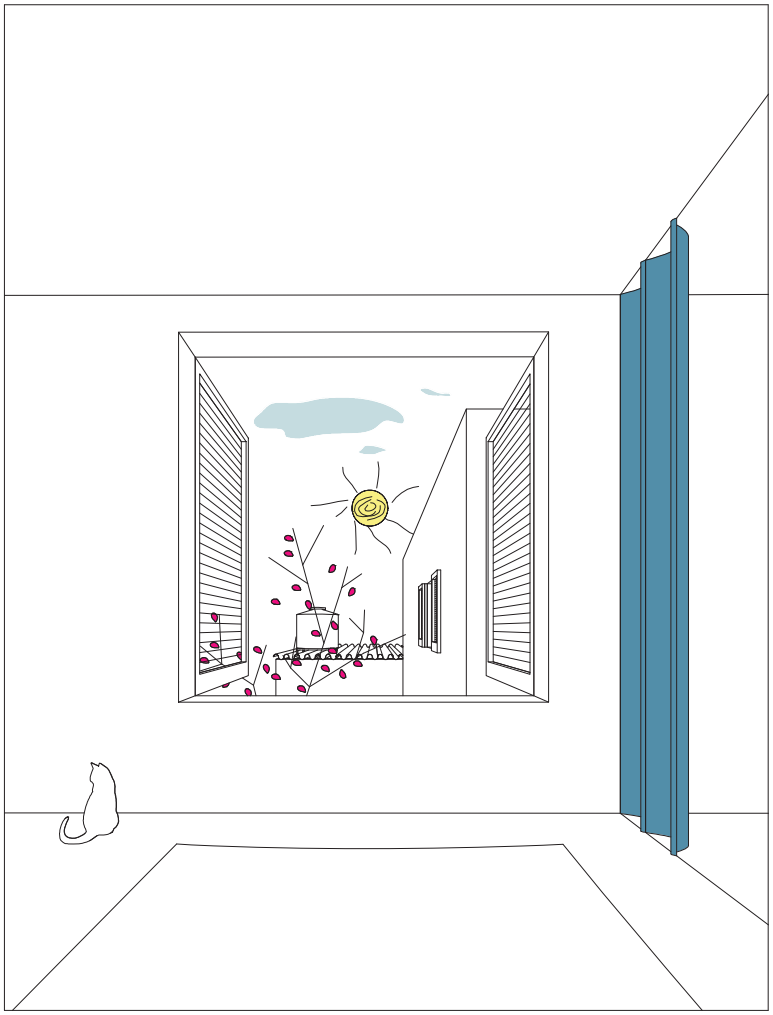
Through the direct view to the sea from each house, individuals will be able to identify with the place and create a schematic image of their surroundings.



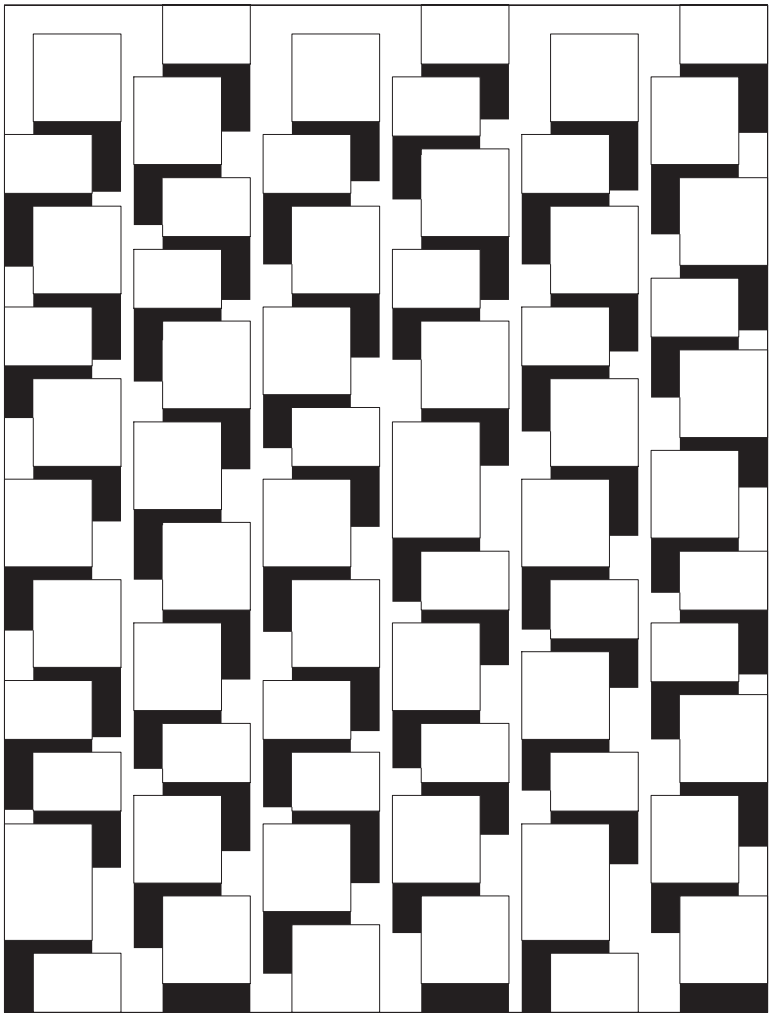
Sun

A part of each house must be re-defined as an open space. The same acquired area should be distributed in the top levels of these houses.

0 16m



By re-defining the shapes of the houses and the creation of new open spaces, the sun will reach all the houses within the superblock.

