



T.C.

**TOKAT GAZIOSMANPAŞA UNIVERSITY
GRADUATE EDUCATION INSTITUTE
DEPARTMENT OF GEOGRAPHY
GEOGRAPHY MASTER'S PROGRAM**

**SPATIAL ANALYSIS OF THE PHENOMENON OF RANDOM
HOUSING IN THE CITY OF ALTUN KUPRI**

Bahra Mohamed Sharif Rashid

**Department of Geography
MASTER'S THESIS**

Supervisor: Doç. Dr. Hüseyin MERTOL

TOKAT - 2024

ETHICAL CONTRACT
T.C
TOKAT GAZİOSMANPAŞA UNIVERSITY
TO THE INSTITUTE OF GRADUATE STUDIES DIRECTORATE

I attest to the originality of the Master's thesis entitled "SPATIAL ANALYSIS OF THE PHENOMENON OF RANDOM HOUSING IN THE CITY OF ALTUN KUPRI" in this document. I confirm that I followed the guidelines of Tokat Gaziosmanpaşa University – Graduate Education Institute while preparing this thesis. Moreover, I affirm that I gathered and presented all the information in accordance with academic regulations and ethical principles. To abide by these regulations and principles, I have cited all the data, thoughts, and findings that are not my own.

25 / 06 /2024

Bahra Mohamed Sharif Rashid

JURY ACCEPTANCE AND APPROVAL

The defense examination of the thesis study titled “SPATIAL ANALYSIS OF THE PHENOMENON OF RANDOM HOUSING IN THE CITY OF ALTUN KUPRI” is prepared by BAHRA MOHAMED SHARIF RASHID was held on 25/06/2024 it has been accepted by jury members as a Master’s Thesis at Tokat Gaziosmanpaşa University, Graduate Education Institute, Department of Geography.

Jury Members

Signature

Üye: Dr. Öğr. Üyesi Onur IŞIK

.....

Üye: Dr. Öğr. Üyesi Kuttusi ZORLU

.....

Üye: Doç. Dr. Hüseyin MERTOL (Supervisor)

.....

CONFIRMATION

/06/2024

Doç. Dr. Yusuf TEMÜR

Director of Graduate Education Institute

ACKNOWLEDGEMENTS

Firstly, all praise due to ALLAH, for the strength he bestowed in me in order to accomplish this task, I have invested considerable dedication dissertation. Nevertheless, its fruition would not have been attainable without the generous assistance and guidance extended by numerous individuals. My sincerest thank goes to my advisor (Doç. Dr. Hüseyin MERTOL).

I extend and express my deep thanks and gratitude to my dear mother who greets me with a smile and bids me farewell with prayers, to my dear father as my idol, and to my brothers and sisters, the repository of strength and love.

Ultimately, language falls short in adequately conveying my appreciation to my esteemed friends, whose unwavering encouragement and support have been instrumental in my journey to this point.



ÖZET**ALTUN KÖPRÜ KENTİNDE RASTGELE KONUTLAŞMA OLGUSUNUN
MEKANSAL ANALİZİ****RASHID, Bahra Mohamed Sharif Rashid****Yüksek Lisans, Lisansüstü Eğitim Enstitüsü, Coğrafya Anabilim Dalı****Doç. Dr. Hüseyin MERTOL****Haziran 2024, xvi, + 101 sayfa**

Bu çalışmaların önemi, kentsel kalkınmayı önemli ölçüde etkileyen acil bir konuyu aydınlatması açısından açıktır. Gelişmekte olan ülkelerdeki çok sayıda şehir, kayıt dışı yerleşim sorunuyla karşı karşıyadır. Konut dışı alanlarda ortaya çıkan bu yerleşimler, devlet mülkiyet yasalarını ihlal etmekte ve tarım arazilerine tecavüz ederek kamu hizmetleri ve şehir planlaması üzerinde zararlı etkilere yol açmaktadır. Etkili bir planlama yapılmadığı takdirde bu mahalleler büyüyüp çoğalmakta ve nihayetinde kentsel dokunun önemli ve kaçınılmaz bir parçası haline gelmektedir. Kayıt dışı konut olgusunun araştırılması, çağdaş kentlerin karşı karşıya olduğu önemli bir sorun teşkil ettiği için coğrafi çalışmalarda büyük önem taşımaktadır. “Altun Köprü Kentinde Kayıt Dışı Konut Olgusunun Mekânsal Analizi” başlıklı çalışmamız, Altun Köprü’de kayıt dışı konut olgusunun gelişiminin ardındaki nedenleri aydınlatmayı ve bu olgunun nedenlerini ve mekânsal etkilerini analiz etmeyi amaçlamaktadır.

Bu çalışma, gayri resmi konutları tanımlamak ve özelliklerini anlamak için tarihsel ve analitik bir yaklaşım kullanmıştır. Çalışma, bu konutların genişlemesini etkileyen ana coğrafi faktörleri belirlemiş ve sorunları tespit edip çözümler önermeyi amaçlamıştır. Metodolojik olarak, çalışma veri toplamak için saha çalışmaları, anketler, analizler, kişisel görüşmeler ve hava fotoğrafları ile Coğrafi Bilgi Sistemleri (CBS) kullanımına dayanmıştır. Bu yaklaşım, Altun Köprü şehrindeki gayri resmi konut durumunun doğru bir şekilde tasvir edilmesini sağlamıştır. Çalışmanın mekansal sınırları şehrin merkezi ile sınırlı iken, zamansal odak noktası 2023 yılı itibariyle gayri resmi konutların mevcut durumunu incelemek olmuştur.

Bu çalışma dört bölüme ayrılmış olup, ilk bölümde enformel konutlara ilişkin kavramsal çerçeve yer almaktadır. İkinci bölüm, Altun Köprü kentindeki gelişigüzel konut gerçeğini içermekte olup, çalışmanın yapıldığı bölgenin en önemli coğrafi faktörlerini ve olgunun yayılmasına katkıda bulunan beşeri faktörleri, ayrıca olgunun

gelişim aşamalarını ve Altun Köprü kentindeki gelişigüzel konut alanlarının dağılımını içermektedir. Üçüncü bölüm, olgunun mekansal örüntüleri, hem kentsel hem de ekonomik örüntüleri ve kentin gecekodu mahallelerine yönelik kamu ve temel hizmetlerin incelenmesine odaklanırken, dördüncü bölüm gelişigüzel konut olgusunun kent üzerindeki olumsuz etkilerini ve olguyu ele alma yöntemlerinin incelenmesini içermektedir.

Bu olgu yeni değildir, ancak Altun Köprü kentinde rastgele konut olgusunun ortaya çıkış tarihi, kentin Kerkük ve Erbil'i birbirine bağlayan ana yol arasındaki stratejik konumunun önemine ek olarak, kentin genişlemesine ve rastgele konut topluluklarının kurulmasına katkıda bulunan kentin konumunun doğal özelliklerinin uygunluğunun yanı sıra nüfusun artması ve kentin temel planlamasının modernizasyonunun olmaması nedeniyle geçen yüzyılın başlarına dayanmaktadır. Konut eksikliğine ek olarak, bu olgu daha da şiddetlenmektedir. Çalışma ayrıca, Altun Köprü kentinin gecekodu mahallelerindeki kentsel, ekonomik ve sosyal örüntülerin, sakinlerinin kentli olmasının bir sonucu olarak, kenttekinden farklı olmadığını ortaya koymuştur. Kent sakinleri, üç milletin (Türkmenler, Kürtler ve Araplar) bir arada yaşadığı bir kenttir.

Çalışma, Altun Köprü kentindeki kayıt dışı konut olgusunun demografik özelliklerle orantılı olarak azaltılması için benimsenmesi umulan bir dizi sonuç ve tavsiyeyle sona ermiştir.

Anahtar Kelimeler: Mekansal Analiz, Altun Köprü Kenti, Rastgele Konut Olgusu, Kentin Kentsel Dokusu.

ABSTRACT**SPATIAL ANALYSIS OF THE PHENOMENON OF RANDOM HOUSING IN
THE CITY OF ALTUN KUPRI****RASHID, Bahra Mohamed Sharif Rashid****Master's Thesis, Institute of Graduate Studies, Department of Geography****Doç. Dr. Hüseyin MERTOL****Jun 2024, xvi, + 101 pages**

The importance of these studies is evident in shedding light on an urgent issue that significantly impacts urban development. Numerous cities in developing countries face the problem of informal settlements. These settlements, emerging in non-residential areas, violate state property laws and encroach upon agricultural land, leading to detrimental effects on public services and urban planning. Without effective planning, these neighborhoods grow and proliferate, eventually becoming an integral and unavoidable part of the urban fabric. The investigation of the phenomenon of informal housing holds great significance in geographical studies as it represents a major issue confronting contemporary cities. Our study, titled "Spatial Analysis of the Random Housing Phenomenon in the City of Altun Kupri," aims to elucidate the underlying causes of the development of informal housing in Altun Kupri and to analyze its causes and spatial impacts.

The study employed a historical and analytical approach to describe random housing and understand its characteristics. It identified the main geographical factors influencing the expansion of these settlements and aimed to identify problems and propose solutions. Methodologically, the study relied on fieldwork, surveys, analyses, personal interviews, aerial photographs, and the use of Geographic Information Systems (GIS) for data collection. This approach ensured an accurate depiction of the state of informal housing in the city of Altun Kupri. The spatial boundaries of the study were confined to the city center, while the temporal focus was on examining the current state of random housing as of 2023.

The structure of this study is divided into four chapters. The first chapter presents the conceptual framework for random housing. The second chapter covers the reality of informal housing in the city of Altun Kupri, including the most significant geographical factors of the study area and the human factors contributing to the spread of the

phenomenon It also addresses the developmental stages of the phenomenon and the distribution of informal housing areas in Altun Kupri. The third chapter focuses on the spatial patterns of the phenomenon, both urban and economic, as well as public and basic services for the city's slums. The fourth chapter examines the negative impacts of informal housing on the city and explores methods to address the phenomenon.

This phenomenon is not new, but the history of the emergence of the phenomenon of random housing in the city of Altun Kupri dates back to the beginning of the last century, due to the importance of the city's strategic location between the main road linking Kirkuk and Erbil, in addition to the appropriateness of the natural characteristics of the city's location, which contributed to its expansion and the establishment of random residential communities, as well as the growth of the population and the lack of modernization of the basic planning of the city. In addition to the lack of housing units, this phenomenon is exacerbated. The study also found that the urban, economic and social patterns in the slums of the city of Altun Kupri are no different from what is in the city, as a result of the fact that its residents are from the city. The inhabitants of the city, a city where three nationalities live together (Turkmen, Kurds, and Arabs).

The study concluded with a number of conclusions and recommendations, which it is hoped to be adopted in order to reduce the phenomenon of informal housing in the city of Altun Kupri commensurate with the demographic characteristics.

Keywords: Spatial Analysis, Altun Kupri City, Random Housing Phenomenon, Urban Fabric of the City.

N	List of Contents	Page No
	ETHICAL CONTRACT	i
	JURY ACCEPTANCE AND APPROVAL	ii
	ACKNOWLEDGEMENTS	iii
	ÖZET	iv
	ABSTRACT	vi
	List of Contents	viii
	Index of Photos	xi
	Index of Figures	xii
	Index of Tables	xiii
	Index of Maps	xiv
	Annex Table	xv
	ABBREVIATION	xvi
	INTRODUCTION	1
	1. The problem of the study	2
	2. Aim of the study	3
	3. The importance of the study	3
	4. The hypothesis of the study	3
	5. Study Methodology	3
	6. Limitations of the study	3
	7. Study structure	4
	8. Review previous literature on random housing & spatial analysis	4
	Chapter one	6
	Conceptual framework of informal housing	6
	1.1 The concept of random housing	6
	1.2 Definition and characteristics of random housing	8
	1.3 The phenomenon of random housing between the pros and cons	11
	1.4 Reasons for the emergence of random housing	11
	1.5 The theoretical framework, and conceptual model related to random Settlement.	12
	1.5.1 Political Economy Approach	12
	1.5.2 Spatial Justice Framework	13
	Chapter Two	15
	2. The reality of informal housing in the city of Altun Kupri	15
	2.1 Natural factors affecting the spread of random housing in the city of Altun Kupri	15
	2.1.1 Geographical location of the city of Altun Kupri	15
	2.1.2 Geological Structure	17
	2.1.3 Landforms	19
	2.1.4 The Climate	20
	2.1.5 Water Resource	22

2.2 Reasons and motives for the emergence of random housing in the city of Altun Kupri	23
2.2.1 Urbanization phenomenon.....	23
2.2.2 Population growth.....	24
2.2.2.1 Natural increase.....	24
2.2.2.2 Immigration	25
2.2.3 Failure to update planning systems	26
2.2.4 Non-compliance with laws	27
2.2.5 Misallocation of residential land.....	28
2.2.6 Increasing the rental value of homes.....	29
2.2.7 Weak government investment and support in housing	29
2.2.8 Weakness of the government apparatus in oversight and follow-up	30
2.3 The evolution stages of the phenomenon of random housing in the city of Altun Kupri.....	31
2.3.1 Emergence stage	32
2.3.2 Growth stage.....	32
2.3.3 Diffusion stage.....	34
2.4 A geographical study of the distribution of random housing areas in the city of Altun Kupri.	36
2.4.1 The northern part of Kurdistan neighborhood	37
2.4.2 The southern part of random housing of Altun Kupri city	38
2.4.2.1 Neighborhood Razgari	38
2.4.2.2 Neighborhood Azadi	39
2.4.3 The eastern part of random housing of Altun Kupri city	39
2.4.3.1 Neighborhood Qalaa	39
2.4.3.2 Neighborhood Qarabag	40
Chapter Three	41
3. Spatial analysis of informal Housing in Altun Kupri	41
3.1 The concept of random housing pattern analysis.....	41
3.2 Urban Pattern of random housing in Altun Kupri	42
3.2.1 Urban Structure of random housing in Altun Kupri	42
3.2.2 Analysis of the Housing Structure in random housing of Altun Kupri.....	44
3.2.2.1 Land Ownership and Type of Use in random Housing.....	45
3.2.2.2 Residential building area	46
3.2.2.3 Materials used in construction	47
3.2.2.4 Residential density	47
3.2.2.5 Number of rooms in the dwelling	50
3.2.2.6 Ownership of the housing unit (Ownership or Rent)	51
3.2.2.7 Rental price of the residential unit:	52
3.2.2.8 Assessment of the quality of the housing structure.....	53
3.2.3 Analysis of economic patterns of the random housing of Altun Kupri	57
3.2.3.1 The Profession of Household Heads.	57

3.2.3.2 Average monthly household income:.....	58
3.2.4 Analysis of social patterns of random housing in Altun Kupri	60
3.2.4.1 Previous place of residence	60
3.2.4.2 Family size.....	61
3.2.4.3 Educational level.....	63
3.2.5 Analysis of basic services and secondary services in random areas in the city of Altun Kupri	64
3.2.5.2 Electricity Services.....	65
3.2.5.4 Services for shopping purposes	68
3.2.5.5 Educational services	68
3.2.5.6 Health Services	68
3.2.5.7 Green squares.....	69
3.2.5.8 Availability of transportation and delivery services.	69
Chapter Four	70
4.1 The effects of the phenomenon of random housing on the city of Altun Kupri....	70
4.1.1 The effects of urban planning and development.....	70
4.1.2 Environmental impacts.....	74
4.1.3 The social and security effects.....	77
4.1.4 Agricultural effects	78
4.2 Addressing the phenomenon of random housing in the city of Altun Kupri	79
4.2.1 Opinions of residents of the study area regarding the treatment of random housing	80
4.2.2 Ways to address the phenomenon of random housing in the city of Altun Kupri.	82
4.2.2.1 The Full Removal Method.....	82
4.2.2.2 Partial removal method.....	83
4.2.2.3 Development method	84
4.2.2.4 Immunization method to reduce the spread of the phenomenon of informal housing in the city of Altun Kupri:.....	85
Conclusions	86
Recommendations	88
References	89
Annex	95
BACKGROUND	101

N	Index of Photos	Page No
	Photo 1: Random housing units in the process of growth – neighborhood Qalaa 2024	30
	Photo 2: Irregular buildings and narrow and meandering streets (Kurdistan neighborhood informal).....	43
	Photo 3: Building a house in medium condition in the neighborhood of Azadi in the city of Altun Kupri for the year 2023.....	54
	Photo 4: Building a house in good condition in the neighborhood of Qarabag in the city of Altun Kupri for the year 2023.....	55
	Photo 5: Building a house in good condition in the neighborhood of Kurdistan in the city of Altun Kupri for the year 2023.....	56
	Photo 6: Overtaking the main electricity network in the neighborhood of Azadi/Altun Kupri City 2023.....	65
	Photo 7: The use of columns to overtake the Kurdistan neighborhood / Altun Kupri 2023.	66
	Photo 8: Overtaking on electricity poles in Kurdistan neighborhood / Altun Kupri 2023.	66
	Photo 9: Lack of service sewage network in the neighborhood Azadi - Azadi-Altun Kupri.....	67
	Photo 10: Random sanitation planning in random housing areas in the city of Razgari/Altun Kupri 2023.	68
	Photo 11: The spread of building materials remains in the neighborhood of Qalaa.	71
	Photo 12: We are selling construction materials on a public street in the neighborhood of Qalaa.....	72
	Photo 13: The widening of the streets in the neighborhood of Qarabeg.	73
	Photo 14: The internal alleys are narrow and winding in the Kurdistan neighborhood.	73
	Photo 15: Random coffee shop on the main road between Kirkuk – Erbil.	74
	Photo 16: Dumping waste at the end of the residential area of the neighborhood Rizgari.	75
	Photo 17: Grazing animals within residential neighborhoods in the Azadi neighborhood.	76
	Photo 18: Rainwater Collection in the Neighborhood Rizgari (Winter Semester).	76
	Photo 19: A group of shops selling construction materials, gasoline, and a car repair shop on the main road of the neighborhood of Qalaa.....	77
	Photo 20: Selling vegetables on a road in the neighborhood of Rizgari.	77

N	Index of Figures	Page No
	Figure 1: Number of IDPs in the city of Altun Kupri after the events of 2003	26
	Figure 2: The prevailing belief of the residents of the slums of the city of Altun Kupri	28
	Figure 3: Relative distribution of residential density in dwellings in the random settlements of Altun Kupri for the year 2023.	49
	Figure 4: Relative distribution of the number of rooms in the random of Altun Kupri for the year 2023.....	51
	Figure 5: Relative distribution of the number of ownership or rent of housing in the random of Altun Kupri for the year 2023.....	52
	Figure 6: Relative distribution of the Rental Price of a Housing Unit in the random housing of Altun Kupri for the year 2023.	53
	Figure 7: Relative distribution of the condition of the dwellings in the random housing of Altun Kupri for the year 2023.....	56
	Figure 8: Relative distribution of the profession of heads of households in the random housing of Altun Kupri for the year 2023.	58
	Figure 9: Relative distribution of the Average monthly household income in the random housing of Altun Kupri for the year 2023.	59
	Figure 10: Relative distribution of the Previous place of residence in the random housing of Altun Kupri for the year 2023.....	61
	Figure 11: Relative distribution of the family size in the random housing of Altun Kupri for the year 2023.	62
	Figure 12: Relative distribution of the educational level of heads of households in the random housing of Altun Kupri for the year 2023.....	64
	Figure 13: Relative Distribution of Crime and Theft Rates in the random Neighborhoods of Altun Kupri City.	78