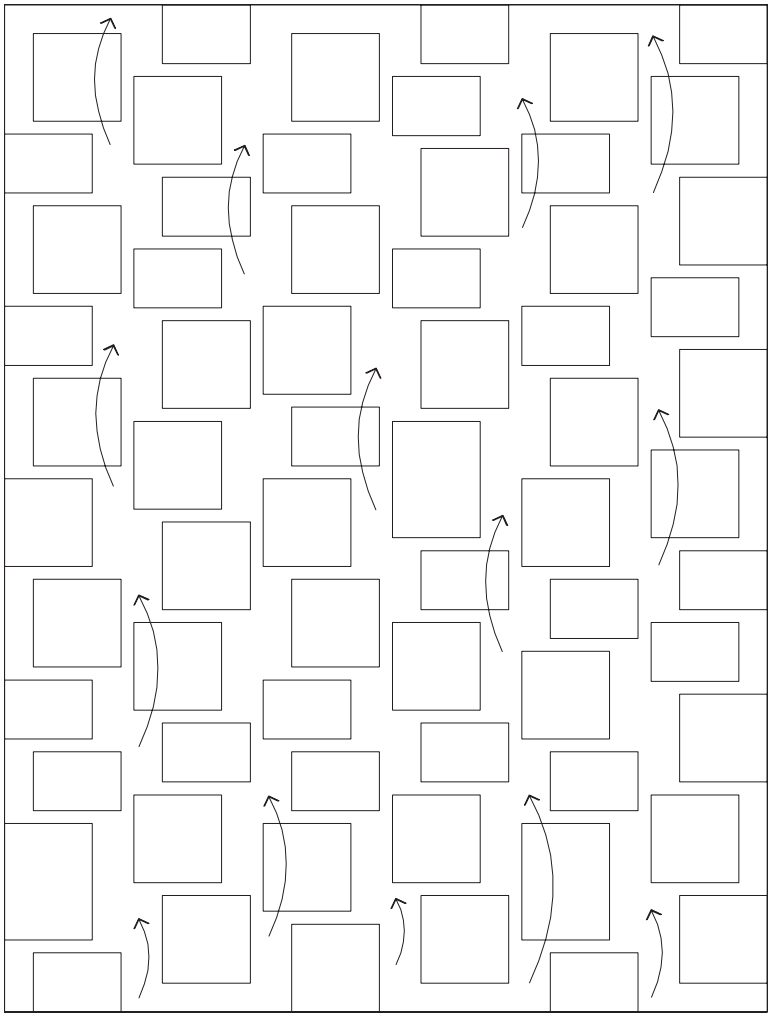


Shadows

Determining shadow angles and distances in the design process allows an optimized arrangement of urban pattern.

0 16m

While most of the houses remain within four floors, the low-angle sun will reach all main living areas in the morning and afternoon.

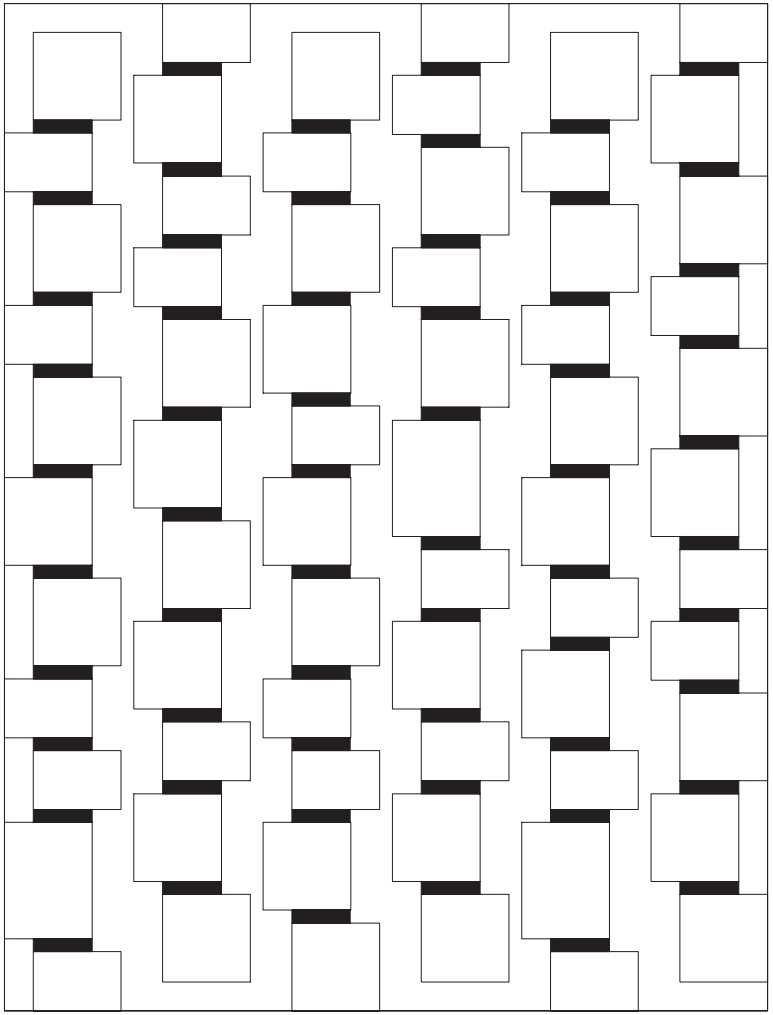


Air Circulation

In summer, main living areas oriented to the sea will ensure the air flow and ease the humid conditions inside the house.

0 16m

The living areas are also located between two open spaces, which affects the perceived spaciousness of the space.

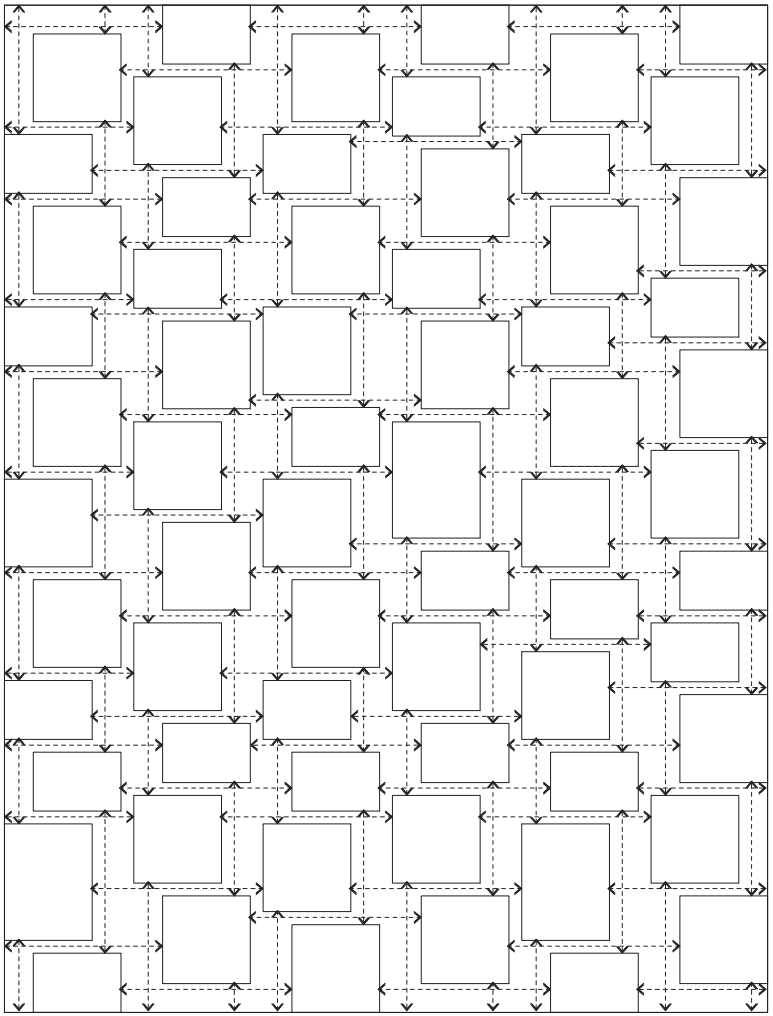


Narrow Paths

These open spaces will be directly connected through the different narrow paths.