N	Index of Tables	Page No
Table 1:	Monthly average rainfall and temperature in the study area for the year (2010 - 2021).....	21
Table 2:	Growth of the population of the city of Altun Kupri from 1997-2023.....	25
Table 3:	Numerical distribution of housing construction history in the random settlements of Altun Kupri for the year 2023.....	35
Table 4:	Geographical distribution of random housing neighborhoods in the city of Altun Kupri.....	38
Table 5:	The numerical distribution of the land return for housing in the random housing of Altun Kupri for the year 2023.....	45
Table 6:	Numerical distribution of the area of residential buildings in the random housing of Altun Kupri for the year 2023.....	46
Table 7:	Numerical distribution of residential density in dwellings in the random housing of Altun Kupri for the year 2023.....	48
Table 8:	Numerical distribution of the number of rooms in dwellings in the random housing of Altun Kupri for the year 2023.	50
Table 9:	Numerical distribution of ownership or rent of a dwelling in the random housing of Altun Kupri for the year 2023.....	51
Table 10:	Numerical Distribution of the Rental Price of a Housing Unit in the random housing of Altun Kupri for the year 2023.	53
Table 11:	Numerical distribution of the condition of the dwelling in the random housing of Altun Kupri for the year 2023.....	55
Table 12:	Numerical distribution of the profession of heads of households in the random housing of Altun Kupri for the year 2023.	57
Table 13:	Numerical distribution of the Average monthly household income in the random housing of Altun Kupri for the year 2023.....	59
Table 14:	Numerical distribution of the Previous place of residence in the random housing of Altun Kupri for the year 2023.	61
Table 15:	Numerical distribution of the family size in the random housing of Altun Kupri for the year 2023.	62
Table 16:	Numerical distribution of the educational level of heads of households in the random housing of Altun Kupri for the year 2023.....	63
Table 17:	The percentage of opinions of residents of the study area regarding the treatment of random housing.	81

N	Index of Maps	Page No
Map 1:	The geographical location of the city of Altun Kupri in the province of Kirkuk and Iraq.....	17
Map 2:	Geological map of the city of Altun Kupri.	19
Map 3:	The evolution of the area of random housing phenomenon across growth stages and diffusion in Altun Kupri.....	36
Map 4:	Geographical distribution of the number of random housing in Altun Kupri. ..	37
Map 5:	Geographical distribution of population density in random housing Altun Kupri.	40
Map 6:	Geographical distribution of urban fabric patterns in the random housing of Altun Kupri.....	44
Map 7:	Geographical distribution of residential density in the random housing of Altun Kupri.....	49

N	Annex Table	Page number
1	Questionnaire Form	95
2	Reasons and Motives for the emergence of Inform Housing	98
3	Examined The Availability of Services in Informal Housing.	98



ABBREVIATION

GPS	Global Positioning System
GIS	Geographic information system
ISIS	Islamic State of Iraq and the Levant
IQD	Iraqi Dinars
LZR	Little Zab River
UAVs	Unmanned aerial vehicles



INTRODUCTION

Shelter stands as an elemental requirement in the human condition, following sustenance and attire in significance. Analogous to a nurturing guardian, it shields individuals from environmental perils and fosters their longevity. Housing is regarded as an inherent entitlement for all individuals, yet its accessibility remains a challenge across various developing and developed nations, thereby contributing to the prevalence of informal settlement issues in numerous urban centers. In Iraq, the advancement of community development encounters numerous hurdles, prominently among them being the proliferation of informal housing, which poses a significant challenge in the effective planning and organization of urban areas.

In Iraq, particularly following the events of 2003, the emergence and rapid proliferation of informal housing have been strikingly apparent. This phenomenon can be attributed to various factors, including the absence of comprehensive urban planning and inadequate regulatory oversight. The swift pace of urban expansion, coupled with a shortfall in housing units relative to population growth through natural increase, exacerbates the situation. Additionally, political instability has precipitated unregulated migration between urban and rural areas, further exacerbating the housing crisis. Neglect of rural regions and disparities in service provision between urban centers and rural areas have spurred migration to cities, fueling the spread of informal housing. Altun Kupri, like many Iraqi cities, grapples with the repercussions of this trend. The collapse of governmental authority resulted in the return of displaced individuals to their former residences and lands, while rural inhabitants migrated to the urban core of Altun Kupri. Encroachment upon municipal lands by individuals seeking housing, coupled with lax enforcement of regulations, has facilitated the proliferation of informal settlements within the city. The absence of effective legal frameworks and regulatory enforcement by responsible authorities has compounded the challenge of combating informal housing. Consequently, Altun Kupri has experienced a proliferation of informal housing, leading to heightened population density. Notably, this city serves as a noteworthy example of interethnic harmony, as it accommodates three distinct nationalities—Turkmen, Kurds, and Arabs—coexisting peacefully. Situated within the administrative purview of both the Kurdistan Region and the Government of Iraq, Altun Kupri embodies a unique geopolitical landscape characterized by multicultural resilience. Various instances of

haphazard breaches of the fundamental urban layout of Altun Kupri have been observed across multiple domains, encompassing infrastructural frameworks, arable lands both within and surrounding the city, as well as coastal regions. The foundational urban blueprint of the city faced substantial challenges dating back to 1997 and has remained unaltered since, lacking subsequent updates or revisions.

The obstacles inherent in conducting research within contested regions such as Altun Kupri are formidable. Challenges include a dearth of foundational data and statistical resources, compounded by governmental barriers and reticence among officials to furnish requisite information, statistics, and cartographic materials. Moreover, inhabitants of informal settlements often exhibit a reluctance to engage due to limited awareness and apprehensions regarding data sharing, impeding activities such as photographic documentation and questionnaire completion. Furthermore, the absence of antecedent scholarly works and empirical investigations pertaining to the targeted locale, coupled with the existence of concealed yet extant data sets, underscores the challenges posed by the prevailing authority's opacity.

Surmounting these challenges necessitates meticulous strategic planning and the implementation of innovative methodologies for data collection and analysis. Exploring alternative reservoirs of information, such as satellite imagery or in-depth qualitative interviews, holds promise for augmenting the existing sparse data repository. Cultivating trust within local communities and forging alliances with pertinent stakeholders can likewise serve as pivotal enablers in bolstering endeavors aimed at data acquisition.

Despite the formidable obstacles, it is imperative to confront these issues comprehensively in order to attain a nuanced comprehension of the circumstances prevailing in Altun Kupri and to formulate policy directives conducive to sustainable urban advancement. Maintaining resilience in the face of adversity is paramount to ensuring the efficacy of research endeavors and their prospective efficacy in ameliorating the well-being of the region's inhabitants.

1. The problem of the study

What is the reality of the spatial distribution of the phenomenon of random housing in the city of Altun Kupri? What are the most important geographical factors contributing to the spread of the phenomenon, and are there negative effects as a result of the current situation in the city?

2. Aims of the study

It aims to conduct a comprehensive spatial analysis of informal settlements in the city of Altun Kupri, focusing on understanding the patterns, causes, and consequences of informal settlements. This study seeks to determine the spatial distribution of informal housing, assess the social, economic, and environmental factors that contribute to its prevalence, and propose policy recommendations for sustainable urban development and improvement of living conditions in Altun Kupri.

3. The importance of the study

The importance of the research is to focus on one of the most prominent problems at present, which is the problem of the spread of the phenomenon of random housing that has not been previously studied in the city of Altun Kupri. In addition, it aims to give a brief picture of the lives of the residents of the city of Altun Kupri, to develop appropriate solutions that help them improve their living conditions.

4. The hypothesis of the study

The phenomenon of random housing is increasing in the city of Altun Kupri day by day, due to many reasons, including the lack of urban planning, economic deterioration, lack of control, and increased demand for housing after the events of 2003. The phenomenon causes negative impacts on agricultural and social aspects including the environment.

5. Study Methodology

The study used the historical and analytical approach in describing random housing and understanding its characteristics, identified the most important geographical factors affecting its growth, and aimed to identify problems and develop solutions, and relied on field study and questionnaire and analysis, in addition to conducting personal interviews, and the use of aerial photos and GIS to collect information, to identify the reality of random housing areas in the city of Altun Kupri.

6. Limitations of the study

The spatial boundaries of the study were limited to the city of Altun Kupri. The temporal limits are represented by studying the reality of the situation of the phenomenon of informal housing as it is in 2023.

7. Study structure

The structure of the study is divided into four chapters, as the first chapter includes the conceptual framework for informal housing. The second chapter includes the reality of random housing in the city of Altun Kupri, which consists of the most important geographical factors of the location of the region study and human factors that contributed to the spread of the phenomenon, also consists of the stages of development of the phenomenon and the distribution of random housing areas in the city of Altun Kupri. The third chapter focused on the study of spatial patterns of the phenomenon, both urban, economic and social, and public and basic services for the city's slums, while the fourth chapter included the most important negative effects of the phenomenon of random housing on the city and the study of methods of addressing the phenomenon.

8. Review previous literature on random housing & spatial analysis

Accurate and comprehensive geospatial data play a pivotal role in facilitating effective interventions aimed at enhancing the living conditions of slums or informal settlements. Utilizing geospatial information is instrumental in exploring the extant body of knowledge concerning interventions for upgrading informal settlements. This study seeks to review existing literature on the subject (Gurran & Maalsen, 2021; Dhumad, 2023; Wegmann & Mawhorter, 2017) categorized geospatial information into three main categories: physical, socio-economic; and boundaries; and classified data acquisition methods employed on studies; review (Al-Hafith et al., 2019; Al-Jawari, 2020; Ghanim & Yuonis, 2020) included primary and secondary sources; encompassing various data collection techniques; findings of literature review (Kahachi & Brown, 2020; Hanoon & Dhumad, 2021) indicate majority of studies focused in collecting geospatial information enumerated; and measured empirically observable characteristics; included data related to structures; infrastructure; utility services; mobility networks; and land descriptions within informal settlements; studies (Sadeq & Alhamdany, 2021; Zaitseva, 2017) collect socio-economic information about occupants of these settlements; allow for a comprehensive understanding of living conditions and needs. also, the review (Dekel, 2020; Hanoon, & Dhumad, 2021) reveals a limited number of studies that collected geospatial information in social networks and social ties within informal settlements; this represents a gap in research, as data provide valuable insights into community dynamics; and social cohesion.

Regarding data acquisition methods; scholars' analysis (Al-Jawari, 2020; Grashoff & Yang, 2020) variety of techniques were employed. Primary data collection methods included paper-based surveys; handheld & mobile GPS devices with GIS data; and vehicle-mounted cameras. Secondary sources, such as spaceborne, airborne; and web-based platforms, were also utilized. Notably, the use of unmanned aerial vehicles (UAVs) was relatively uncommon in reviewed studies, despite their growing popularity as a source of base maps; it is anticipated use of UAVs increase shortly; offering new opportunities for data collection in informal settlements upgrading projects. The findings of this literature review serve as a valuable resource for informing data collection strategies on informal settlement upgrading interventions. Policymakers and stakeholders involved in such projects can benefit from a centralized source of knowledge that outlines types of geospatial information commonly collected and methods employed for data acquisition; by addressing the identified gaps; future interventions enhance understanding of informal settlements; facilitating more targets; and effective upgrade initiatives.

Chapter one

Conceptual framework of random housing

1.1 The concept of random housing

Informal housing, alternatively referred to as informal settlements or slums, represents a prevalent urban occurrence that presents substantial obstacles to cities on a global scale. These settlements arise due to accelerated urbanization, burgeoning population growth, and the incapacity of formal housing markets to adequately address the escalating need for affordable housing (Shrestha et al., 2021). Altun Kupri, a municipality contending with the intricacies of urban progress, aligns with this prevailing global pattern (Al-Abadi et al., 2017). The emergence of informal settlements, marked by the occupancy of low-income residents in unregulated and chaotic living environments, stems from governmental shortcomings in furnishing sufficient housing options commensurate with population expansion and the influx of rural-to-urban migrants (Hanoon & Dhumad, 2021). These enclaves, perceived as irregular and nonconforming in contrast to conventional urban settings, function as densely populated habitats for impoverished communities. While informal settlements pose obstacles such as unauthorized construction, deficient infrastructure and amenities, congested layouts, and restricted accessibility, they also serve as a recourse for economically disadvantaged individuals in search of housing solutions (Karachi & Brown, 2020). The genesis of these communities stems from economic impoverishment and disparity, whereby individuals with lower incomes are marginalized from participatory planning procedures that favor affluent regions, especially in the realms of physical urban planning and housing initiatives. Informal housing within an urban context pertains to residential units constructed and inhabited outside the established regulatory frameworks and standards prescribed by governmental entities. It is often linked with spontaneous settlements, slums, and squatting encampments within urban locales (Ghanim, & Yuonis, 2020). Informal housing emerges as a consequence of diverse factors such as accelerated urbanization, population expansion, economic deprivation, insufficiency of affordable housing alternatives, and deficient urban planning and governance measures (Al-Jawari, 2020).

Urban development entails the strategic coordination of planning, design, and administration within cities and urban regions with the objective of enhancing the well-

being of their inhabitants. This multifaceted endeavor encompasses numerous facets including infrastructure enhancement, housing facilitation, establishment of transportation networks, provision of social services, and the promotion of environmental sustainability (Al-Hafith et al., 2019).

The interconnections between informal housing and urban development exhibit intricacy; informal settlements serve as manifestations of the challenges and disparities inherent within urban settings. These settlements typically endure deficiencies in fundamental amenities including clean water, sanitation, electricity, and adequate healthcare. Living conditions within such settlements are typically substandard, characterized by overcrowding, inadequate housing structures, and limited infrastructure (Wegmann and Mawhorter, 2017).

Initiatives aimed at mitigating informal housing and fostering urban development necessitate comprehensive approaches that encompass a range of pivotal strategies. Foremost among these is the implementation of regularization measures for informal settlements, entailing the enhancement of existing housing and infrastructure alongside the assurance of legal tenure rights for residents. Enabling access to essential services, improving housing standards, upgrading infrastructure, and facilitating the integration of informal settlements into the formal urban framework constitute essential elements of this approach. Secondly, the provision of affordable housing is imperative; devising and executing strategies to augment the availability of affordable housing serves to mitigate the complexities linked with informal housing. This is accomplished through endeavors such as the construction of economical housing units, the implementation of social housing initiatives, and the cultivation of partnerships with the private sector to stimulate the development of affordable housing options (Dhumad, 2023; Durst & Wegmann, 2017). Thirdly, participatory planning and community involvement assume significant significance; involving inhabitants of informal settlements in decision-making processes is pivotal for fostering inclusive urban development. Through participatory planning, the needs, preferences, and priorities of communities are discerned, thereby facilitating more efficacious interventions to tackle the specific challenges encountered by informal settlements. Enhancing governance structures and institutional capacities represents another critical dimension. Enhancements in urban governance and the fortification of institutions tasked with urban development are pivotal in addressing the root causes of

informal housing. This encompasses endeavors such as fostering transparency, ensuring accountability, fostering collaboration among stakeholders, and implementing robust mechanisms for land-use planning and regulation (Grashoff & Yang, 2020). It is crucial to prevent the emergence of new informal settlements through proactive measures. This entails the promotion of affordable housing alternatives, the implementation of inclusive urban planning policies, and the mitigation of underlying factors contributing to poverty and inequality (Hanoon & Dhumad, 2021). The integration of sustainable urban development initiatives is essential in endeavors to tackle informal housing. This entails the promotion of energy-efficient infrastructure, the establishment of sustainable transportation networks, the creation of green spaces, the adoption of environmentally friendly approaches in housing construction and resource management, and the cultivation of long-term viability and resilience (Kahachi & brown, 2020).

Altun Kupri, situated within the Kirkuk governorate of Iraq, holds considerable strategic importance. Predominantly inhabited by Turkmen, Arab, and Kurdish populations, Altun Kupri is positioned alongside the banks of the Little Zab River and is situated along the Erbil-Kirkuk road (Al-Abadi et al., 2017). The intricate character of the town, characterized by its diverse ethnic makeup and pivotal geographic placement, has fueled persistent disputes regarding its governance. The strategic significance of Altun Kupri emanates from its geographical location and role as a key transportation nexus. Positioned along the Erbil-Kirkuk thoroughfare, it serves as a vital conduit connecting these prominent Iraqi cities. Additionally, its proximity to the Little Zab River amplifies its importance, offering access to water reservoirs and prospective economic prospects. Furthermore, Altun Kupri has undergone considerable urban expansion in recent years (Sadeq & Alhamdany, 2021). This rapid urbanization has led to the emergence of informal housing in various parts of the city, creating a range of social, economic, and environmental issues (Al-Jawari, SM. 2020). Spatial analysis, as a powerful tool in urban planning and geography, allows examining patterns and relationships between many variables in geographic space (Al-Hafith et al., 2019).

1.2 Definition and characteristics of random housing

Traditionally, the notion of "informal" housing or urban activities has predominantly been linked with regions classified as the global south, with minimal consideration given to counterparts in the global north (Grashoff&Yang,2020).

Urban geographers and political economists have in recent times contested these perceptions, advocating that informality should be regarded as a more encompassing phenomenon inherent in metropolitan urbanization across the globe (Shrestha & Maalsen, 2021). They contend that informality is not solely a product of spontaneous or unregulated actions by individuals, but is also influenced by state institutions and regulations. These regulations delineate what is deemed permissible or impermissible, yet they inadequately address enduring challenges related to urban poverty and inequality (Durst and Wegmann, 2017). The binary distinction between "informal" and formal should undergo reevaluation, as informality emerges as an intrinsic aspect of urbanization processes across diverse geographical contexts. It is shaped by intricate interplays among state practices, regulatory frameworks, and socio-economic dynamics (Shrestha et al., 2021). According to various references, it is approximated that around a quarter of the worldwide urban populace inhabits precarious and volatile communities distinguished by various manifestations of informality, including shantytowns, favelas, *barriadas*, *bidonvilles*, *bustees*, *kampungs*, or *gecekondular* (Wegmann and Mawhorter, 2017). The presence of diverse informal settlements across different political and social landscapes underscores the nuanced dimensions of urban informality. This intricacy arises from a multitude of factors, such as socio-economic inequalities, deficient housing policies, restricted access to essential services, and governance challenges within urban environments (Al-Hafith et al., 2019). Comprehending and tackling the complexities of urban informality necessitates thorough examination. Tailored interventions must consider the distinctive features and dynamics of individual informal settlements (Grashoff & Yang, 2020).

Informal housing, alternatively termed informal settlements or slums, denotes residential zones that have evolved outside of formal planning and regulatory frameworks. These settlements commonly arise in urban or peri-urban locales in response to a shortage of affordable housing alternatives and insufficient access to basic services and infrastructure (Karachi and Brown, 2020).

In Iraq, the landscape of informal housing reflects the socioeconomic and political dynamics of the region. The tumultuous effects of wars, accelerated urbanization, and population expansion, prevalent across numerous Middle Eastern nations, have precipitated the formation of informal settlements in response to escalating requirements for affordable housing. These settlements are typified by the occupation of land lacking

legal ownership or formal land tenure rights, posing challenges for residents seeking proper documentation and legal acknowledgment of their dwellings (Al-Jawari, 2020).

In Iraq, informal housing zones demonstrate elevated population densities and overcrowding, largely attributable to spatial constraints and deficient urban planning initiatives. Construction techniques utilized in informal housing rely on locally accessible and economical materials such as concrete blocks, corrugated metal, or recycled materials. However, these construction practices commonly diverge from formal building codes and regulations (Hanoon and Dhumad, 2021).

Basic service accessibility within informal settlements is severely impeded, characterized by inadequacies in clean water, sanitation, electricity, and healthcare. Infrastructure and service provisions are frequently deficient or entirely absent in these localities, thereby presenting formidable obstacles to the welfare and standard of living of inhabitants (Zaitseva, 2017).

A considerable segment of the populace inhabiting informal housing partakes in informal economic endeavors to maintain their sustenance. These pursuits encompass street vending, small-scale enterprises, and involvement in the informal labor sector. Constrained access to formal employment opportunities motivates engagement in these economic activities.

Informal housing is intricately linked with marginalized or disadvantaged groups, comprising low-income individuals, displaced communities, and migrant laborers. These demographics frequently encounter social marginalization, encountering obstacles in accessing education, healthcare, and various social services. Discrimination and social stigma represent prevalent challenges experienced by residents of informal settlements (Dekel, 2020).

Government authorities in the nation utilize diverse strategies to tackle informal housing, encompassing measures such as regularization and enhancement initiatives alongside eviction and relocation programs. The efficacy and consequences of these interventions exhibit considerable variance contingent upon particular circumstances and the methodologies employed.

1.3 The phenomenon of random housing between the pros and cons

Informal housing expedites the provision of immediate shelter in response to urgent housing demands and cultivates robust social networks and community resilience. These settlements uphold cultural and ethnic identities and function as centers for informal economic endeavors. In regions characterized by high formal housing costs, informal housing presents more accessible alternatives. Moreover, it demonstrates flexibility and adaptability to evolving conditions. While acknowledging these advantages, it is imperative to confront the challenges and risks inherent in informal housing. Efforts should be directed towards enhancing living standards and advancing inclusive and sustainable urban development (Grashoff and Yang, 2020).

Informal settlements emerge due to factors such as population expansion, migration from rural to urban areas, economic deprivation, and scarcities in affordable housing alternatives. These settlements are typified by the occupancy of land or structures lacking legal ownership or formal sanction. Challenges associated with informal housing encompass insecurity of tenure, rendering residents susceptible to eviction and displacement, insufficiencies in infrastructure and basic services like clean water and sanitation, substandard housing conditions, restricted access to education and healthcare, and economic adversities stemming from the absence of formal addresses and tenure rights (Bernard, 2000). The unplanned and densely populated nature of informal settlements presents challenges in urban planning and management, as authorities encounter difficulties in delivering comprehensive services and infrastructure.

1.4 Reasons for the emergence of random housing

The phenomenon of informal housing exhibits diversity across cities worldwide, influenced by the economic and social contexts of individual countries. The most notable contributing factors can be outlined as follows:

- The economic, cultural, and social dynamics of certain cities position them as focal points that attract numerous immigrants seeking to enhance their circumstances. Consequently, rather than a surge in urban housing rents, these cities witness an escalation in the prices of residential land (Haider, 2010).
- The rise in population growth stems from the natural increase resulting from disparities between birth and death rates. Additionally, various forms of migration

contribute significantly to the demand for housing, reflecting the insufficiency of available accommodations.

- Involuntary factors compel residents to vacate their residences and seek refuge in informal housing areas due to natural calamities (including earthquakes, hurricanes, floods, volcanoes, droughts, landslides, tsunamis, etc.), conflicts, or the autocratic policies of certain governments.
- Weak laws and systems applied in integrated housing policies capable of addressing housing problems in most developing countries (Khalil, 1986).
- The decline in security and political stability, coupled with inadequate oversight by governmental agencies on construction activities, has facilitated the expansion of informal housing beyond designated urban plans. Subsequently, these areas have been assimilated into the official urban plan due to their integration into the broader framework.

1.5 The theoretical framework, and conceptual model related to random Settlement.

Numerous theoretical frameworks and conceptual models have been formulated to comprehend and scrutinize informal settlements, alternatively termed slums or informal housing. These frameworks offer analytical perspectives for researchers, policymakers, and practitioners to delve into the intricacies of informal settlements and steer interventions. Below are some noteworthy frameworks:

1.5.1 Political Economy Approach

The political economy approach presents a theoretical framework that centers on the political and economic determinants influencing informal settlements. It explores the ways in which power dynamics, economic frameworks, and political mechanisms influence the emergence, continuity, and evolution of informal housing (Dekel, 2020).

Political economy approaches acknowledge that informal settlements are not solely outcomes of individual decisions or market dynamics but are significantly shaped by wider political and economic circumstances. They underscore the complex interactions among actors, institutions, and systems that foster the creation and perpetuation of informal settlements (Smit, 2019).

The political economy perspective on informal settlements comprises several pivotal components. It underscores the importance of power dynamics in configuring settlements, examining influential entities such as political elites, landowners, and developers who wield authority to govern land, resources, and urban development procedures. These power imbalances often result in the marginalization and exclusion of residents within informal settlements (Hanoon and Dhumad, 2021).

Secondly, this approach directs attention to land tenure systems and their nuanced ramifications for informal settlements. It scrutinizes matters pertaining to land ownership, access, and distribution, recognizing that legal frameworks and policies govern land tenure arrangements. Inadequate land tenure systems and residents' incapacity to secure formal land rights frequently contribute to the emergence of informal settlements (Dekel, 2020). Urban governance emerged as another pivotal aspect underscored by the political economic approach. It scrutinizes urban planning, policies, and regulations that shape the spatial arrangement of informal settlements and the delivery of essential services. This perspective investigates the interplay between formal and informal governance structures within the realm of informal settlements. Moreover, political economy approaches recognize the influence of economic disparities in informal settlements, exploring facets such as poverty, income gaps, and restricted access to formal employment and income-generating opportunities, which play significant roles in the genesis and perpetuation of informal housing (Hyal Ghanim and Yuonis, 2020; Smit, 2019).

Informal settlements concentrate on marginalized and low-income populations (Zaitseva, 2017). By encompassing these fundamental components, political economic approaches furnish a comprehensive comprehension of the intricate dynamics underlining informal settlements. This comprehension informs interventions and policies designed to tackle the fundamental origins of informality, foster inclusive urban development, and enhance the living standards of informal settlement residents.

1.5.2 Spatial Justice Framework

The spatial justice framework serves as the theoretical underpinning for numerous researchers and studies concentrating on the spatial aspect of social justice, particularly within informal settlements or slums. These studies investigate the uneven allocation of resources, services, and opportunities in urban settings and endeavor to rectify spatial

disparities (Zaitseva, 2017); The Spatial Justice Framework acknowledges the unequal distribution of vital resources and opportunities throughout urban landscapes, resulting in disparities and injustices. It underscores the necessity for fair and inclusive spatial planning and development initiatives to guarantee equal access to urban resources and benefits for individuals and communities (Wegmann and Mawhorter, 2017). The frameworks underscore the presence of spatial disparities, where specific regions or demographic groups possess superior access to resources, services, and opportunities compared to others. They investigate how factors such as land valuation, infrastructure, proximity to amenities, and environmental conditions contribute to these spatial inequalities (Dhumad, 2023); The spatial justice framework is closely intertwined with the right to the city perspective, which asserts that urban residents have the entitlement to actively engage in and influence the development of their cities. It underscores the significance of inclusive urban planning processes that engage marginalized communities and address their spatial requirements and aspirations (Wegmann and Mawhorter, 2017). The framework advocates for spatial planning and development approaches that prioritize equity and social justice; calls for interventions aim to redistribute resources; improve infrastructure; and provide equal access to basic services in underserved areas; including informal settlements (Wegmann and Mawhorter, 2017); the spatial justice framework emphasizes the importance of participatory decisions making processes involve local communities; especially those live on informal settlements; recognizes the value of their local knowledge and lived experiences in shaping urban policies and interventions (Smit, 2019); the frameworks acknowledges intersection between spatial and environmental justice, examines marginalized communities, including those in informal settlements, were disproportionately affected by environmental risks and hazards, advocates for environmentally sustainable; and socially one approach to urban development.

Chapter Two

2. The reality of random housing in the city of Altun Kupri

This chapter seeks to examine the key geographical factors influencing the proliferation of informal housing within the study area. The city of Altun Kupri has experienced significant urban expansion in recent years, largely due to the intensification of various issues, including the development of an informal settlement in the Altun Kupri region following 2003. In Iraq, many individuals have been displaced from their home regions due to unrest, wars, and armed conflicts, particularly in the study area, which lies within the contested zones between the regional government and the Iraqi government. These displaced populations, seeking refuge amidst widespread chaos, instability, and sporadic warfare, have established an unplanned and disorganized settlement in the Altun Kupri area. Consequently, it is essential to understand the key geographical factors influencing the distribution and variation of informal housing in this region.

2.1 Natural factors affecting the spread of random housing in the city of Altun Kupri

The situational and positional characteristics of a city are fundamental elements in geographical studies, as no phenomenon on the Earth's surface can develop and expand without being influenced by natural characteristics. In the context of Altun Kupri City, several key natural features significantly impact the proliferation of informal housing. These include:

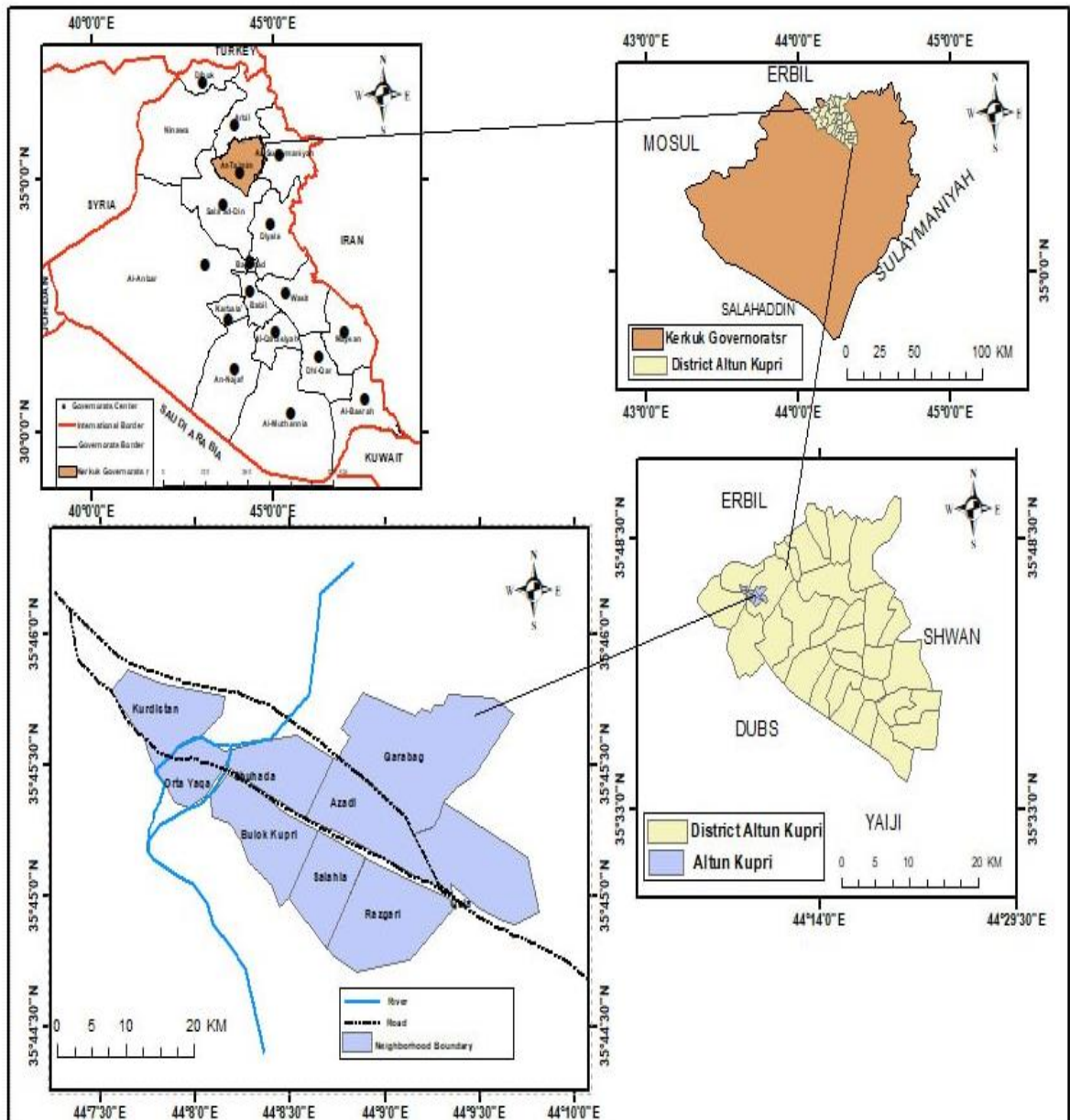
2.1.1 Geographical location of the city of Altun Kupri

Altun Kupri, a city in Iraq's Kirkuk Governorate, is situated along the banks of the Lesser Zab River. The study area includes a section of the Lesser Zab River, stretching roughly 12 kilometers between Altun Kupri and the Dibbs Dam. Astronomically, Altun Kupri is positioned at coordinates using the WGS84 system: Latitude (35° 44'30"N – 35° 46'0"N) and Longitude (44° 07'30"E – 44° 10'0"E) (see map 1). Altun Kupri holds significant strategic importance and is a contested territory. It is situated approximately 35 kilometers northwest of Kirkuk in northern Iraq, along the road linking Kirkuk to Erbil, which lies about 50 kilometers north of Altun Kupri. This strategic position makes Altun Kupri a crucial junction between these two major cities, enhancing transportation and trade within the region (Siddiqui et al., 2017). During the reign of Ottoman Sultan Murad

IV, two bridges were built in Altun Kupri, significantly enhancing its prominence. The town became a popular destination for European travelers and was celebrated for its scenic beauty (Sadeq and Alhamdany, 2021). By the late 18th century, Altun Kupri comprised approximately 400 to 500 households. In 1799, Mirza Abu Taleb Khan visited and described it as a sizable village with a mixed population of Kurds and Turkmen, primarily engaged in agriculture. Altun Kupri functioned as a trading hub between Kurdistan and Baghdad, specializing in agricultural products like figs and grapes. Under the rule of Muhammad Pasha of Soran (1813-1836), the town saw an expansion of influence, compelling the Ottoman governor of Baghdad to recognize his control over the area. By 1906, the population of Altun Kupri had grown to around 4,000 residents. In 1918, the Ottoman Empire demolished the town's famous stone bridges and replaced them with modern steel structures. By 1925, Turkmen made up the majority of Altun Kupri's inhabitants (Siddiqui et al., 2019).

A city's location is defined as the specific area it occupies within its administrative boundaries or its built-up area (Sabri and Saleh, 1987). Altun Kupri benefits from a favorable location, with the Lesser Zab River flowing through it, and its terrain being fertile and flat, devoid of sharp undulations. These features make the land suitable for agriculture and other uses, thereby facilitating the spread of informal settlements. The presence of flat lands particularly supports various human activities, leading to urban expansion and construction in multiple directions.

Map 1: The geographical location of the city of Altun Kupri in the province of Kirkuk and Iraq.



Source: Researcher based on (1) Directorate of Altun Kupri Municipality, Planning and Follow-up Division, 2023. (2) Aerial photos of the city of Altun Kupri, 2023.

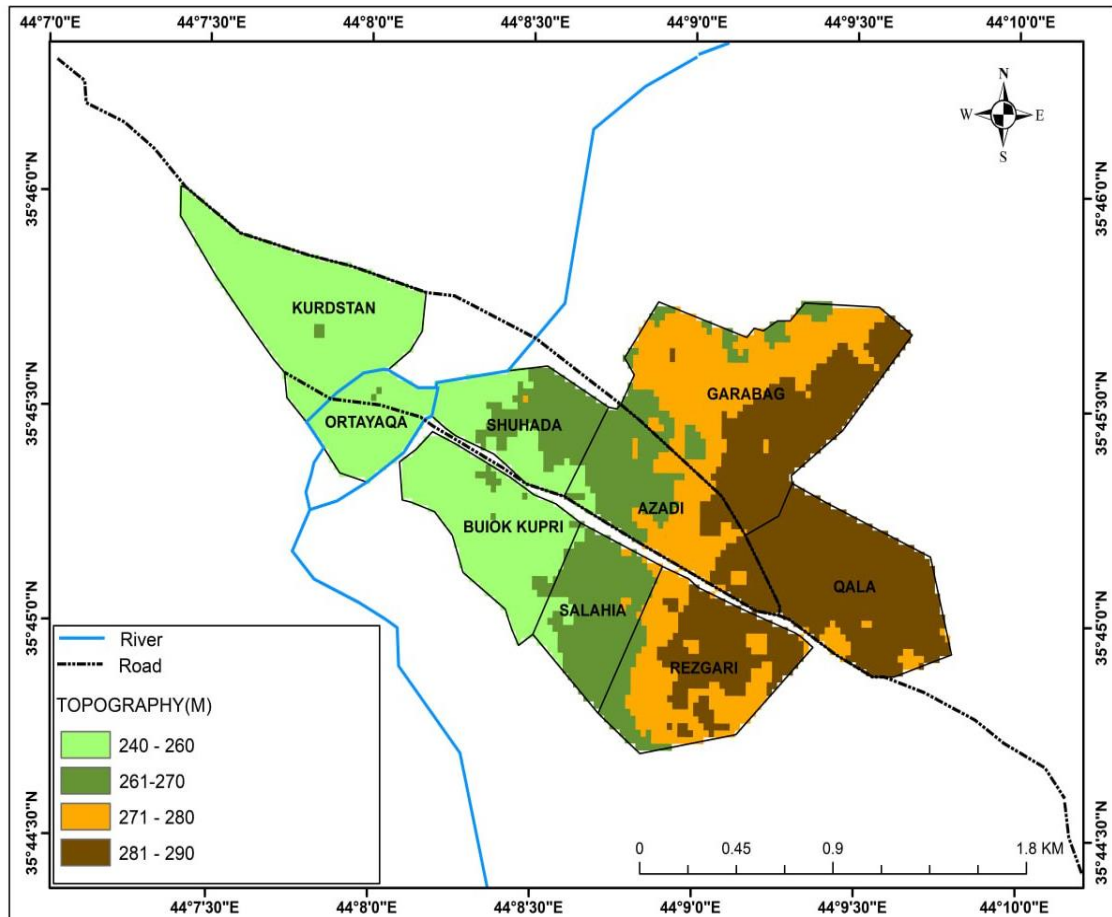
2.1.2 Geological Structure

Geological structure has direct and indirect effects on the urban planning of the city. For example, the viability of the prevailing rocks in the region for building and construction purposes directly affects urban planning decisions. In addition, the hardness

of the surface layer helps the vertical height of housing units, and vice versa, and also plays a role in laying roads and railway lines, which contributes to the revival of residential shops in the city. The indirect effect is represented in the content of the underground layers of minerals and its richness in various organic and chemical elements, which makes the land fertile and suitable for agricultural production. In both cases, the city becomes attractive to a large number of residents and economic activities, which leads to the proliferation of urban shops (Mohammed and Said, 1976). Geologically, the studied area is characterized by various formations dating back to tertiary age, as classified by Jassim and Buday (2006); prominent geological formations in the area include the Injana, Mukdadiya (Lower Bakhtiari Fn), and Bai Hassan formations (Upper Bakhtiari Fn); formations are of particular importance as they host the primary underground water aquifer within the middle section of the LZR. Some of these formations are visible as ridges along the right bank of the river. The area of the Altun Kupri gradually decreases from the south and southeast to the north and from the northwest to the west. The study area generally ranges between (240-290) m, above sea level (Map 2) and is situated at an elevation of (240-270) m, above sea level. Its lowest level is along the small river, and its highest level ranges between 280-300 meters in the south and southeast.