0 16m

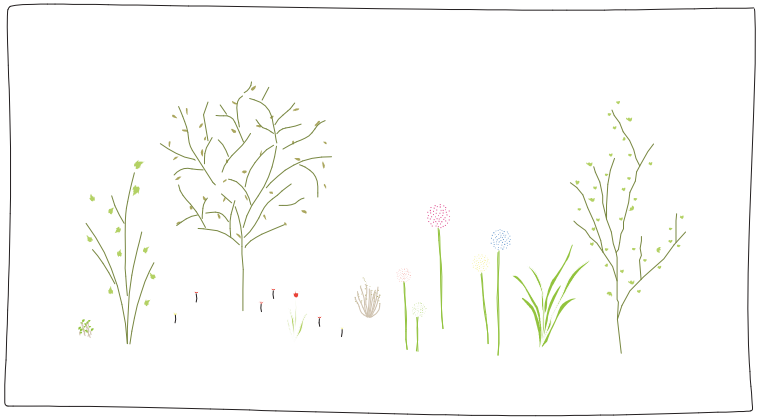
In addition, each house could see through these narrow paths into the next open spaces.

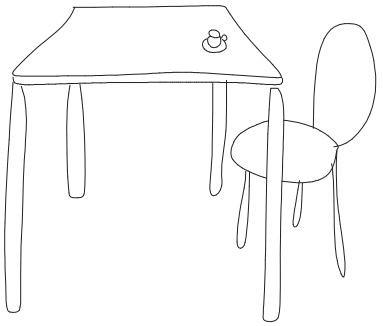


Density Perception

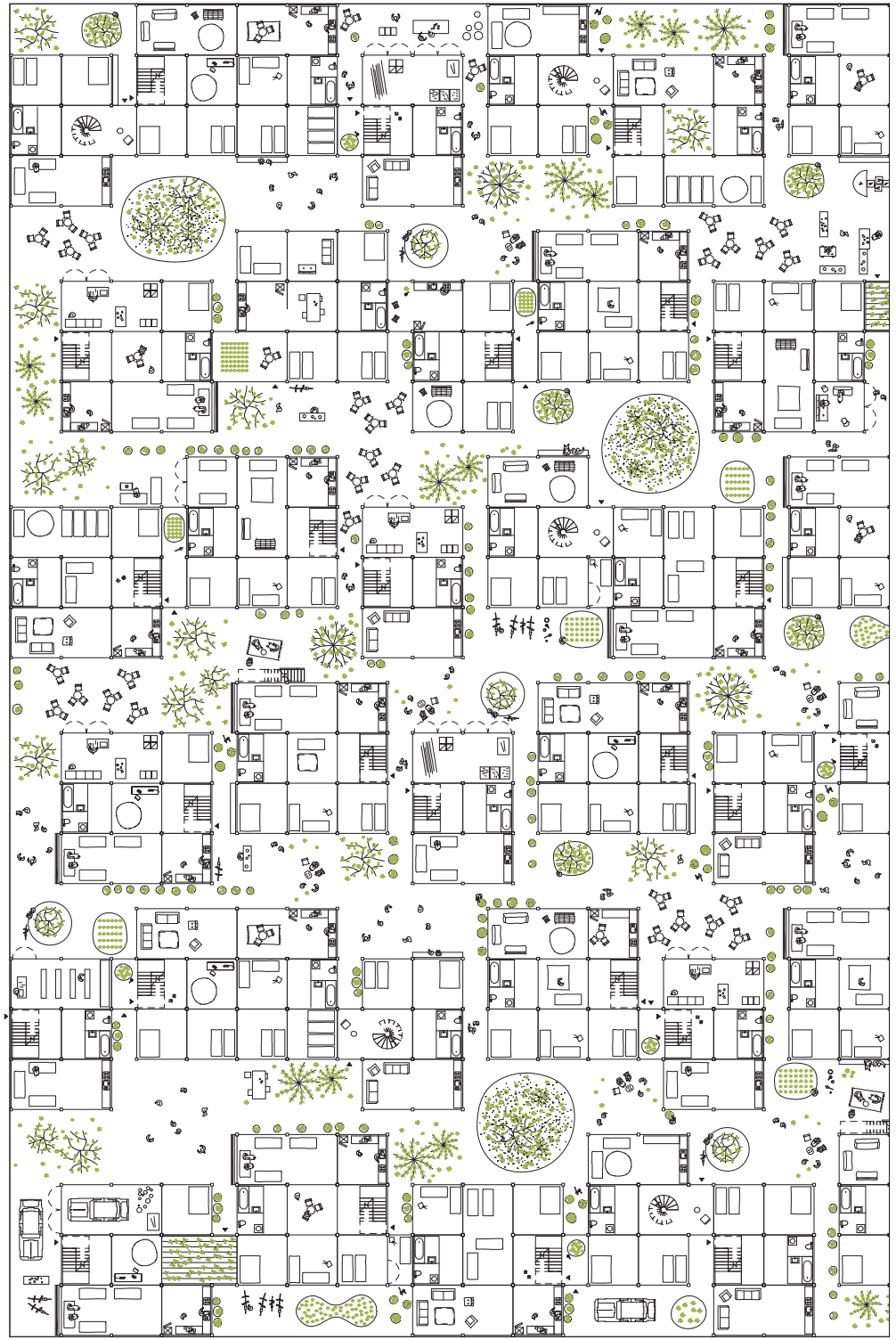
The spatial relations allow to manipulate the physical density of the urban pattern.