This indicates that the flat land area of the study region is a factor attracting the population, in addition to being a contributing factor to the urban expansion of Altun Kupri City and the spread of informal housing therein.

Map 2: Geological map of the city of Altun Kupri.



Source: Researcher based on (1) Directorate of Altun Kupri Municipality, Planning and Follow-up Division, 2023. (2) Aerial photos of the city of Altun Kupri, 2023.

2.1.3 Landforms

The forms of the earth's surface are natural manifestations affecting human activity, and they also have an effective role in the process of growth and development of cities, as the plains are considered the most suitable areas for human activity compared to mountains and rugged areas. The town is nestled within a valley formed by the Little Zab River; the valley features rolling hills, agricultural fields, and meandering waterways, offering visually striking and fertile terrain.

Altun Kupri is surrounded by hills that add to the town's natural beauty; hills, varying in size and elevation, provide vantage points to observe surrounding landscapes and offer opportunities for outdoor exploration and hiking; The region surrounding Altun

Kupri features vast plains that are primarily use for agricultural purpose; flat expanse of land provides fertile soil for farming and contribute to town agricultural economy. Vicinity of Altun Kupri, some plateaus rise above surrounding areas; elevated landforms offer a panoramic view of surrounding landscapes and can be seen as distinct features on the horizon. Little Zab River has carved gorges through surrounding hills, creating breathtaking natural formations; gorges, characterized by cliffs and narrow passages, showcase the erosive power of the river and provide opportunities for geological study and outdoor activities (AL-JANABI, 2022).

Along riverbanks, terraces are observed; flat, elevated platforms are formed by gradual deposition of sediment over time; terraces offer the unique perspective of the river and surrounding landscapes; a combination of these landforms contributes to the diverse and visually appealing natural environment surrounding Altun Kupri. The presence of rivers, valleys, hills; plains; plateaus, gorges, and terraces adds to the town's geographical charm and provides opportunities for various recreational, agricultural, and geological activities (Hassan, 2016). Altun Kupri is surrounded by hills that add to the town's natural beauty; hills, varying in size and elevation, provide vantage points to observe surrounding landscapes and offer opportunities for outdoor exploration and hiking; The region surrounding Altun Kupri features vast plains that are primarily use for agricultural purpose; flat expanse of land provides fertile soil for farming and contribute to town agricultural economy.

2.1.4 The Climate

The environmental conditions prevailing in the researched locale are conducive to sustaining life within it (Al-Haddad, 2000). Situated at an elevation of 257.48 meters (844.75 feet) above sea level, Altun Kubri exhibits a Mediterranean climate predominantly characterized by hot summers, denoted by the climatic classification of Csa. The regional climate encompasses typical Mediterranean traits, featuring arid summers and comparatively temperate winters, a climatic pattern influenced significantly by the area's geographical location.

It is imperative to underscore that the climatic information furnished pertains exclusively to the examined zone adjacent to the Lesser Zab River. Discrepancies are apparent across diverse sectors of the region, wherein localized elements such as altitude,

proximity to aqueous bodies, and terrain intricacies engender microclimatic nuances, thus augmenting the area's overall variability.

The climatic conditions prevailing within the examined vicinity, encompassing a segment along the course of the Lesser Zab River (LZR), manifest conspicuous seasonal fluctuations attributable to its geographical disposition. Throughout the year, the region experiences discernible shifts in average temperatures. For instance, January, denoted as the coldest month, records an average temperature of 9.2°C, whereas July, identified as the warmest month, registers a notable elevation to 36.1°C. These temperature differentials underscore substantial variances in thermal intensity between the winter and summer seasons within the area (UN Habits, 2024).

Table 1: Monthly average rainfall and temperature in the study area for the year (2010 - 2021).

Months	Maximum temperature (C)	Minimum temperature (C)	Rate (Average temperatures)	Monthly rainfall rate	Solar radiation rate	Relative humidity rate	Average wind speed m/s
January	16,3	5,4	9,2	74,5	4.9	70.3	1.8
February	19,6	6,6	10,8	66,6	5.9	64.7	2.1
March	24,4	11,1	14,8	76,9	6.4	56.6	1.9
April	31,7	16,4	19	97,3	7.2	47.2	2
May	38,8	23,4	27,1	90,7	8.9	33.8	2.2
June	45,9	28,8	32,7	/	11.4	24.1	2.3
July	48,9	32,5	36,1	/	10.5	22.9	2.1
August	49,2	31,7	35,4	/	9.9	23.9	1.2
September	43,6	27,2	31,4	/	8.7	28.6	1.44
October	36,3	19,5	25,1	/	6.9	40.3	1.4
November	23,7	11,8	17	67,2	5.6	59.3	1.4
December	19,6	6,8	11,1	36,8	5.2	67	1.5
Rate	33.1	18,4	22,4	90	7.62	44.9	1.77

Source: Data of the Ministry of Transport and Communications, Iraqi General Authority for Meteorology and Seismic Monitoring, Climate Section, Kirkuk Station, data 2010-2020, unpublished.

The precipitation received during the winter and spring periods plays a substantial role in augmenting river discharge, with an estimated 30.4% of the total rainfall being converted into surface runoff. The area typically observes an average annual precipitation ranging between 250 to 350 millimeters. Notably, precipitation distribution across the year is uneven, with certain seasons contributing more significantly to the overall precipitation volume (Saleh, 2010, Vol. 540). Concurrently, the region experiences an

average annual wind speed of approximately 1.77 meters per second, characterized by predominantly low-speed winds. Regarding humidity, the annual average hovers around 44.9, with relative humidity rates demonstrating an inverse correlation with rainfall and temperatures (Ministry of Transport and Communications, 2024).

2.1.5 Water Resource

The significance of water resources in facilitating the expansion and prosperity of urban areas cannot be overstated. It is imperative to efficiently secure and manage these resources to ensure the sustainability and advancement of the city. As urban centers expand in size, their demand for water correspondingly escalates. Hence, the emergence of cities often aligns with the presence and utilization of rivers to fulfill their water requirements. This underscores the crucial role of water and underscores its indispensability in the establishment, distribution, and evolution of these settlements (Haider Al-Qarawi, 2014).

The Lesser Zab River (LZR) stands as a pivotal water asset within the investigated locality, fulfilling essential roles as the principal water source for myriad human endeavors and sustaining a rich array of ecosystems. Serving as a significant tributary to the Tigris River, it substantially contributes to the regional water supply. Fed by diverse origins, including precipitation in the form of rainfall and melting snow from adjacent mountainous regions, the river undergoes continuous replenishment, ensuring a consistent water flow year-round. Seasonal fluctuations in precipitation exert notable influence on the river's discharge dynamics, with heightened flow typically occurring during the winter and spring seasons, coinciding with periods of increased rainfall (UN Habits, 2024).

The utilization of water from the Lesser Zab River encompasses a multitude of functions, with a notable emphasis on irrigation, notably within agricultural contexts. Through diversion into intricate networks of irrigation canals and channels, river water is allocated to sustain crop cultivation, thereby bolstering agricultural output within the area. Additionally, the river serves as a fundamental source of potable water for adjacent communities, effectively addressing their domestic water requirements (Al-Janabi, 2022).

Industrial enterprises similarly depend on the water reservoirs provided by the Lesser Zab River, utilizing its waters for a spectrum of operations including

manufacturing, cooling, and energy generation. The accessibility of water from the river substantiates the economic expansion and advancement across diverse industrial domains within the region. The existence of the Lesser Zab River, along with its accompanying riparian environments, fosters a plethora of ecosystems conducive to sustaining a rich diversity of flora and fauna. Acting as a habitat for aquatic life forms such as fish, amphibians, and invertebrates, the river plays a pivotal role in supporting these organisms. Furthermore, the riparian vegetation lining the riverbanks sustains a diverse array of plant species, offering habitats for terrestrial animals, birds, and insects. Thus, the river ecosystems significantly contribute to the overall biodiversity of the region.

The presence of the river has played a pivotal role in sculpting the topography of Altun Kupri while facilitating a multitude of activities. Serving as a critical water reservoir, the river functions as a primary irrigation source, thereby facilitating agricultural endeavors in the vicinity. The fertile tracts flanking its banks significantly contribute to the town's agrarian economy, supporting the cultivation of staple crops including wheat, barley, and various vegetables (Hassan, 2016).

2.2 Reasons and motives for the emergence of random housing in the city of Altun Kupri

The urban environment stands as a quintessential testament to human civilization, evolving across epochs through dynamic spatial configurations. Undoubtedly, housing holds paramount significance across global landscapes, particularly within Iraqi urban centers. This imperative stems from the inadequacies prevalent in housing initiatives, resulting in a shortage of residential units vis-à-vis the burgeoning populace, a phenomenon pervasive in all Iraqi cities, Altun Kupri included (Ahmed Ali, 1988). Furthermore, the examination of human factors, the dynamic component interfacing with natural capacities, assumes paramount significance, as it underpins the inception and progression of human habitation, whether organized or spontaneous. Among these factors, some are particularly noteworthy:

2.2.1 Urbanization phenomenon.

It is the process of changing social status by moving rural populations to cities (Khaled Hosni, 1984). This occurrence has fueled the proliferation of informal housing

challenges within the urban landscape of Altun Kupri. The city's expansion, encroaching upon agricultural domains and converting them into residential areas, has been catalyzed by the adoption of urban characteristics and social norms. Additionally, governmental neglect of rural regions and a pronounced disparity in service provision between rural areas and the urban center have exacerbated this issue.

2.2.2 Population growth.

Numerous urban centers are experiencing a surge in population size attributed to demographic expansion, thereby exerting strain on public amenities and infrastructure. Population growth correlates directly with the housing sector, leading to escalated demand for residential accommodations. The magnitude of population increase corresponds proportionally to the quest for housing solutions to fulfill fundamental shelter needs. Due to the absence of monitoring housing unit numbers relative to population growth, individuals have resorted to establishing informal housing settlements on municipal land at the city periphery. The city's population increase within a defined timeframe is influenced by two primary factors: natural increase, denoting a surplus of births over deaths, and migration, involving the spatial relocation of population segments.

2.2.2.1 Natural increase.

The increase in the natural population is intertwined with various social, economic, and cultural factors, alongside the accessibility of essential urban services. Table (2) highlights the notable population growth rate observed in Altun Kupri during the period spanning from 1997 to 2023, indicative of a pronounced fertility rate within its populace. This upsurge in birth rates towards the end of the 1990s can be attributed to heightened health awareness initiatives, enhanced healthcare provisions for expectant mothers facilitated by the establishment of specialized medical facilities, improved familial living standards, and expanded service provision. Additionally, population policies encouraging heightened reproduction during the Iran-Iraq war period have played a contributory role in this demographic trend. During the timeframe spanning from 1997 to 2007, a natural increase of 2035 individuals was documented. Subsequently, between 2007 and 2017, this figure surged to 3807 individuals. Notably, from 2017 to 2023, the natural increase escalated to 4395 individuals.

Table 2: Growth of the population of the city of Altun Kupri from 1997-2023.

year	Number Population	growth rate	Difference between the two censuses
1997	22374	3,2	---
2007	24409	2,3	2035
2017	28216	2.1	3807
2023	32611	1.7	4395

Source: (1) Ministry of Planning and Development Cooperation, Central Organization for Statistics and Information Technology, Directorate of Statistics of Kirkuk Governorate, Population estimates, the year 1997, unpublished data. (2) Central Bureau of Statistics, Results of the exclusive and numbering of population and housing for the years 2007-2023.

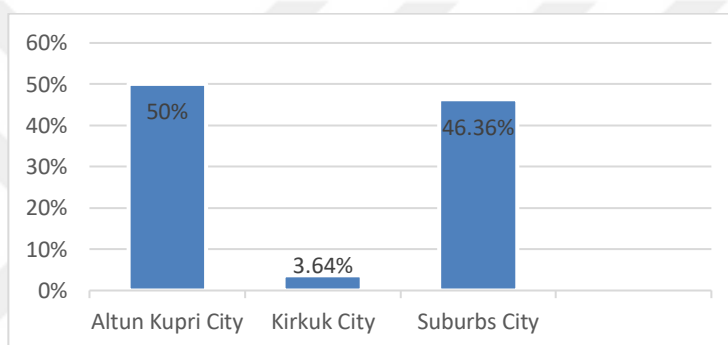
Based on the foregoing analysis, it becomes evident that the population of Altun Kupri city is experiencing sustained growth, primarily driven by rising birth rates and a decrease in child mortality owing to advancements in medical care, resulting in increased life expectancy. Furthermore, the natural population increase in Altun Kupri has significantly contributed to the proliferation of informal housing, spurred by the surge in population growth. Consequently, this surge has intensified the demand for affordable housing units, exacerbating the scarcity of housing options accessible to low-income residents.

2.2.2.2 Immigration

Considered a significant catalyst for population dynamics, migration ranks among the most intricate demographic phenomena due to its multifaceted effects and ramifications, which shape the societal landscape. Migration can be categorized into internal and external movements, encompassing the relocation of individuals within the confines of a single nation. Internal migration encompasses various forms, including voluntary relocation within a country's borders, as well as involuntary displacement due to factors such as political strife, natural calamities, or socio-economic reasons (Suzanne, 2005). The city of Altun Kupri has witnessed substantial internal migration over successive periods. For instance, in 1991, numerous families were forcibly displaced and resettled in Altun Kupri, while others were relocated to surrounding rural areas, a trend that persisted until 2003. The phenomenon of coerced relocations remained ongoing,

primarily due to the persisting security instability within the city and the coexistence of multiple governing bodies in the region, including the Kurdistan Regional Government and the Government of Iraq. Following the events unfolding in Iraq post-2003 and the escalating security challenges, a portion of Altun Kupri's rural populace migrated from the city, with approximately 2538 individuals relocating between 2009 and 2019. Additionally, impoverished families migrated from urban cores to their peripheries, settling in these areas or encroaching upon land within the city's neighborhoods, consequently altering land usage to residential purposes (See Figure 2).

Figure 1: Number of IDPs in the city of Altun Kupri after the events of 2003



Source: Researcher based on: Republic of Iraq, Ministry of Migration and Immigrants, Kirkuk, Statistics and Field Monitoring Division, unpublished data, 2023.

2.2.3 Failure to update planning systems

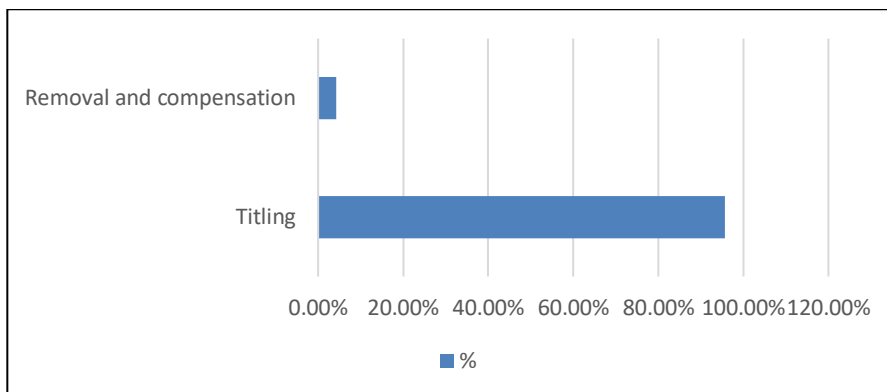
The consequence of neglecting to revise urban planning frameworks for cities is the failure to adequately address the requirements of urban expansion to accommodate population growth. This oversight has resulted in a proliferation of housing challenges and the expansion of informal housing settlements (Lina, 2008).

Altun Kupri stands as one of the cities grappling with neglect stemming from prevailing governance policies. The most recent comprehensive urban plan for the city dates back to 1997 and has remained unaltered since (Aso, personal interview1,2024). Consequently, the city has endured 24 years of neglect in urban planning, resulting in the absence of a structured approach to anticipate future housing needs. This oversight has precipitated the proliferation of informal settlements within the city's urban fabric.