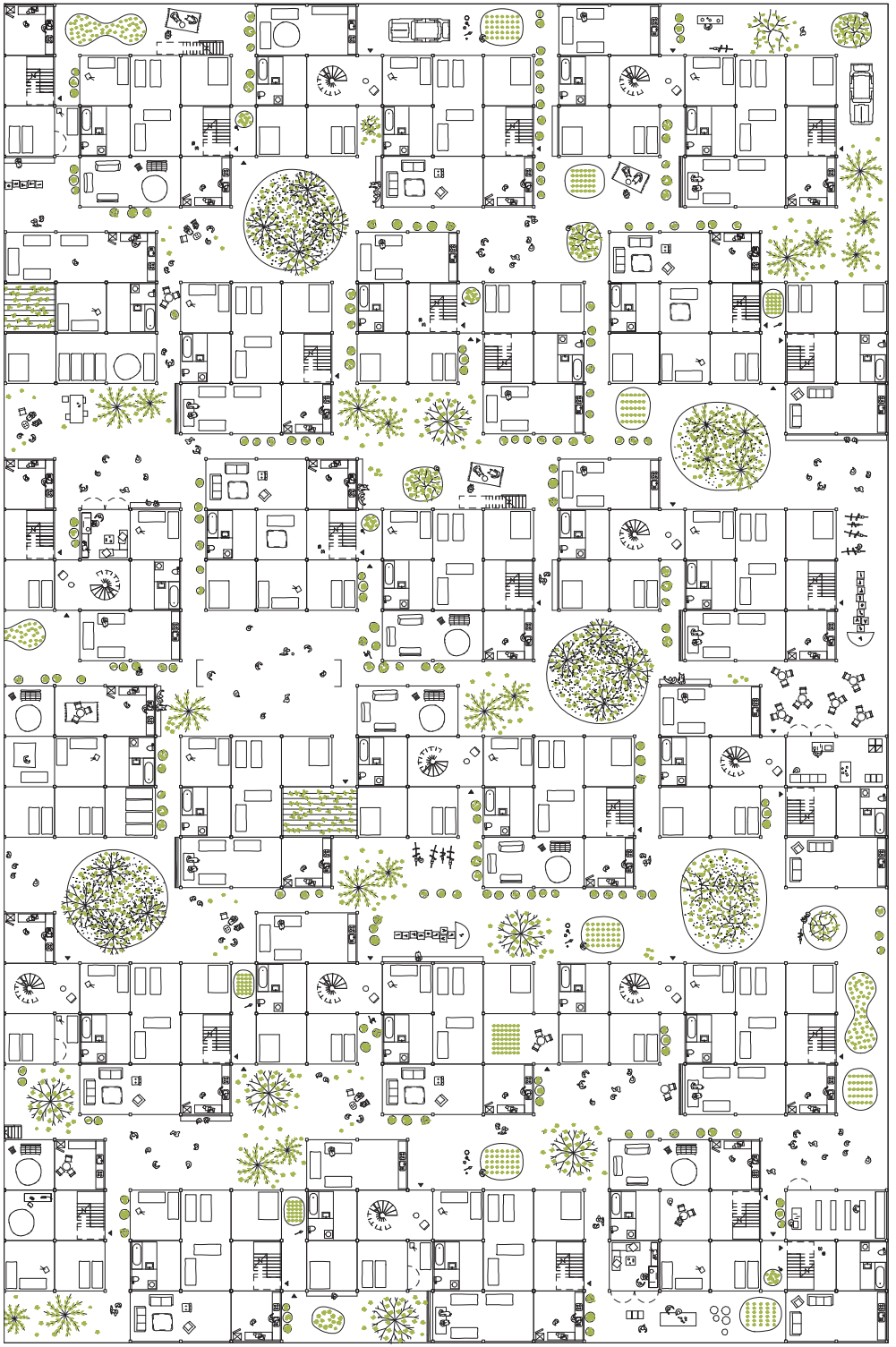
0 16m



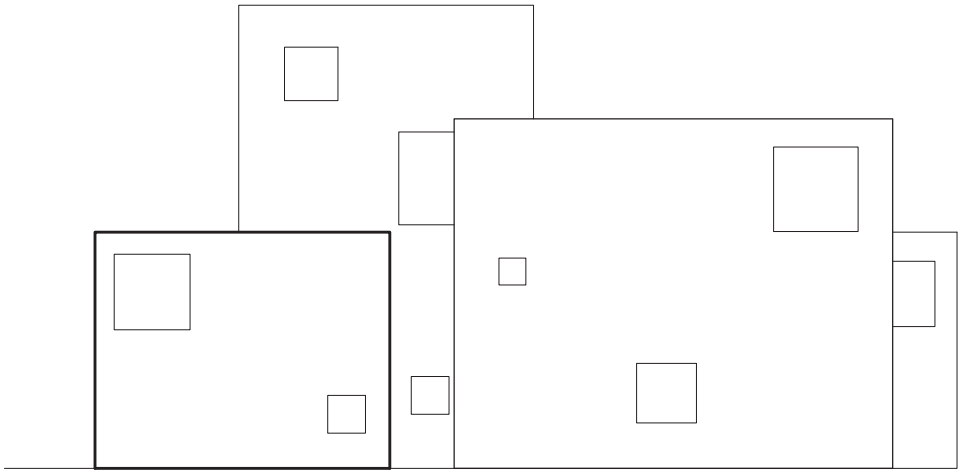


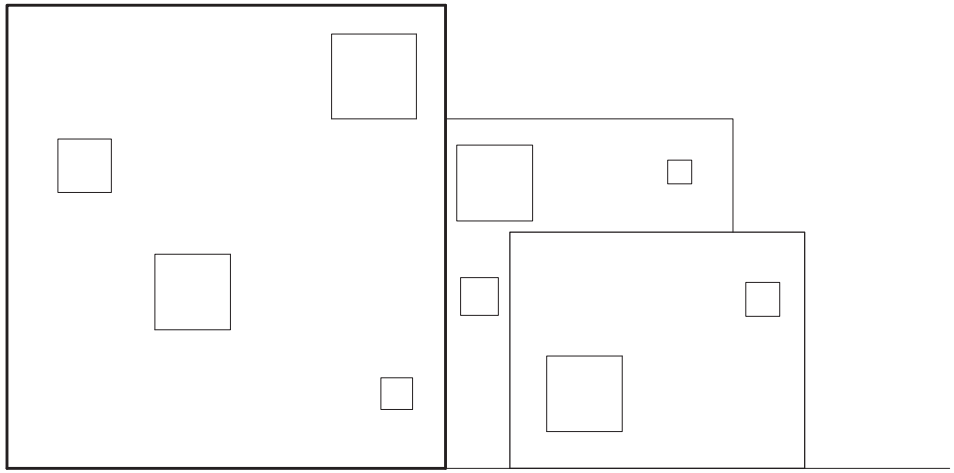
While a defined configuration of architectural elements can achieve a new perceived density.





Within the superblock, openings determine the relation between indoor and outdoor spaces.



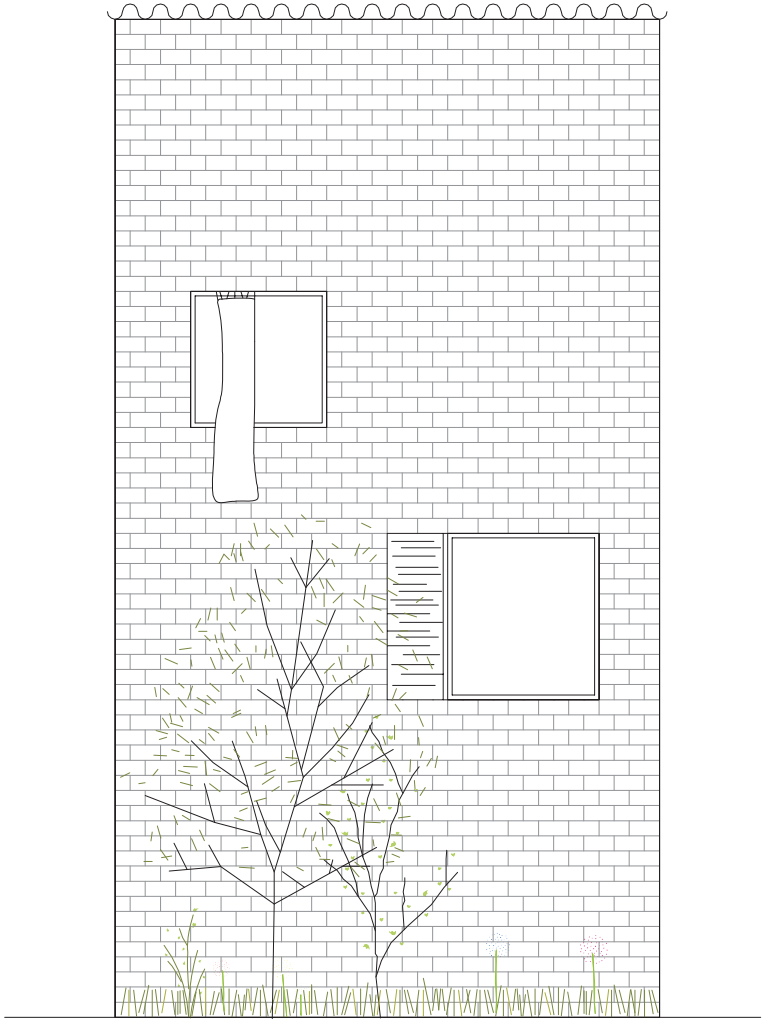


Openings

The dimension and the position of windows influence people's perception of density more than any other variables.