2.2.4 Non-compliance with laws

One of the primary catalysts contributing to the proliferation of slums within the city, particularly post-2003, is the diminishing influence of state institutions in Altun Kupri. This erosion of institutional authority has precipitated an unprecedented surge in law infringements, particularly pertaining to regulations governing land use and construction, both in agricultural and non-agricultural zones. Numerous instances of unauthorized construction have transpired, with swathes of agricultural and state-owned lands being illegally converted into informal housing areas, without facing any significant deterrents. Inadequate surveillance of the bridge and insufficient coordination among governmental bodies in law enforcement have fostered the proliferation of this phenomenon. Moreover, the alteration in Iraq's political landscape has resulted in a lack of commitment from central authorities to address or implement effective measures to curb its expansion. This reluctance stems from apprehensions regarding potential repercussions on their electoral support base. In Altun Kupri, there has been a noticeable absence of significant efforts aimed at either suspending the expansion of slums or actively addressing their existence. Conversely, official authorities have undertaken certain measures targeting residents of visible areas, often providing services with the aim of securing their electoral support. The provision of services and facilities to these regions has predominantly occurred during electoral campaigns, along with periodic promises to residents regarding land ownership rights for the properties they inhabit. This has prompted numerous families to trespass on land and propagate this phenomenon, fueled by the belief that the state will eventually grant ownership rights to the land where their residences stand. This belief has been particularly prevalent in various instances, notably observed in Altun Kupri, as evidenced by occurrences such as the government's ownership of slum areas in neighborhoods such as Saddam and Ninety, as decreed by the Revolutionary Command Council in 1997 (Decision No. 1862). Figure (3) illustrates that the majority of households (95.70% of the sample) subscribe to this belief, while a minority (4.30%) hold the belief that government agencies will dismantle their homes and allocate alternative residential plots.

Figure 2: The prevailing belief of the residents of the slums of the city of Altun Kupri



Source: Field study, results of the questionnaire form according to the first question of Part 4.

The political landscape not only facilitated the proliferation of this phenomenon but also hindered the timely resolution of this persistent issue, exacerbating its severity and complicating potential solutions. Furthermore, this factor has contributed to the emergence and expansion of new informal settlements. It can be asserted that the proliferation of informal housing in Altun Kupri is, to a degree, endorsed by the government for political advantages.

2.2.5 Misallocation of residential land

This term denotes the improper allocation of land for housing, resulting in various challenges and issues within the housing sector. The distribution and allocation of residential land commenced in Iraq in 2006 through a decree issued by the Ministry of Municipalities, targeting specific groups such as martyrs, political prisoners, employees, war veterans, and university professors. This initiative was implemented in 2007 but did not encompass disadvantaged socio-economic groups. One of the primary catalysts behind the proliferation of informal housing settlements in Altun Kupri, a trend that persists to this day, can be attributed to errors committed by authorities responsible for the distribution of residential land. These mistakes have resulted in inequitable treatment among the city's residents. Conversely, another contributing factor lies in the inadequate choice of distant and underserviced locations by the governing bodies, as guided by directives mandating the allocation of land plots based on the beneficiary's place of origin. This practice has motivated numerous residents from these areas to sell their land and

acquire plots elsewhere, subsequently constructing housing in an informal manner (Haidar, 2014). The process of land distribution remains ongoing in Altun Kobri, where certain residents acquire land from the municipal district of Altun Kupri as compensation for land taken from them during the previous political regime.

2.2.6 Increasing the rental value of homes

Similar to other cities across Iraq, Altun Kupri experienced a discernible surge in the valuation of housing units, propelled by population growth and heightened demand for accommodation. According to a field investigation, rental rates for housing in Altun Kupri varied between 100,000 to 150,000 Iraqi Dinars (IQD). Over time, prices have continued to escalate, with rates reaching between 151,000 to 200,000 IQD. Additionally, in certain standard residential districts within the city center, rental prices soared to 300,000 IQD. Similarly, residential real estate prices have observed an upward trend in recent times. The overall prices mentioned fluctuate depending on the location and characteristics of the dwelling, such as the area, number of floors, and living standards. The improvement in living conditions for some individuals, along with their increased capacity to afford rent, has led to the escalation in rental prices. This phenomenon has contributed to the displacement of low-income residents from conventional neighborhoods to informal settlements that align with their monthly income, even if these areas lack basic services.

2.2.7 Weak government investment and support in housing

Housing policy inadequacies pertain to legislative and organizational frameworks designed to efficiently utilize available human and material resources for housing unit investment within specific timeframes. The primary objective of housing policy is to ensure the provision of housing that meets both qualitative and quantitative standards, suitable in location to accommodate the diverse needs of families and various social strata (Haidar, 2010).

In Altun Kupri, housing policies have directly influenced the proliferation of informal housing settlements, as no housing initiatives have adequately addressed the city's demand for housing units. Since the era of the former regime until the present, Altun Kupri has not witnessed the establishment of any housing complexes, primarily due to

the lack of determination among relevant authorities to tackle the housing issue. Additionally, insufficient governmental support for the private sector in housing unit investment, stemming from the absence of a consistent housing policy and investors' apprehensions regarding the conflict-ridden nature of the study area, has deterred investment in housing, thus exacerbating the spread of informal housing settlements.

2.2.8 Weakness of the government apparatus in oversight and follow-up

It is recognized as a primary factor contributing to the proliferation of informal settlements and exerting influence on the morphology of adjacent urban neighborhoods. This circumstance has intensified with the deterioration of security conditions and governance policies, resulting in the emergence of local armed entities that assert control over state-owned land and seize ownership from vulnerable individuals, subsequently constructing informal housing settlements upon it (Zikra, 2012). In Altun Kupri, there's also a lack of social cohesion to address and eradicate this issue, stemming from weakened security and administrative services following the events of 2003. Moreover, the outbreak of conflict in 2014 between the Iraqi army and the Islamic State (ISIS) further exacerbated the proliferation of informal settlements on the city's outskirts and certain urban areas. Photo (1).

Photo 1: Random housing units in the process of growth – neighborhood Qalaa



Photo taken on 17/3/2024

2.3 The evolution stages of the phenomenon of random housing in the city of Altun Kupri.

Informal housing represents a negative societal reaction to unmet housing demands, emblematic of the fulfillment of basic necessities that governments have failed to provide. This phenomenon does not solely stem from urban deficiencies but also arises from a confluence of factors including demographic, social, political, and economic challenges, particularly prevalent in developing nations, thus contributing to its widespread prevalence. Broadly speaking, the phenomenon of informal housing emerged subsequent to the Industrial Revolution in Britain, with a parallel occurrence witnessed in New York during the early twentieth century, coinciding with a surge in rural-to-urban migration driven by increased housing demands. In the nineteenth century, developed nations, including those in Europe and North America, experienced a direct correlation between urbanization and city expansion, facilitated by industrial advancements. This facilitated the accommodation of rapidly growing urban populations. In contrast, the urbanization process in developing countries exhibited an inverse relationship with urban growth. Here, population increases outpaced economic growth, giving rise to numerous challenges, with housing being foremost among them, followed by issues related to infrastructure and employment (Mustafa, 2010). The proliferation of informal housing exhibits spatial variability, with certain settlements emerging in peri-urban areas, capitalizing on various land types, including agricultural and non-agricultural land, whether publicly or privately owned. Over time, these settlements evolve into integral parts of expanding cities. Others are situated within urban cores, utilizing vacant plots, where initial small-scale housing encroaches upon state-owned land, gradually extending along the peripheries of established residential neighborhoods. Subsequently, these settlements undergo rapid expansion, leveraging the services provided by adjacent formal neighborhoods. The phenomenon of informal housing, in its diverse manifestations, is distinguished by several fundamental traits, including its rapid proliferation, the spontaneous emergence of dwellings, and the absence of essential public services. Typically situated on the peripheries of urban centers, these areas underscore a marked disparity within the city's built environment (Neamat et al., 2007). In the city of Altun Kupri, there are two types of random housing phenomena within the city center and its outskirts.

2.3.1 Emergence stage

Cities can be categorized based on their origins into two distinct types: spontaneous or unplanned cities, which evolve from rural settlements and gradually develop into urban centers, and planned cities, which are intentionally established by a governing authority according to predefined blueprints. Unplanned cities have the potential to transition into planned urban centers through the implementation of structured plans involving the construction of roads and creation of urban spaces, thereby undergoing urban restructuring. Planned urban centers can undergo transformations into informal settlements under extraordinary circumstances such as natural calamities, conflicts, etc. (Jalila, 2009). Regarding the expansion of the urban area and the emergence of informal housing in Altun Kupri, this occurred gradually in several stages beginning with the establishment of the city around 17 AH. By the end of the 18th century, Altun Kupri housed approximately 400 to 500 families. In 1799, Mirza Abu Talib Khan documented his visit to the city, describing it as a sizable village with a diverse populace comprising Turkmen and Kurds, primarily engaged in agricultural pursuits (Siddiqui et al., 2009).

By 1906, Altun Kupri boasted a population of approximately 4,000 individuals. In 1918, the renowned stone bridges of the city were demolished by the Ottoman Empire and substituted with contemporary steel structures, prompting a reconfiguration of the urban layout in the study area. During the same year, the city's territory began to expand, initially encompassing only one residential district known as Orta Yaqa, situated between the banks of the Small Zab River (Hassan, 2016).

2.3.2 Growth stage

The resurgence and subsequent expansion of informal housing in Altun Kupri occurred following the city's urban revival in 1918, proliferating along both the northern and southern banks of the Small Zab River. Concurrently, the territory of Ortayaqa, initially comprising solely a single residential neighborhood, began to extend, situated amidst the banks of the Small Zab River. At the end of the fifties, after a large number of informal housing in the area (Kurdistan - Buick Kupri), the entire area was owned after it was registered in the name of the municipality, the city of Altun Kobri (Salam, personal interview², 2024).

In the period under Saddam Hussein's rule, Altun Kobri experienced not only a process of Arabization but also the displacement of local residents and a significant demographic shift within the region's population (Siddiq and Al-Hamdani, 2021). The city of Altun Kupri, akin to other urban centers in northern Iraq, has undergone various transformations over time. These transitions serve as precursors to the emergence of informal housing within the study area. Evidence suggests that the frequent cycles of construction and demolition experienced by the residents of Altun Kupri signify a trajectory towards urbanization and development, albeit in a haphazard manner (Mutasim Sally, 2008).

In 1997, informal settlements expanded within the jurisdiction of the municipality in the study area, utilizing agricultural land and undeveloped plots. Over 550 houses were constructed in the expanded area, referred to as Büyücek Kobri neighborhood, subsequently named Salahia. Similarly, in the vicinity of the Shuhada neighborhood, approximately 275 slum dwellings were erected to the south of the study area, with land distribution to families of martyrs from the Iran-Iraq war. Additionally, an area known as Azadi neighborhood witnessed similar developments. Still, in the municipal department, there is a file of land ownership for those Arab families who came by the government of Iraq previously to change the demography of the study area and reduce the percentage of nationalities (Turkmen and Kurdish) in it.

The tenure of the informal settlements was short-lived, as they were swiftly redeveloped into a planned urban area by the Iraqi government. This transformation occurred following a directive from the Kirkuk province, specifically the Department of Urban Planning, through its publication numbered 918 on August 19, 1997. Subsequently, a new comprehensive urban layout for the city was devised, integrating data from the existing areas and accommodating the contemporary needs of the city, while also refining the previous design (Aso, personal interview³, 2024).

During this period, the urban fabric exhibited spatial and temporal variations influenced by the socio-economic status of families. Construction materials such as bricks, mud, and timber were utilized across all areas like Ninety and Büyücek Kupri, with wooden doors and windows commonly employed. Conversely, in areas like Shuhada and Salahia, iron became prevalent in construction. This shift in material usage was not limited to specific areas but affected the entire urban landscape, altering the structure of

housing units. Additionally, side streets remained narrow and winding across all regions. The majority of residential dwellings, which emerged to meet housing demands, feature essential amenities such as kitchens, bathrooms, and toilets. During this phase, housing units typically comprise a single floor with a height ranging from 3 to 4 meters (a field study 18/2/2024).

Based on a field investigation conducted during this phase, it is evident that the majority of residential zones within the study area, particularly the older neighborhoods depicted in Map 2, have developed as informal settlements. These areas have been constructed without prior planning by relevant authorities, and no formal organization of residential zones has occurred since their inception to the present day. This serves as testament to the entrenched nature of informal housing within Altun Kupri, with governmental bodies failing to address the issue. The proliferation of informal settlements during this phase can be attributed to the lack of preemptive planning and the influence of various human and political factors prevailing within the study area.

2.3.3 Diffusion stage

The onset of informal housing expansion commenced in 2003 following the diminished influence of governmental institutions and the lapse in oversight by planning and monitoring departments throughout Iraq. This expansion was further propelled by socio-demographic factors and the widespread housing crisis affecting all Iraqi cities, including Altun Kobri. The resurgence of informal housing has shifted from the city center to the periphery and adjacent areas of Altun Kobri, serving as new zones for expansion. Notably, there has been no revision to the city's master plan since 1997. At this juncture, informal housing has visibly proliferated within the city limits, encompassing areas such as the Rizgari, Azadi, Qalaa, Qarabag neighborhoods, and a segment of the Kurdistan neighborhood.

Based on the data presented in Table 3, the progression of informal housing construction within Altun Kupri can be observed during this phase. Notably, informal housing constructed in 2003 accounted for 2.98% of the total, followed by a significant increase in construction between 2004 and 2010, comprising 46.69%. Subsequently, housing constructed between 2011 and 2017 amounted to 31.79%, whereas informal

housing erected between 2018 and 2024 constituted 18.54% of the sample size. Additionally, Table 1 provides further insights.

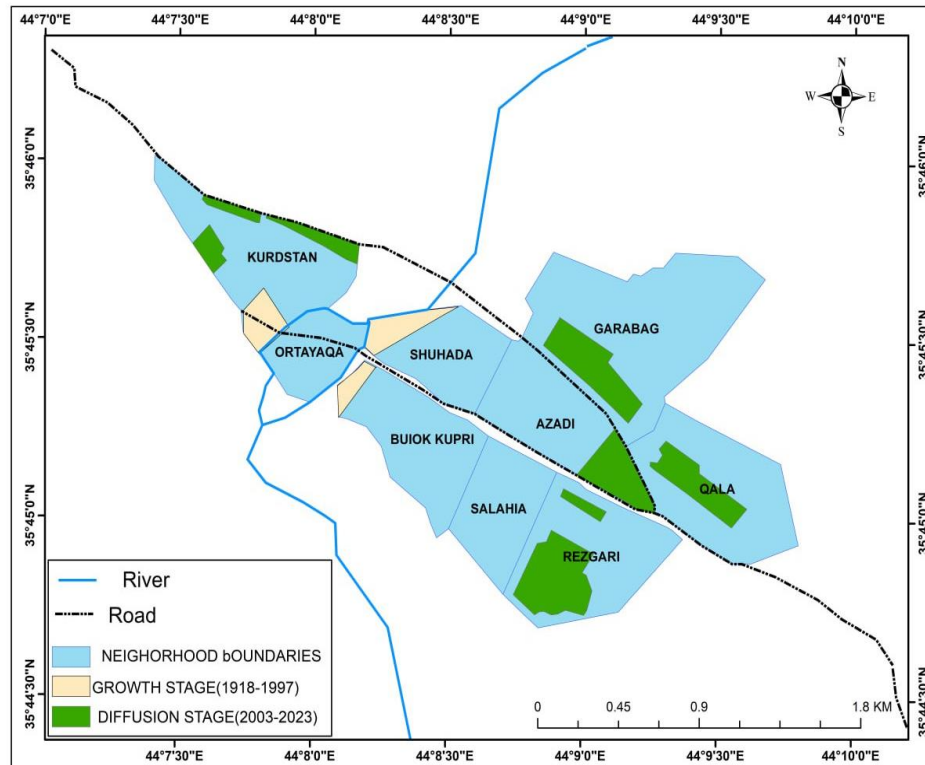
Table 3: Numerical distribution of housing construction history in the random housing of Altun Kupri for the year 2023.

n	Neighborhoods	2003 and before	2004 - 2010	2011 - 2017	2018 - 2023	Total
1	Azadi	0	41	21	0	62
2	Kurdistan	9	44	0	0	53
3	Qalaa	0	9	30	23	62
4	Qarabag	0	3	30	29	62
5	Razgari	0	44	15	4	63
	Total	9	141	96	56	302
	%100	%2.98	%46.69	%31.79	%18.54	%100

Source: Field study, results of questionnaire form according to question (2).

Based on the data presented in Table 3, the progression of informal housing construction within Altun Kupri can be observed during this phase. Notably, informal housing constructed in 2003 accounted for 2.98% of the total, followed by a significant increase in construction between 2004 and 2010, comprising 46.69%. Subsequently, housing constructed between 2011 and 2017 amounted to 31.79%, whereas informal housing erected between 2018 and 2024 constituted 18.54% of the sample size. Additionally, Table 1 provides further insights. This variation can be attributed to several factors inherent to these regions, including their geographical positioning, land valuation, the availability of amenities, and the diversity in socio-economic demographics. These variables were not solely influenced by disparities in dwelling ages but were also shaped by the quantity and quality of construction. During the stages of inception and proliferation of informal housing in Altun Kupri, the phenomenon exhibited a notable clustering of residential units. The total number of dwellings across all informal settlement areas within the study area amounted to 3783. Presently, Altun Kupri has reached a state of saturation and congestion, posing numerous challenges for any attempts at urban re-planning and organization.

Map 3: The evolution of the area of random housing phenomenon across growth stages and diffusion in Altun Kupri.



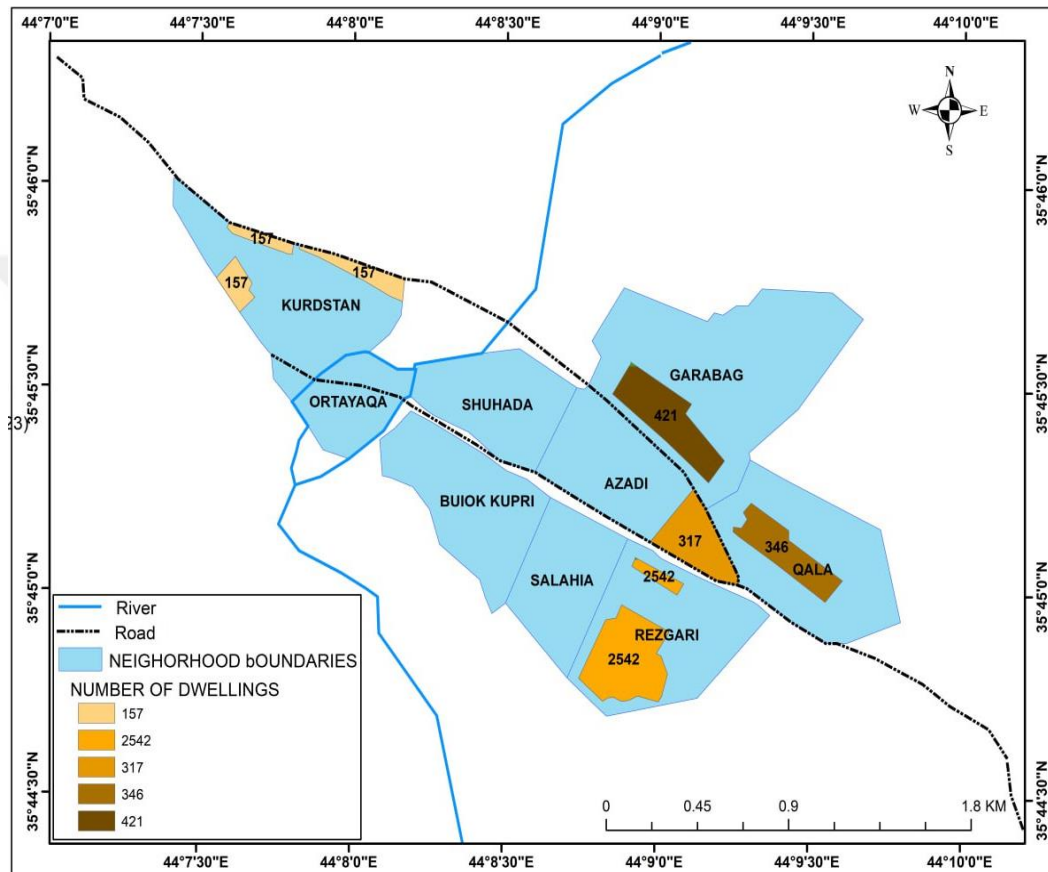
Source: (1) Based on Altun Kupri Municipality Directorate, Planning and Follow-up Section, unpublished data, 2023. (2) The researcher's reliance on aerial photographs of the city of Altun Kupri, Based on map (1) and table (3).