0 3m

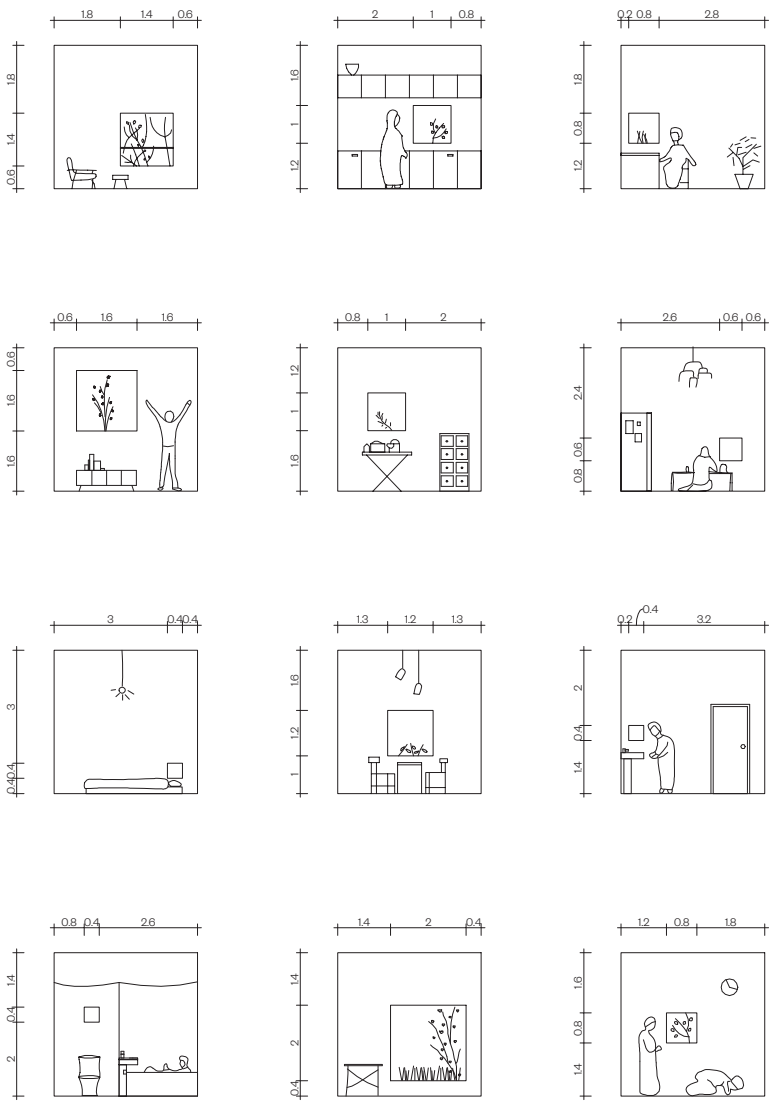
The used construction method in Gaza allows various facade configurations to be adjusted to the surrounding.



Facade

The openings are a part of the facade pattern system, which is mainly consisted of 40x20cm staggered blocks.

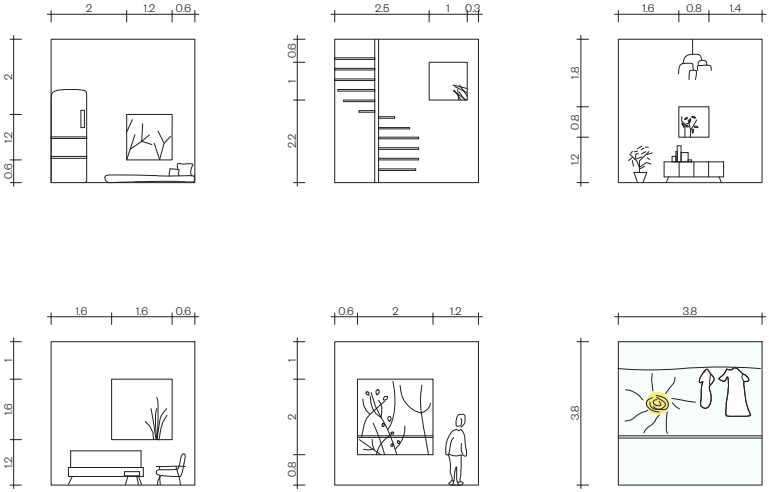
0 4m



Opening Types

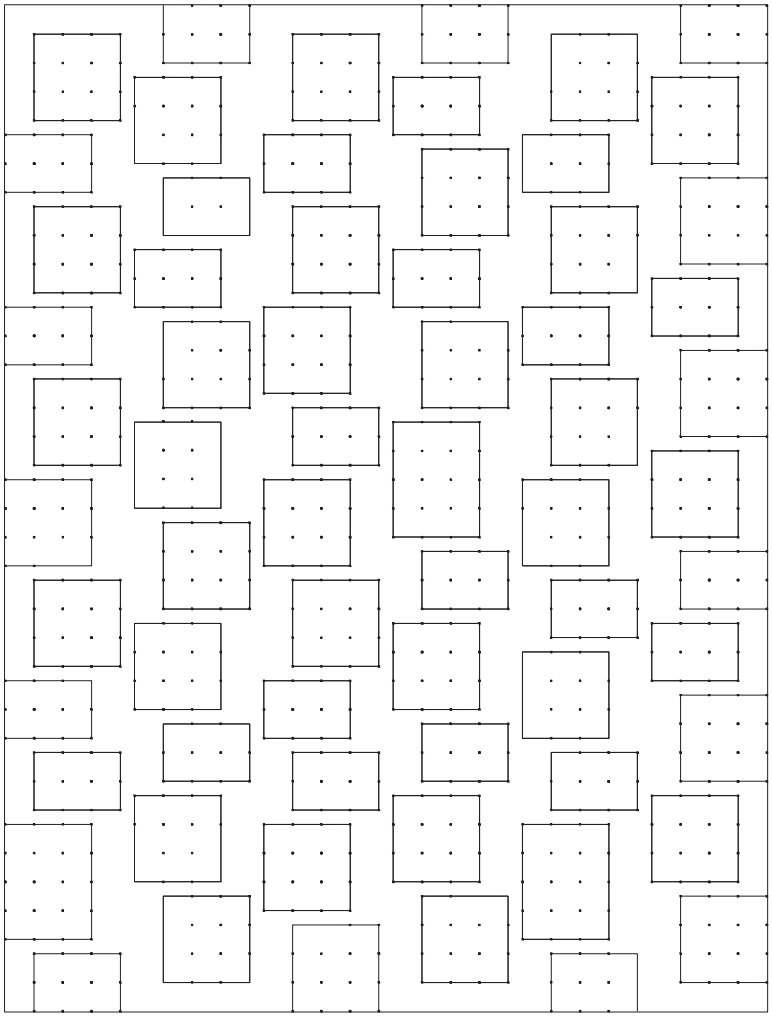
The decision of openings placement next to position or dimension must consider the variable elements within the outdoor space.