2.4 A geographical study of the distribution of random housing areas in the city of Altun Kupri.

An essential focus of geographical investigation involves examining the spatial interconnections of geographical occurrences. To grasp these interrelations comprehensively, it is imperative to delineate the spatial distribution of these phenomena. The spatial arrangement of phenomena holds significant importance within the realm of geography, with the primary objective being societal service and advancement. It is imperative to elucidate the geographic dispersion of the informal housing phenomenon in Altun Kupri to delineate its spatial dimensions. Between the years 2004 to 2010, the total count of informal housing in the study area accounted for 46.69% of residences, distributed across three residential neighborhoods, according to field research. By 2023, the cumulative count of informal housing escalated to 3783 units, originating from both agricultural and non-agricultural lands situated within Altun Kupri's city center and

periphery. The ongoing proliferation of informal settlements underscores the pervasive nature of the phenomenon in Altun Kupri, resulting in areas exhibiting disrupted urban configurations within the study area's foundational plan, as detailed in Table (4):

Map 4: Geographical distribution of the number of random housing in Altun Kupri.



Source: Researcher based on field study, data Table (4). and map source (1).

2.4.1 The northern part of Kurdistan neighborhood

This encompasses an ad-hoc residential cluster dispersed within the urban core, exemplified by the random housing enclave in Kurdistan neighborhood. The emergence of Halimawa neighborhood, situated within the precincts of Kurdistan, marks one of Altun Kupri's earliest residential zones. Originating from the grounds designated for cemetery services, this area came into being following a series of events, notably the upheavals of 2003, coinciding with governmental regime changes, lax oversight, and limited public consciousness regarding communal welfare. Concurrently, vacant lands were parcelled out and marketed as residential plots by land proprietors. The erosion of

governmental authority amid armed confrontations and tensions between Kurdish factions and the Iraqi state resulted in a lapse of control, facilitating the division and sale of land as residential plots. These transactions were orchestrated by landowners or armed influencers lacking official documentation within the Altun Kupri municipality (Mohammed, Personal interview4, 2024). This area now hosts 157 houses, spanning approximately 2.27 hectares, accommodating a population of 1320 individuals. Consequently, the net population density stands at 581.24 people per hectare.

Table 4: Geographical distribution of random housing neighborhoods in the city of Altun Kupri.

Axes	N	Neighborhood	Number of dwellings	Population number	Area dwellings in m ²	Area dwellings in hectare	population density persons/hectare
City Center	1	Kurdistan	157	1320	22710	2.27	581.24
South Side	2	Azadi	317	2029	47342	4.73	428.60
	3	Razgari	2542	15881	409575	40.96	387.72
East Side	4	Qalaa	346	1926	122074	12.21	157.74
	5	Qarabag	421	2745	153728	15.37	178.594
Total			3.783	23.900	755429	75.54	1733.89

Source: (1) Altun Kupri Municipality Directorate, Planning and Follow-up Division, and Random Neighborhoods Division, Unpublished data, under audit and review. (2) Field study of the researcher for the period 7/1/2024 - 24/3/2024.

2.4.2 The southern part of random housing of Altun Kupri city

This section of the urban area comprises two informal settlements, delineated in Table (4), spanning from the city center southwards toward Kirkuk. These neighborhoods emerged on government-owned municipal lands, with construction commencing after 2003, leveraging the available amenities in nearby residential areas. Additionally, the affordable land prices and proximity to the Altun Kupri city center contributed to the establishment of these neighborhoods in this vicinity: -

2.4.2.1 Neighborhood Razgari

This local designation, coined by residents following the events of 2003 and the city's liberation, stems from the Kurdish term meaning "survival." Situated in the southern

sector of the city, stretching from the periphery of the Salahia neighborhood to the municipal boundaries of Altun Kupri, this area predominantly comprises land owned by the Altun Kupri municipality. This land was subdivided and sold, while another portion was acquired informally. The area encompasses 2,542 dwellings across 40.96 hectares, with a population density of 15,881 people and a density of 387.72 people per hectare.

2.4.2.2 Neighborhood Azadi

This designation emerged due to its location within the region, situated between two primary thoroughfares, namely the Kirkuk-Erbil roads, and an older route within the study area. Additionally, it occupies a pivotal position at the juncture of these two roads' boundaries. This locality originated and expanded over agricultural territories situated within the jurisdiction of the Altun Kupri municipality. Initially designated for tourism services, these lands were under the ownership of the Ministry of Finance. Subsequently, they were parcelled out and sold as residential plots, leveraging the amenities available in the adjacent vicinity. The residential count within this zone amounts to 317 dwellings, covering an expanse of 4.73 hectares, accommodating a population of 2029 individuals, equating to a population density of 428.60 people per hectare, as depicted in Map 4.

2.4.3 The eastern part of random housing of Altun Kupri city

These districts lie to the east of the city, flanking the main Kirkuk-Erbil thoroughfare. Their inception followed a sequence of local events, capitalizing on the availability of agricultural terrain and unoccupied sectors owned by the Altun Kupri municipality. They were influenced by various factors, notably the possession of land title deeds ensuring residents' tenure rights, even in the event of resettlement. Moreover, the establishment of Al-Kitab University and the presence of archaeological and touristic sites in the vicinity further contributed to their development (Daoudi, Personal interview5,2024). These two areas encompass:

2.4.3.1 Neighborhood Qalaa

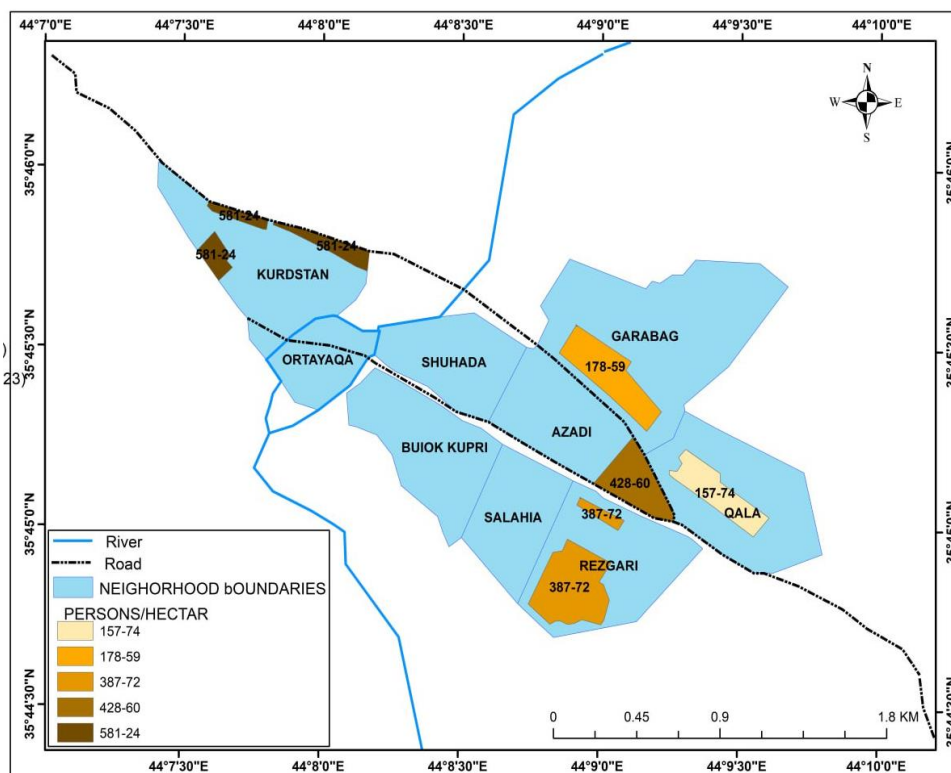
It acquired this appellation due to its proximity to the historic fortress, extending from its rear towards Kirkuk. Primarily agricultural, it encompasses the Agricultural Directorate of Altun Kupri within its confines. Residential expansion in this locale

commenced post-2009, previously hosting only a few houses belonging to landowners and a limited number of residences for the castle guards (the castle was utilized as a political prison during Saddam Hussein's regime), which lack any legal title. Presently, the district comprises 346 residences, spanning an area of 12.21 hectares, accommodating a population of 1926 individuals, with a population density of 157.74 people/ ha.

2.4.3.2 Neighborhood Qarabag

It acquired this appellation due to its proximity to the historic fortress, extending from its rear towards Kirkuk. Primarily agricultural, it encompasses the Agricultural Directorate of Altun Kupri within its confines. Residential expansion in this locale commenced post-2009, previously hosting only a few houses belonging to landowners and a limited number of residences for the castle guards (the castle was utilized as a political prison during Saddam Hussein's regime), which lack any legal title. Presently, the district comprises 346 residences, spanning an area of 12.21 hectares, accommodating a population of 1926 individuals, with a population density of 157.74 people/ ha.

Map 5: Geographical distribution of population density in random housing Altun Kupri.



Source: Researcher based on field study, data Table (4). and map source (1).

Chapter Three

3. Spatial analysis of random Housing in Altun Kupri

The spatial examination of informal housing entails delineating distinct attributes that differentiate it from formal housing within urban settings. These attributes are evident in the urban fabric, which serves as a tangible reflection of households' economic and social standings. Analyzing these patterns extends beyond the prevailing urban morphology, encompassing the socio-economic dynamics prevalent within informal areas. Architectural styles exhibit variability across cities and regions, rendering each urban landscape unique. The distinct styles within any given city typically result from a complex interplay of factors, encompassing human and environmental elements, alongside the city's economic and architectural framework. These spatial configurations are dynamic rather than static, often undergoing transformations over time (Saadi et al., 1990).

In this section, we will delineate the examination of key spatial patterns that differentiate the study area from other residential zones concerning urban, social, and economic dimensions. It is essential to note that while informal housing patterns diverge from conventional housing, they are not fixed entities within the urban fabric, but rather integral components of a particular phase in the city's evolution and advancement.

3.1 The concept of random housing pattern analysis

The concept of pattern analysis is used in geography to refer to the spatial distribution that is formed with a set of elements on the surface of the Earth (Sabri and Khalil, 1986). Informal housing patterns denote the configuration and structure of residential structures within informal settlements, typically distinct from adjacent formal housing. Consequently, any semblance among residences constitutes a pattern. Such clusters of dwellings exhibit shared traits that confer upon them a unique identity within the urban landscape, fostering urban, social, and economic disparities. Hence, the manifestations of informal housing encompass an array of spontaneous designs and approaches that set them apart within their urban context, shaping their economic and social attributes at a particular juncture in time and space.

3.2 Urban Pattern of random housing in Altun Kupri

The urban configuration encompasses the array of structural designs adopted by residential zones within cities, under the sway of diverse human factors including economic standing, social dynamics, and service accessibility, alongside natural elements like geographical location and terrain characteristics. Informal housing, likewise, is subject to these influences, fostering mutual interaction among them, thereby yielding a mosaic of informal urban patterns characterized by spatial and temporal diversity. To ascertain the urban configuration of informal housing in Altun Kupri, it is imperative to grasp the urban layout, the defining features, and the prevalent housing typology, while also elucidating the housing composition. In this regard, the researcher employed on-the-ground observation of informal residential zones, alongside aerial imagery and photography, supplemented by findings from questionnaire surveys.

3.2.1 Urban Structure of random housing in Altun Kupri

Urban Structure stands as a pivotal criterion in discerning urban configurations, particularly concerning informal housing. It unveils the overarching form embraced by these residences, and any departure from the foundational tenets and guidelines of the planning procedure engenders spontaneous informal urban configurations. Hence, Urban Structure bifurcates into two categories: formal Structure and informal Structure. In Altun Kupri, informal housing encompasses the strip pattern, emerging as the density of informal housing escalates, thereby evolving the urban fabric from a dispersed layout to a strip pattern (refer to map 6). The configuration of land parcels plays a determining role in shaping such an urban Structure during the construction phase. Presently, this configuration proliferates towards the north in the city, encompassing the expansion of municipal lands in the Kurdistan district, and extends eastward along the land route connecting Kirkuk and Erbil, which includes the Qalaa and Qarabag neighborhoods. Towards the south, neighborhoods like Azadi and Rizgari are evident.

Additionally, there exists an irregular pattern, which emerges due to the escalation of spontaneous residential construction and aligns with the natural terrain characteristics. Several factors facilitate the dissemination of this urban configuration, including transportation networks, availability of electricity and water services, alongside high land costs and minimal agricultural productivity. These conditions encourage land subdivision

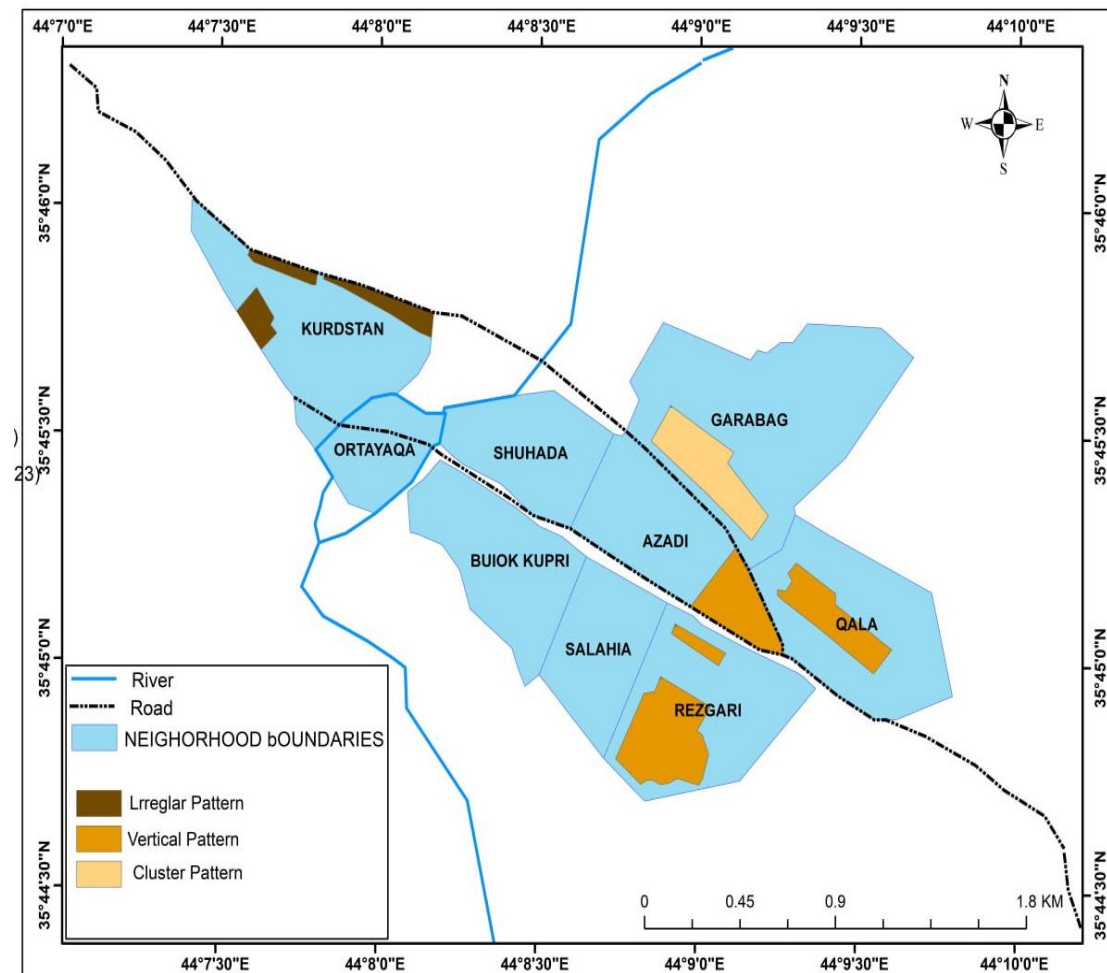
and subsequent sale in the form of residential plots. This configuration is distinguished by the close proximity of residences and the narrow, winding streets. Such an urban layout is evident in the Kurdistan neighborhood, where it originated in 2003, resulting from a confluence of factors, primarily the weakened oversight and inadequate response from relevant authorities. This laxity encouraged on-site developers, particularly those who received compensation following the termination of their services, to sell properties to residents. Given that they are not liable if the government demolishes their homes built on those lands, it was observed in the Informal Settlements of Altun Kupri that the urban layout exhibits a variability in land usage sizes. Residential spaces dominate the largest areas, encompassing a total of 49.5 hectares, which constitutes approximately 20.04% of Altun Kupri's total area, amounting to 247 hectares. Additionally, there is considerable diversity in the widths of streets and internal pathways. For instance, some streets measure approximately 2-4 meters wide, while others range from 7-9 meters wide. Several factors contribute to this variation, including landowners' preferences to allocate space and homeowners' willingness to relinquish portions of their land to widen streets. Consequently, street widths, typically ranging from 1-2 meters, are determined by individual homeowners, resulting in irregular constructions and straightness of streets in these areas, leading to difficulties in vehicular access in certain locations, as depicted in Picture (2). Furthermore, it is noteworthy that no land plots have been designated for community services, except for the existence of a health clinic in the Kurdistan neighborhood's slums.

Photo 2: Irregular buildings and narrow and meandering streets (Kurdistan neighborhood informal).



Taken on 7-4-2024.

Map 6: Geographical distribution of urban fabric patterns in the random housing of Altun Kupri.



Source: Based on field study and aerial photographs of the city of Altun Kupri.

3.2.2 Analysis of the Housing Structure in random housing of Altun Kupri

The research seeks to scrutinize and assess the structure and attributes of housing, unveiling fundamental traits of residences and their diversities in terms of configuration, dimensions, type, and other pertinent aspects. Additionally, it endeavors to pinpoint any hindrances encountered by indigenous communities residing in these informal localities. Consequently, housing patterns exhibit variances contingent upon the array of residences present. To dissect the housing framework of informal settlements in Altun Kupri, the paramount criteria will be examined in accordance with the requisites of this investigation.