Depending on the use of space, a particular window position or dimension enable a specific spatial quality experience.



The relation between all spatial and architectural elements next to conscious design decisions can define how Gaza can be perceived in 2050.

0 4m

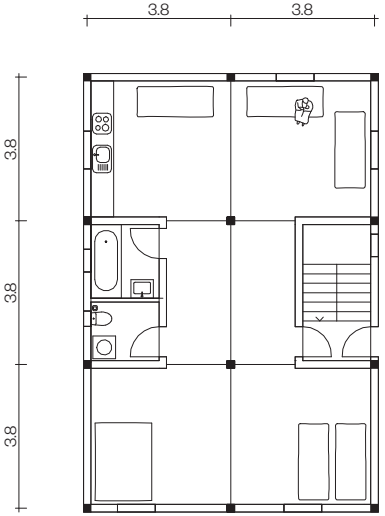


Structure

The main structural system is consisted of reinforced concrete columns grid with a span of around 4 meters.

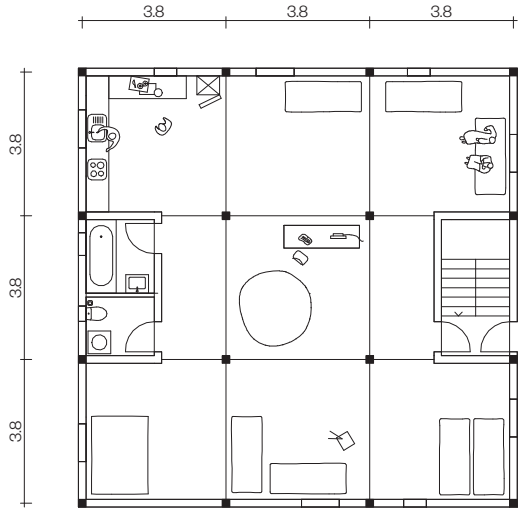
0 16m

The types of the houses are based on the usual typology sizes in Gaza, which are simple structures that are reduced to the essential.

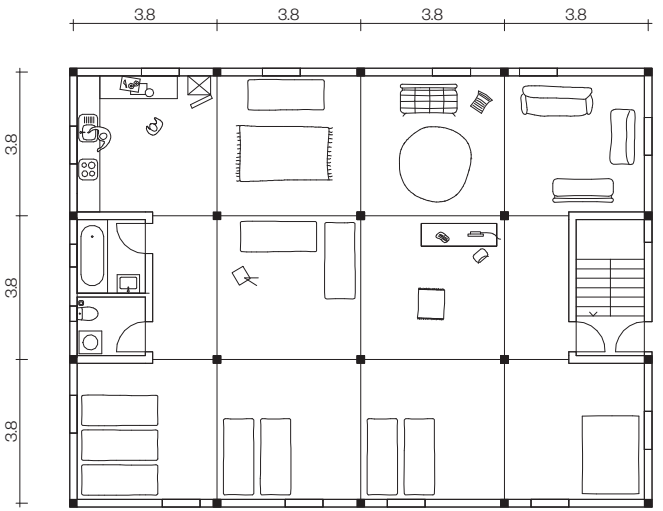


0 3m

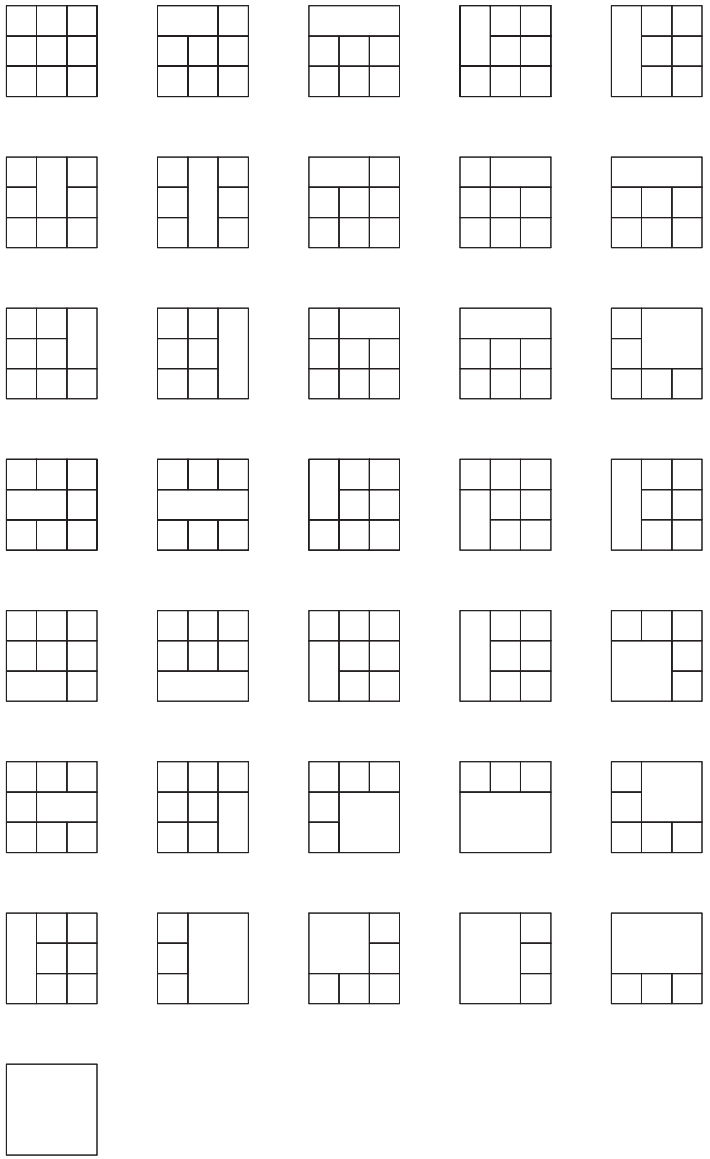
The support structure must be predetermined and built. The various functions and the formation of living spaces must be defined by the users themselves.



0 3m



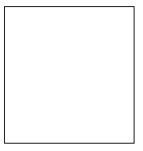
0 3m



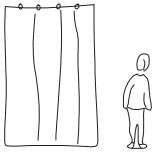
Composition Space composition allows to characterize multiple areas by flexible divisions of the house.

Multiple space composition can be implemented within the same house. A free plan provides a control over the perception of space.

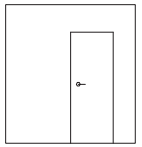
Other than walls, new space separating elements must be experimented. Thus, same spaces can be perceived differently when combining.



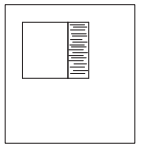
Plain Wall



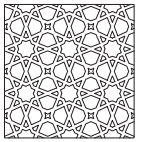
Textile Curtains



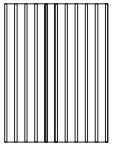
Door in Wall



Window in Wall



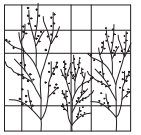
Perforated Wall



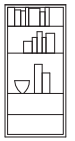
Vertical Panels

Wall Niche

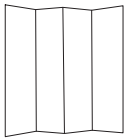
Thread Curtain



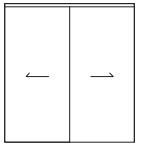
Planting Net



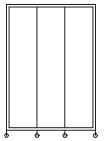
Mini Wardrobe



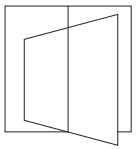
Folding Wall



Sliding Wall

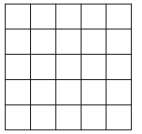


Wheel Wardrobe



Rotating Wall

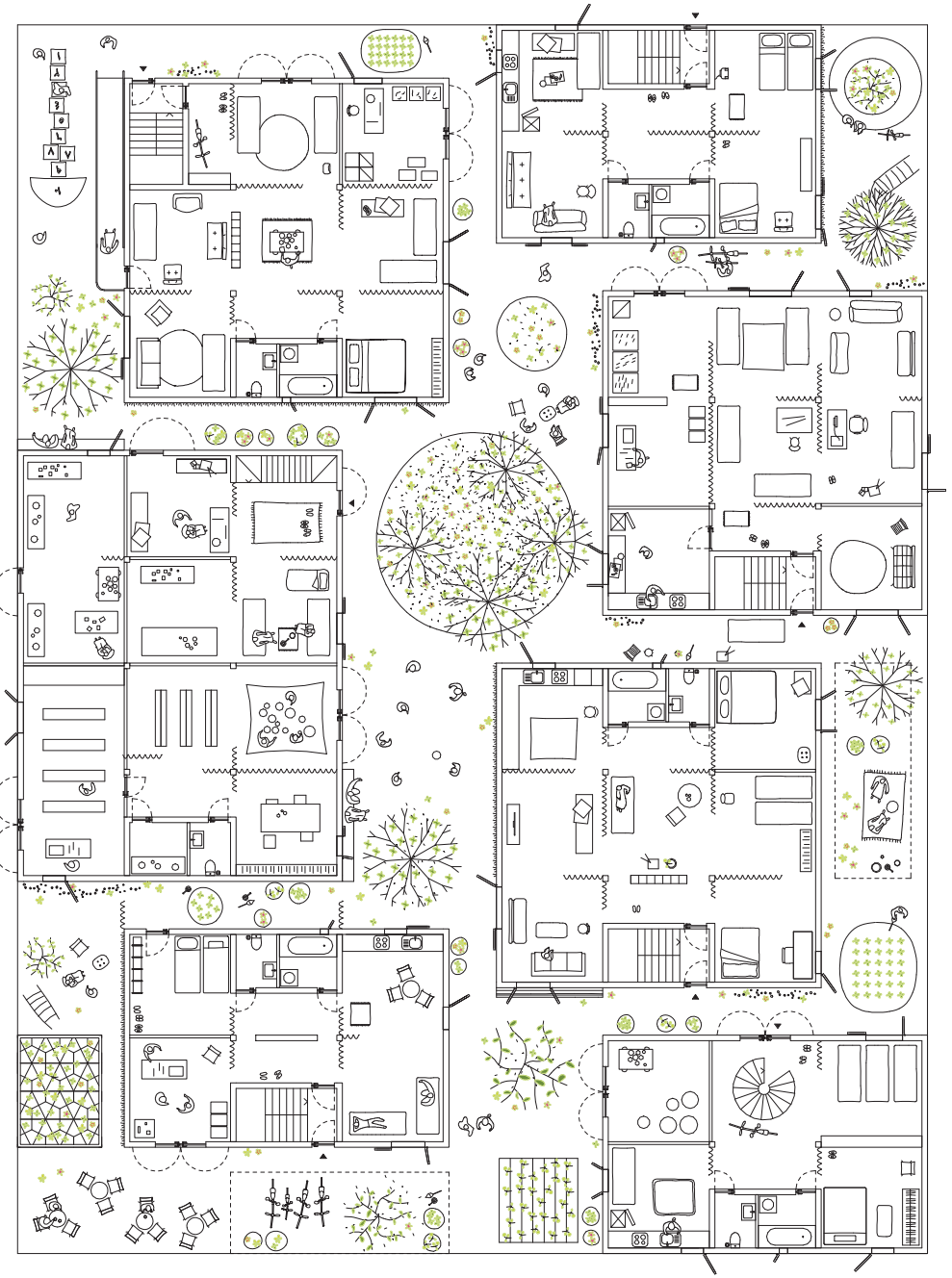
Bookcase



Modular Cabinet

Separating Elements

Other elements can be presented or suggested to the users, before deciding to build walls.



A preliminary decision on every detail could influence the diversity of urban design. If we do not plan walls, then maybe the users will not build them. Nevertheless, users must recognize the different living qualities in which different scenarios are experimented, implemented and subsequently expanded as a new building culture.