3.2.2.1 Land Ownership and Type of Use in random Housing

Encroachments on public or private properties represent a notable characteristic of informal housing, with much of the informal development taking place on lands owned by the public or a combination of sectors. Typically situated near city centers, these areas capitalize on the amenities available in neighboring districts and their proximity to urban employment hubs. As a result, they have evolved into spontaneous residential enclaves within both the urban core and its outskirts. This phenomenon extends to privately owned lands under individual ownership or management, exempt from government oversight, and utilized for real estate endeavors without adherence to urban planning directives governed by local municipalities (Mohammed, Personal interview6, 2024). This category of housing predominates in Altun Kupri due to legislative shortcomings, resulting in the sale and conversion of certain private lands into informal settlements. Table 5 illustrates the numerical distribution of land ownership for informal housing in Altun Kupri. The data reveal that the majority of informal dwellings were constructed on privately owned lands, comprising 87.09% of the total sample. In contrast, 9.27% of the dwellings were built on public sector lands, and 3.64% on mixed-sector lands. This distribution highlights the dominance of private sector land usage in the development of informal housing within the study areas.

Table 5: The numerical distribution of the land return for housing in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Public domain	Private property	Mixed property	Total
1	Azadi	15	47	0	62
2	Kurdistan	8	45	0	53
3	Qalaa	1	53	8	62
4	Qarabag	4	55	3	62
5	Razgari	0	63	0	63
Total		28	263	11	302
% 100		%9.27	%87.09	%3.64	% 100

Source: Field study, results of the questionnaire, according to question (5).

3.2.2.2 Residential building area

The area of residential buildings is a crucial aspect in studying the structure of housing, whether formal or informal. Larger residential areas enhance the comfort and well-being of residents by allowing for more expansive internal courtyards and gardens, which provide fresh air and greater privacy. Conversely, the dwelling's size often reflects the economic status and family size of its occupants. The size of these dwellings varies across different regions, influenced by factors such as location, land prices, and legal status.

Table (6) indicates that housing areas between 75 and 100 square meters make up 38.41% of the sample size in the study area. This trend is attributed to the recent increase in land prices in the city's slums, particularly noticeable since 2020. Consequently, some families have opted to purchase smaller housing plots. This decision is driven by various factors, including the high cost of land, the preference of landowners to rent out smaller plots for profit, the smaller size of some families, or the desire of newly married children to live independently from their parents.

Dwellings ranging in size from 125 to 150 square meters constitute 40.40% of the sample size, representing the highest percentage. This trend is largely due to the increased sense of security among residents in the study area regarding the permanence of their homes, especially post-2004. This assurance has encouraged the purchase of land, which was available at reasonable prices during that period.

Table 6: Numerical distribution of the area of residential buildings in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	75-100 m2	125-150 m2	>200 m2	Total
1	Azadi	27	27	8	62
2	Kurdistan	25	16	12	53
3	Qalaa	25	22	15	62
4	Qarabag	23	27	12	62
5	Razgari	16	30	17	63
Total		116	122	64	302
%100		%38.41	%40.40	%21.19	%100

Source: Field study, results of the questionnaire, according to question (6).

For housing areas exceeding 200 square meters, the percentage is 21.19%. This is primarily because most residents of these larger homes are middle-income individuals, many of whom are long-term residents of Altun Kupri. They often sold their smaller city-center homes due to the limited space and their growing family sizes, or to move closer to their relatives and acquaintances.

3.2.2.3 Materials used in construction

In informal housing areas, a variety of materials are typically used in construction, including stone, clay, and block. This diversity in materials distinguishes slum residential areas from official residential neighborhoods, largely due to the economic status of the families. Furthermore, the choice of building materials reflects the type of construction and influences the decision to retain or remove structures during redevelopment in the study area. Based on the field survey and the results of the questionnaire (refer to the table in the annex), it was observed that the materials used for housing construction in the study area are predominantly (100%) block materials. This prevalence is due to the abundance and low cost of these materials in the study area, as well as the quick completion time for construction using these materials. In Altun Kupri, it was found that all informal housing is similar to the housing in official neighborhoods and is constructed with permanent materials. This similarity is attributed to the lack of regulatory oversight, which has reassured violators and encouraged the use of fixed materials. Additionally, this indicates the economic capability of the population in the study area.

3.2.2.4 Residential density

The analysis of housing density in the city of Altun Kupri is crucial as it illustrates the degree of residential crowding within the study area. Housing density is one of the simplest and most straightforward measurement methods, determined by dividing the total number of dwellings by the total area (Jeromey et al., 2007). Additionally, understanding housing density helps reveal the environmental conditions of residential areas, particularly in slum regions where overcrowding and the lack of public spaces and parks are prominent features. It is clear from Table (7) and Figure (3) that the amount of residential density in the slum housing areas in the city of Altun Kupri, formed the highest residential density in the area of Kurdistan neighborhood by about (69.16)

housing/hectare, and then comes the area of the neighborhood of Azadi by about (67.019) housing/hectare, and then the Razgari neighborhood area, as the residential density reached (62.06) housing/hectare, and the reason for the high residential density of these residential neighborhoods is due to their location within the center of the city of Altun Kupri, In addition to the small residential lands and their location within regular residential neighborhoods with private ownership, which led to the desire of many residents to live in this area. We note in a table that in both the Qalaa neighborhood and Qarabeg neighborhood, the housing density reached about (28.34) and (27.39) housing/Km² respectively, and the reason for the low residential density of these areas is the breadth of their land and the extension of the housing construction process with the extension of transportation roads between Erbil-Kirkuk.

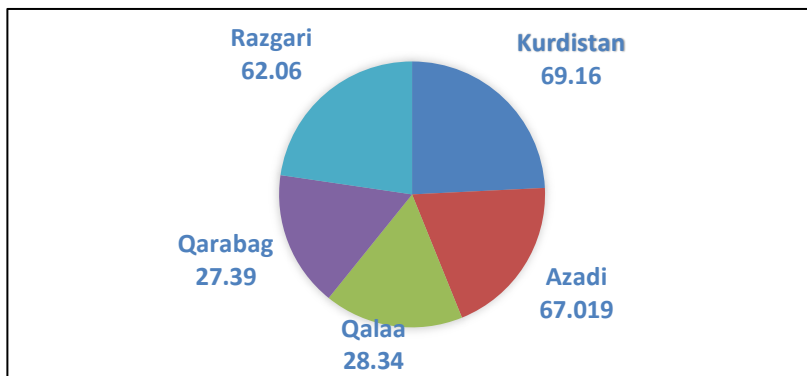
Table 7: Numerical distribution of residential density in dwellings in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Number of dwellings	Area in hectare	Net housing density dwellings/ha
1	Kurdistan	157	2.27	69.16
2	Azadi	317	4.73	67.019
3	Qalaa	346	12.21	28.34
4	Qarabag	421	15.37	27.39
5	Razgari	2542	40.96	62.06
Total		3783	75.54	25.66

Source: (1) 2024 Field Study. (2) Republic of Iraq, Ministry of Municipalities and Public Works Municipality of Altun Kupri, Planning and Follow-up Division, GIS Unit Unpublished data 2024.

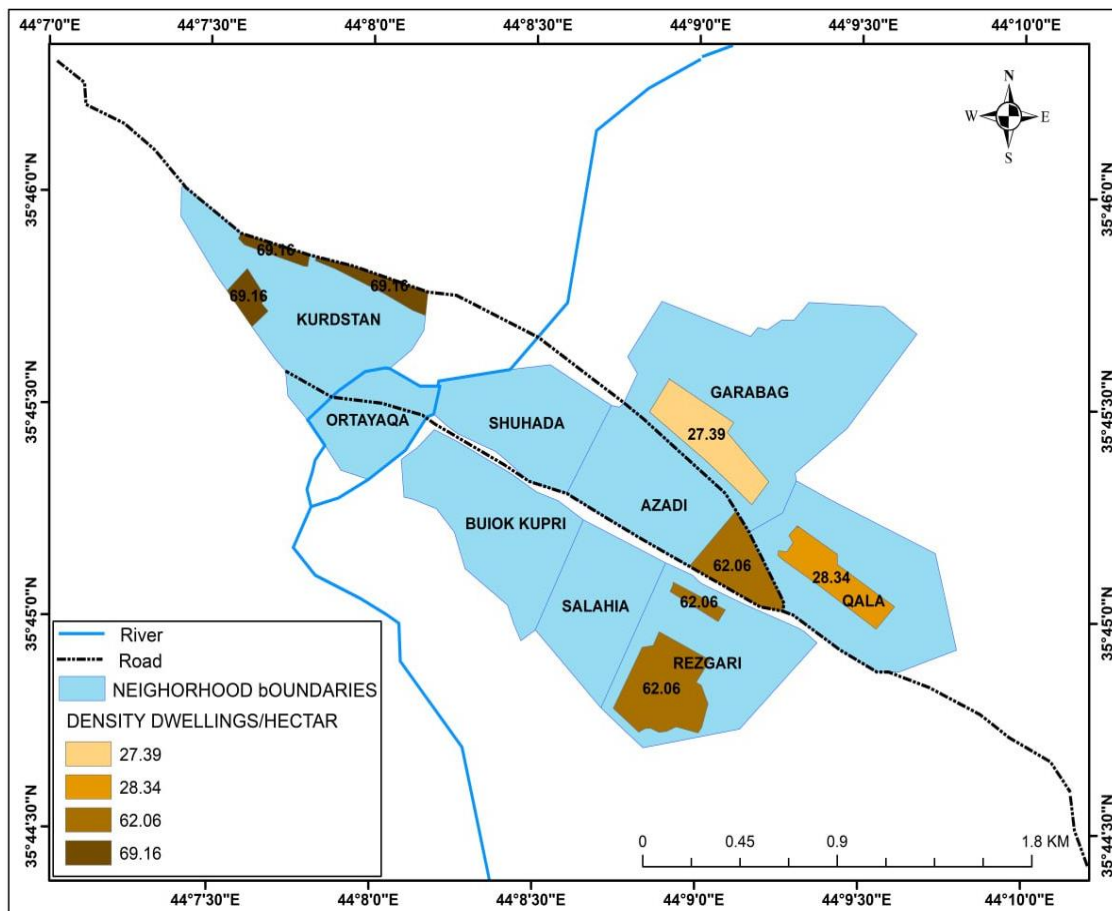
Based on the information table, we can say that the housing density of the slums of the city of Altun Kupri was affected by the factor of distance and proximity to the city center, as it increases in the areas that fall within the city center of Altun Kupri and gradually decreases as we head towards the outskirts and as shown in the map (7).

Figure 3: Relative distribution of residential density in dwellings in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (7).

Map 7: Geographical distribution of residential density in the random housing of Altun Kupri.



Source: Researcher based on field study, data Table (7). and map source (1).

3.2.2.5 Number of rooms in the dwelling

The numerical disparity in the quantity of rooms among residences across different areas serves as a metric for gauging the economic and social standing of the occupants and offers insight into family size (Tahseen, 2004). Furthermore, a room is defined as a confined space measuring equal to or more than (4 m²), capable of accommodating individuals separately, and the term "hall" is also categorized as a room if utilized for residential purposes. The diversity in the count of rooms among residences across different localities serves as an indicator reflecting the economic and social position of the occupants and offers insights into family size (Tahseen, 2004). Additionally, a room is delineated as a confined space measuring equal to or exceeding (4 m²) in area, facilitating the segregation of users from one another. Moreover, the inclusion of a hall as a room is warranted if it serves residential functions.

Table 8: Numerical distribution of the number of rooms in dwellings in the random housing of Altun Kupri for the year 2023.

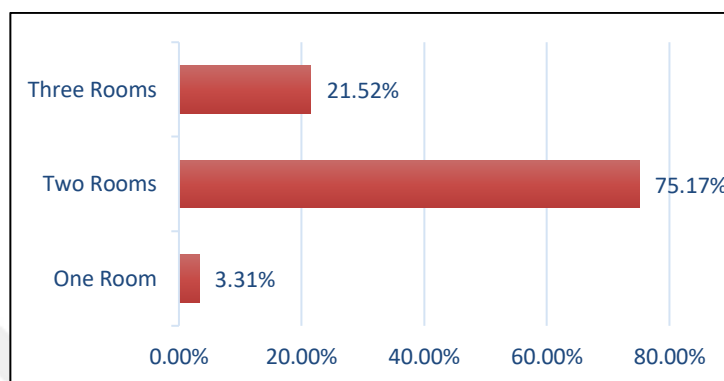
N	Neighborhoods	One	Two	Three	Total
1	Azadi	4	48	10	44
2	Kurdistan	6	38	9	53
3	Qalaa	0	45	17	53
4	Qarabag	0	51	11	44
5	Razgari	0	45	18	63
Total		10	227	65	302
% 100		% 3.31	% 75.17	% 21.52	% 100

Source: Field study, results of the questionnaire, according to question (4).

When analyzing the distribution of room numbers in the informal settlements of Altun Kupri, it becomes evident that there is variability from one area to another. This variation arises due to several factors. Firstly, most of these residences are constructed on lands of diverse sizes, resulting in differences in room counts. Additionally, variations in the land area allocated for housing and the architectural designs of individual dwellings contribute to this diversity. Many constructions are designed in a compact manner, where the inclusion of common areas like the living room as a room is common, influencing room counts. Moreover, economic considerations play a crucial role, as the family's financial capacity determines the ability to construct additional rooms. Furthermore, bed

sizes also impact room numbers, as they directly correlate with the dwelling's spatial layout, making economic factors a pivotal determinant of housing room numbers.

Figure 4: Relative distribution of the number of rooms in the random of Altun Kupri for the year 2023.



Source: Researcher based on Table (8).

3.2.2.6 Ownership of the housing unit (Ownership or Rent)

Housing stands as one of the most essential requirements sought after by families, as it embodies their primary aspiration. Humans have devised various methods in acquiring, designing, and constructing housing, relying sometimes on personal resources and at other times on state and other institutional support. Consequently, this has resulted in diverse geographical, engineering, planning, and economic patterns. To understand housing ownership within informal settlements in Altun Kupri, two economic variables were utilized: ownership type (ownership or rental) and rental rates.

Table 9: Numerical distribution of ownership or rent of a dwelling in the random housing of Altun Kupri for the year 2023.

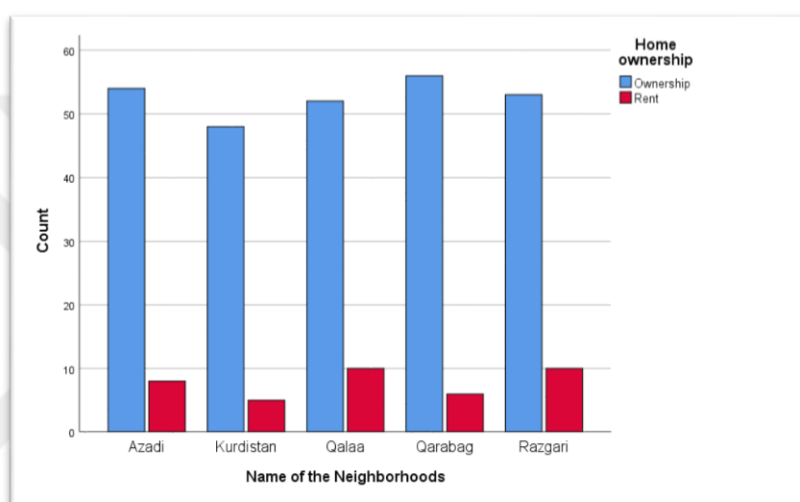
N	Neighborhoods	Ownership	Rent	Total
1	Azadi	54	8	62
2	Kurdistan	48	5	53
3	Qalaa	52	10	62
4	Qarabag	56	6	62
5	Razgari	53	10	63
Total		263	39	302
% 100		% 87.1	% 12.91	% 100

Source: Field study, results of the questionnaire, according to question (7).

Table (9) shows the numerical distribution of housing ownership in informal housing in the city of Altun Kupri, as the housing owned by its residents constituted a

percentage of (%87.1), which is the size of the studied sample, and the reason for this is the desire of families to own an independent housing unit accompanied by a high level of income and the availability of residential plots at reasonable prices, followed by rented housing, which constituted (% 12.91) the lowest percentage, due to the appropriateness of housing rental prices in the study area.

Figure 5: Relative distribution of the number of ownership or rent of housing in the random of Altun Kupri for the year 2023.



Source: Researcher based on Table (9).

3.2.2.7 Rental price of the residential unit:

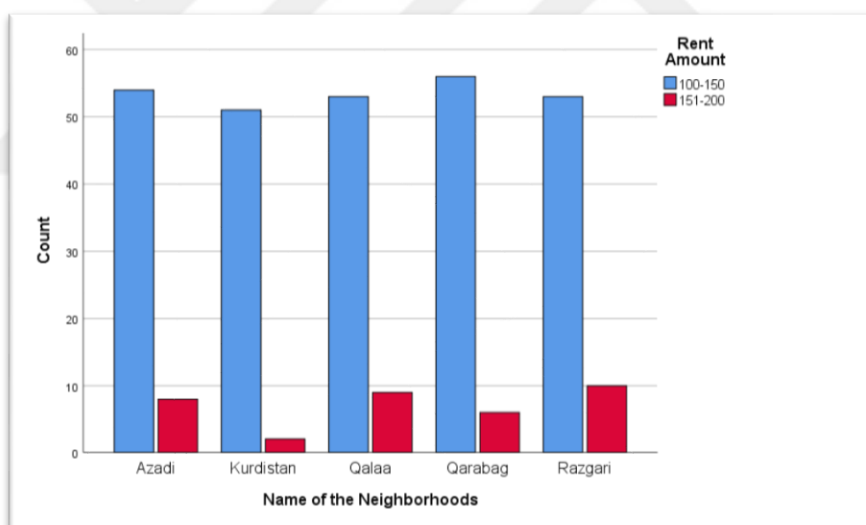
The rental value of the housing unit varies in any area random, according to the location and area of the housing unit, and through Table (10) it was found that there are three categories for the value of rents in the study areas, which are as follows: The first category is housing whose rents range between (100-150)IQD, (88.41%) This category has included low-income people, which is the largest percentage of the sample in the study area, while the second category is housing ranging between (151-200) IQD, and it has constituted (11.59%) of the total study area, as the reason for the high rents is because the area has some services or is located within the city center, It included middle-income earners. As for the third category, which ranges between (201 thousand Iraqi dinars or more), its presence did not appear in the questionnaire due to the choice of residents to live in random areas to get rid of high rents in regular housing areas, as in the Figure (6).