0 4m

V

Appendix

10 Image, Universal History Archive: **Gaza under British Mandate.** [1. January 1930]
14 Image, Google LLC: Sat Image
16 Image, Google LLC: Sat Image
16 Report, United Nations Population Fund: **Palestine 2030.** URL: https://palestine.unfpa.org/sites/default/files/pub-pdf/Palestine%202030%20Full%20Report%20English.pdf [December 2016]
18 Research, UN-Habitat: **Gaza Urban Profile.** URL: humanitarianresponse.info/files/documents/files/Gaza%20Urban%20Profile.pdf [December 2014]
20 Thesis, Iman El Masri: **Slum Areas in Gaza Governorates.** URL: https://library.iugaza.edu.ps/thesis/102010.pdf [2012]
22-24 Research, UN-Habitat: Gaza Urban Profile. URL: humanitarianresponse.info/files/documents/files/Gaza%20Urban%20Profile.pdf [December 2014]
26 Weatherspark.com: **Average Weather in Gaza.** URL: https://weatherspark.com/y/98164/Average-Weather-in-Gaza-Palestinian-Territories-Year-Round
28 Research, Anwar Abu-Zarifa: **Design of a Stand-Alone Power Wind Turbine Optimized for Low Wind Speed in Gaza.** URL: http://article.sapub.org/10.5923.j.ijee.20140405.01.html [April 2014]"
30-36 Research, UN-Habitat: Gaza Urban Profile. URL: humanitarianresponse.info/files/documents/files/Gaza%20Urban%20Profile.pdf [December 2014]
38 Image, URL: Hosamir.com [2018]
40 Research, UN-Habitat: Gaza Urban Profile. URL: humanitarianresponse.info/files/documents/files/Gaza%20Urban%20Profile.pdf [December 2014]
42 Image, Momen Faiz: **The almond trees blossom in the Gaza Strip.** [22. February 2018]
42 Article, Ahmed Sourani: **Urban and Peri-urban Agriculture in Gaza: Perspectives.** URL: https://www.ecomena.org/urban-agriculture-gaza/ [10. February 2018]
46 Poem, Mahmoud Darwish: **Silence for Gaza.** [24. November 2012]
46 Image, Eva Bartlett: **Impressions From Gaza On A Few Hot August Days.** URL: https://ingaza.wordpress.com/2012/08/28/impressions-from-gaza-on-a-few-hot-august-days/ [28. August 2012]
48 Article, Palestine Remix: **Vanishing Palestine.** URL: https://interactive.aljazeera.com/aje/palestineremix/maps_main.html
50-58 Book, Malkit Shoshan: **Atlas of the Conflict: Israel-Palestine.** [30. April 2013]
52 Article, Hosam Salem: **Gaza: Refugees call for right of return in mass protests.** URL: https://www.aljazeera.com/indepth/inpictures/gaza-refugees-call-return-mass-protests-180330154419077.html [30. March 2018]
54 Article, Mark LeVine: **Tracing Gaza's chaos to 1948.** URL: https://www.aljazeera.com/focus/arabunity/2008/02/200852518573784291 9.html [13. July 2009]
58 Image, Wikimedia: **Balata Camp 1955.** URL: https://commons.wikimedia.org/wiki/File:Balata_Camp_circa_1950.jpg [13. August 2009]
60 Image, Alex Correa: **Couchsurfing In Palestine.** URL: https://www.worldcrunch.com/rue-amelot/couchsurfing-in-palestine-part-2-where-are-you-from [28. July 2016]
66 Article, fanack: Chronology. URL: https://fanack.com/arab-palestinian-israeli-conflict/israeli-settlements/chronology/ [25. March 2011]
68 Image, Dror Etkes: **Aerial Photos Of Israeli Settlements To Be Evacuated From The Gaza Strip.** [28. July 2004]
70 Image, David Furst [28. March 2005]
70 Image, Mahmud Hams [26. August 2004]
72 Image, Gideon Lichfield, URL: https://qz.com/165998/ariel-sharon-kicked-my-cousins-out-of-gaza-heres-what-they-wanted-to-say-to-him-before-he-died/ [12. January 2014]
72 Wikipedia: Gaza Strip. URL: https://en.wikipedia.org/wiki/Gaza_Strip
74 Image, Jonas Bendiksen: URL: https://pro.magnumphotos.com/Asset/-2K7O3RJH33SS.html [2003]
78 Image, Google LLC: Sat Image
80 Image, Marco Di Lauro: **Sixty Five Funerals.** URL: http://www.marcodilauro.com/features/65-funerals/ [18. August 2005]
84 Report, OCHA: **Three years on from the 2014 conflict, 29,000 people remain displaced.** URL: https://www.ochaopt.org/content/three-years-2014-conflict-29000-people-remain-displaced [11. September 2017]
88 Image, Sandra Hoyn: URL: https://www.sandrahoyn.de/portfolio/a-married-teenage-couple-in-gaza/
90-96 Research, Palestinian Central Bureau of Statistics: **Building statistics.** URL: http://www.pcbs.gov.ps/Downloads/book1624/book1624_0501.pdf [2009]
98-102 Book, Nihad Almughany: **Traditional Architecture in Gaza.** [November 2007]
110 Image, Esaias Baitel [1. May 1988]
110 Image, Majdi Fathi [25. August 2015]
112 Article, UN: **Secretary-General's remarks at press encounter in Gaza.** URL: https://www.un.org/unispal/document/secretary-general-s-remarks-at-press-encounter-in-gaza-press-release/ [28. June 2016]
114 Image, Ibraheem Abu Mustafa [5. June 2016]
114 Report, gisha: **Entrance of construction materials.** URL: https://gisha.org/graph/2395
116 Image, Khalil Hamra [31. July 2014]
118 Report, UNOSAT: **Impact of the 2014 Conflict in the Gaza Strip.** URL: https://unosat.web.cern.ch/unosat/unitar/publications/UNOSAT_GAZA_REPORT_OCT2014_WEB.pdf [30. September 2014]
120 Report, OCHA: **Gaza Initial Rapid Assessment.** URL: https://www.ochaopt.org/content/gaza-initial-rapid-assessment [27. August 2014]
122 Image, Emad Nassar [26. August 2014]
124 Image, Ali Jadallah [9. June 2017]
124 Report, Palestinian Central Bureau of Statistics: **The housing situation in the Gaza Strip.** URL: http://www.mpwh.ps/article/read/74
126-128 Image, Andrea Dicenzo [2014]
130 Article, Middle East Monitor: **90% of homes in Gaza destroyed by Israel have been rebuilt.** URL: https://www.middleeastmonitor.com/20190204-90-of-homes-in-gaza-destroyed-by-israel-have-been-rebuilt/ [4. February 2019]
138 Image, Google LLC: Sat Image
142-146 Research, Usama Badawy and Victoria Waltz: **Housing Conditions and Upgrading of the Refugee Camps in Palestine.** [April 2014]
144 Image, Mario De Biasi [1. January 1971]
146 Image, Sergio del Grande [31. December 1979]
150 Image, Google LLC: Sat Image
156 Image, Wissam Nassar [12. June 2018]
162 Image, Google LLC: Sat Image
164 Map, OpenStreetMap: **Beach Camp.** URL: https://www.openstreetmap.org

Ahmad Alkhalaf
Ahmad Rabie
Bernd Vlay
Georg Schwalm-Theiss
Houda Alali
Igor Petrychenko
Jasmin Fejzić
Johannes Pointl
Katharina Urbanek
Kostantin Trpenoski
Lina Streeruwitz
Mahmoud Nihad
Marta de las Heras
Mohammed Shebak
Mo'min T. Salem
Murad Najjar
Naser Alimrani
Nina Kolowratnik
Omar Alssaid
Osama Ewaiwi
Reham Almughanni
Saidabdellah Themer
Sami Alshamali
Tarek Aldakkak
Usama Ibrahim Badawy
Viktoria Metschl
Viktoria Waltz
Zahar Bunchak
Zuhair Salem

Thank you for your support and sharing each information.

I was deeply influenced by your rational understanding of architecture, especially when it comes to the form. Thank you for making me question each part this project.

Tina Gregorič-Dekleva

غزّة

— مشروع إسكاني تجريبي