Table 10: Numerical Distribution of the Rental Price of a Housing Unit in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	100.000-150.000 IQD	151.000-200.000 IQD	Total
1	Azadi	54	8	62
2	Kurdistan	51	2	53
2	Qalaa	53	9	62
4	Qarabag	56	6	62
	Razgari	53	10	63
	Total	267	35	302
	%100	% 88.41	% 11.59	%100

Source: Field study, results of the questionnaire, according to question (8).

Figure 6: Relative distribution of the Rental Price of a Housing Unit in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (10).

3.2.2.8 Assessment of the quality of the housing structure.

This pertains to the external appearance of the dwelling, encompassing factors such as the quality of construction materials utilized, the level of completion, and the overall suitability of the housing units for habitation. Based on the field survey and questionnaire analysis, data presented in Table (11) indicates that housing categorized as being in moderate condition predominates in the study area, constituting the largest proportion (51.99%) of the sample size. This can be attributed to the prevalent use of block materials in construction, known for their durability and resilience to environmental

factors. Additionally, these dwellings exhibit a comprehensive urban structure, albeit with some instances of incomplete exterior finishes or upper walls, as depicted in photo (3).

Photo 3: Building a house in medium condition in the neighborhood of Azadi in the city of Altun Kupri for the year 2023.



Photos were taken on 2024-3-24.

In the ranking of housing conditions, dwellings classified as being in good condition followed closely with a representation of 42.71%. This is attributed to the effectiveness of the construction materials employed and the thoroughness in completing the construction process, often influenced by modifications made over time owing to increased family income levels, as evidenced in photo (4).

Table 11: Numerical distribution of the condition of the dwelling in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Good	Medium	bad	Total
1	Azadi	14	43	5	62
2	Kurdistan	5	37	11	53
3	Qalaa	32	30	0	62
4	Qarabag	39	23	0	62
5	Razgari	39	24	0	63
Total		129	157	16	302
%100		%42.71	% 51.99	% 5.3	%100

Source: Field study, results of the questionnaire, according to question (3).

Photo 4: Building a house in good condition in the neighborhood of Qarabag in the city of Altun Kupri for the year 2023.



Photos were taken on 2024-2-21.

A smaller proportion, constituting 5.3% of the sample size, was observed to be in poor condition. This can be attributed to the varied nature of construction materials used and the incomplete state of many of them, whether in terms of exterior wall finishes or internal components of the dwelling. Consequently, owners face limitations in their

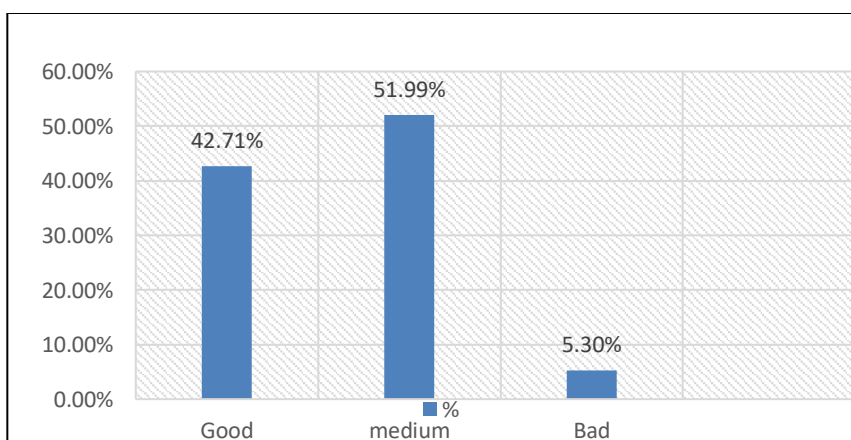
ability to improve or renovate their homes due to insufficient financial resources, as depicted in photo (5).

Photo 5: Building a house in good condition in the neighborhood of Kurdistan in the city of Altun Kupri for the year 2023.



Photos were taken on 2024-2-14.

Figure 7: Relative distribution of the condition of the dwellings in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (11).

3.2.3 Analysis of economic patterns of the random settlements of Altun Kupri

The objective is to examine the strategies and approaches employed by individuals in optimizing and enhancing limited resources to attain contentment and fulfill their requirements. Given that residents primarily inhabit informal settlements and largely possess constrained incomes within the city, they frequently engage in modest service occupations, such as building security or street vending. To elucidate this circumstance, an examination of the economic behaviors of slum inhabitants in Altun Kupri, in contrast to those in other areas, can delineate the principal disparities between them:

3.2.3.1 The Profession of Household Heads.

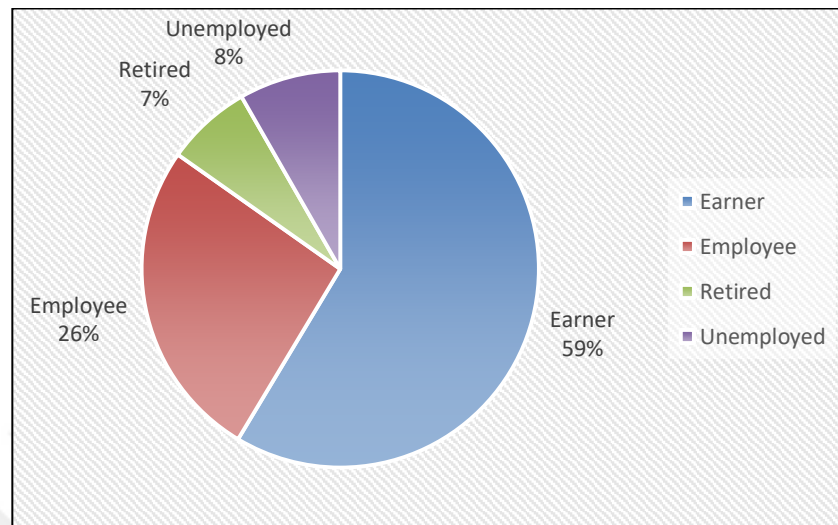
The nature of occupation serves as a significant gauge of the populace's standard of living, reflecting both the economic and social milieu of the broader community. Given its correlation with monthly income, occupation significantly impacts household income levels and essential expenditures. Analysis of Table (12) data reveals a diverse distribution of family heads' professions residing in Altun Kupri's slum areas. Predominantly, earners constitute a majority percentage (58.60%) of the sample, indicative of available employment opportunities. Additionally, employees account for (26.16%) due to opportunities in governmental and private sectors, contingent upon individual educational attainment and job type. Retirees represent a smaller proportion (6.95%) of the sample, while the unemployed category comprises (8.28%), primarily consisting of the elderly and recent graduates, as illustrated in Figure (8).

Table 12: Numerical distribution of the profession of heads of households in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Earner	Employee	Retired	Unemployed	Total
1	Azadi	36	16	4	6	62
2	Kurdistan	27	11	7	8	53
3	Qalaa	45	15	1	1	62
4	Qarabag	40	16	2	4	62
5	Razgari	29	21	7	6	63
Total		177	79	21	25	302
% 100		% 58.60	% 26.16	% 6.95	% 8.28	% 100

Source: Field study, results of the questionnaire, according to question (10).

Figure 8: Relative distribution of the profession of heads of households in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (12).

3.2.3.2 Average monthly household income:

The monthly income of the heads of the family is a mirror that reflects the reality of the social, economic, and housing life of the family, and is used to describe the amount of money that an individual or family receives during a month, and is an important factor through which all the basic needs of the family are met to obtain a decent life and financial stability while low income leads to the opposite (Tcharles, 1964). Through Table (13) and Figure (9) it was clear that there is a discrepancy in the income of the residents of slums in the city of Altun Kupri, families with a monthly income of less than (250) thousand IQD recorded (6.29%) of the distributed sample size, and families with a monthly income ranging between (260-500) thousand IQD constitute (13.25%), While households with a monthly income ranging between (510-750) thousand IQD reached the highest percentage of (45.36%) and families with a monthly income ranging from (>760) thousand IQD, constituted a percentage of (35.10%) of the sample size in the study area.

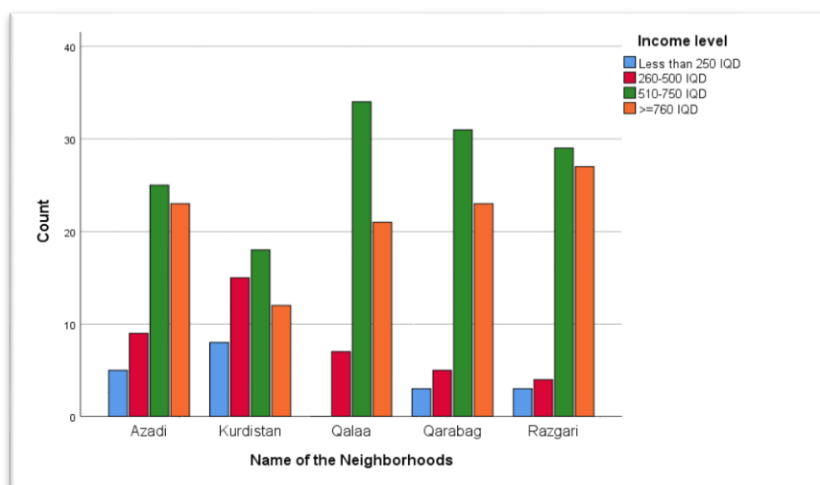
Table 13: Numerical distribution of the Average monthly household income in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	(Less than 250.000) IQD	(260.000-500.000)IQD	(510.000-750.000)IQD	>760.000)IQD	Total
1	Azadi	5	9	25	23	62
2	Kurdistan	8	15	18	12	53
3	Qalaa	0	7	34	21	62
4	Qarabag	3	5	31	23	62
5	Razgari	3	4	29	27	63
	Total	19	40	137	106	302
	% 100	%6.29	%13.25	%45.36	%35.10	

Source: Field study, results of the questionnaire, according to question (13).

The field investigation into the monthly income of families within the study area reveals a diversity of professions among household heads. From this observation, it is deduced that a significant portion of families with an average monthly income possess adequate resources to sustain their living expenses. Moreover, the average monthly income serves as a metric for assessing a family's capability to procure land for housing. Consequently, it augments the family's capacity to fulfill its financial obligations and essential service requirements, thereby contributing to overall stability.

Figure 9: Relative distribution of the Average monthly household income in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (13).

3.2.4 Analysis of social patterns of random settlements in Altun Kupri

The social pattern is characterized by a recognition of the characteristics, origins, and forms of human communities living in slums. It also expresses a range of different lifestyles in addition to the harsh conditions they are exposed to in informal housing areas from the chaos of construction and lack of services, which leads to negative socialization that threatens the balance and social stability of cities. As for the social patterns in the slums of the city of Altun Kupri, the most important of them will be explained to know whether they differ from the known social patterns of the apparent areas or not, and they are as follows: -

3.2.4.1 Previous place of residence

Knowing the previous place of residence of the family is important in knowing the social patterns of the residents of random housing because it is associated with the features and methods practiced by the residents of those areas, as the expatriate usually practices social patterns different from what prevails in neighboring areas, and the reason for this is due to the origins of expatriates and their social lifestyle. Through the field survey, the former place of residence of the residents of the slums of the city of Altun Kupri is clear according to three variables as shown in Table (14), as the families whose former place of residence in the city of Altun Kupri constituted (50%) of the sample size, followed by the variable of the suburbs of the city Altun Kupri by (46.36%), while the families whose previous place of residence in the city of Kirkuk constituted (3.64%) as shown in Figure (10).

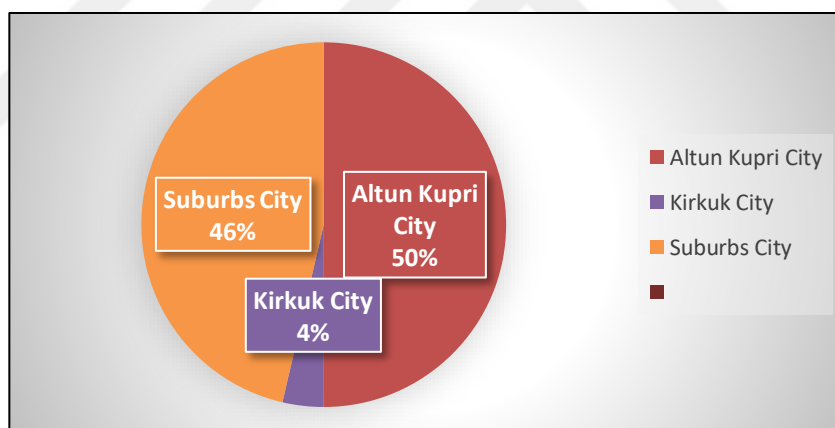
We conclude from this that most of the residents of the slums in the city of Altun Kupri are from within the city due to family fission, the small area of their housing, the increase in the number of family members, or the marriage of their children, which led to an increase in random housing. In the suburbs of Altun Kobri, most families were forcibly displaced during the previous government, and some came to Altun Greater due to a lack of services in their villages. As for the families who had their former place of residence in Kirkuk, they are employees who have changed their place of work.

Table 14: Numerical distribution of the Previous place of residence in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Altun Kupri City	Kirkuk City	Suburbs Altun Kupri City	Total
1	Azadi	40	2	20	62
2	Kurdistan	34	0	19	53
3	Qalaa	19	4	39	62
4	Qarabag	23	2	37	62
5	Razgari	35	3	25	63
Total		151	11	140	302
%100		%50	%3.64	%46.36	%100

Source: Field study, results of the questionnaire, according to question (14).

Figure 10: Relative distribution of the Previous place of residence in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (14).

3.2.4.2 Family size

The size of the family consists of the number of members in one dwelling, and it is clear the extent of crowding in housing, especially random, there is in the city of Altun Kupri there are some housing that lacks the simplest elements of life, however, crowded with several family members. Table (15) shows the numerical distribution of the size of households in the study area. It is clear that the numerical distribution of the size of households in the slums of the city of Eltun Kupri is clear, and it is noted that the family

consisting of (4-5) members ranked first by (51.0%) of the total sample size and families within this variable are newly formed families with two or three children.

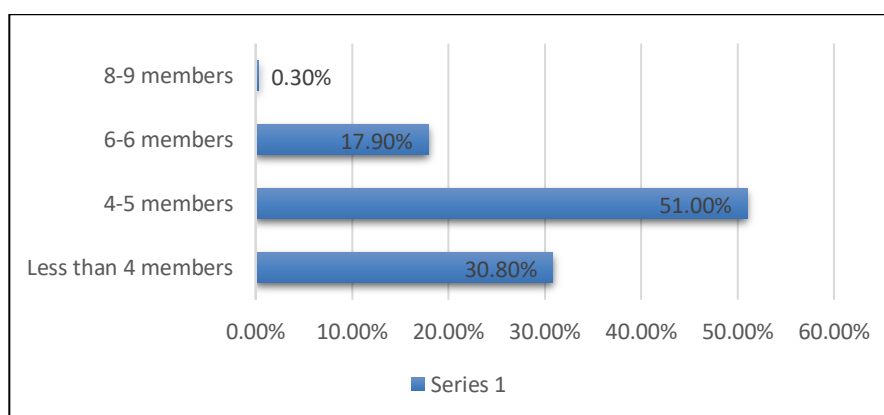
Table 15: Numerical distribution of the family size in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Less than 4	4-5	6-7	8-9	Total
1	Azadi	22	28	12	0	62
2	Kurdistan	15	30	8	0	53
3	Qalaa	14	36	11	1	62
4	Qarabag	18	30	14	0	62
5	Razgari	24	30	9	0	63
Total		93	154	54	1	302
%		%30.8	%51.0	%17.9	%0.3	

Source: Field study, results of the questionnaire, according to question (12).

Households consisting of (less than 4 members) constituted (30.8%) as most families in this rank consist of newly married couples with or without one child, Followed by families consisting of (6-7 members) which constituted (17.9%) The majority of families of this rank are of rural origin, and by the nature of their customs, they must have many children, while families consisting of (8-9 members) came in fourth place with a lower percentage (0.3%) that most of these families consist of both spouses or one of them with their children married and living with them as shown in Figure (11).

Figure 11: Relative distribution of the family size in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (15).

3.2.4.3 Educational level

The level of education is very important in population studies because it gives clear and accurate indications of the country's ability to develop economically, culturally, and socially and also determines the expected future needs of learners according to different economic activities (Fadel, 1983). To know the educational level of heads of households in slum areas in the city of Altun Kupri, and through Table (16) according to question (11) in the questionnaire, it is clear that the parents who have a university degree constitute (30.46%) of the sample size. Followed by those who obtained the diploma certificate, as they constituted a percentage (28.48%), while the percentage of those who have a secondary certificate (26.16%) As for the total number of employers who have a primary certificate, they constituted (14.9%) as shown in Figure (12).

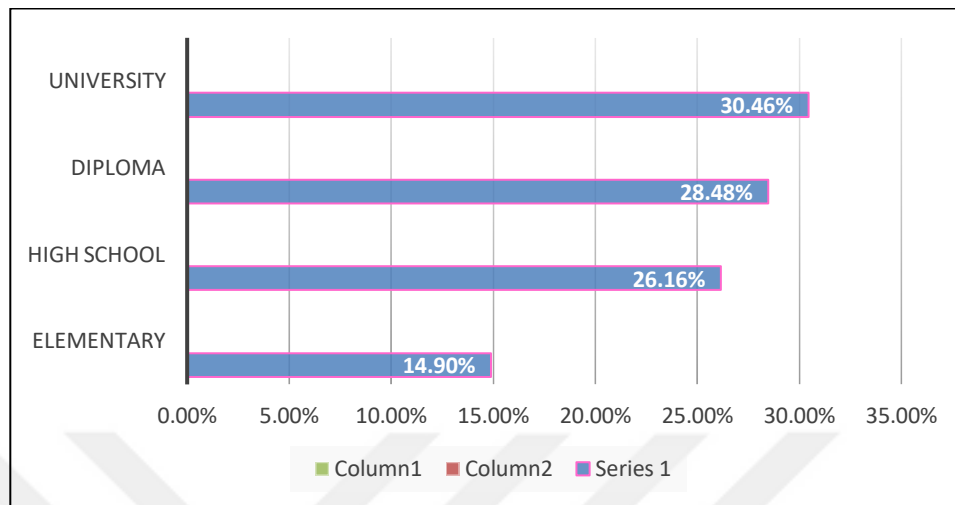
Table 16: Numerical distribution of the educational level of heads of households in the random housing of Altun Kupri for the year 2023.

N	Neighborhoods	Elementary	High school	Diploma	University	Total
1	Azadi	10	18	19	15	62
2	Kurdistan	8	18	17	10	53
3	Qalaa	8	14	13	27	62
4	Qarabag	6	9	19	28	62
5	Razgari	13	20	18	12	63
Total		45	79	86	92	302
%100		%14.9	%26.16	%28.48	%30.46	%100

Source: Field study, results of the questionnaire, according to question (11).

Here, it is clear that the number who have a primary certificate constitutes the lowest percentage of the sample size due to the low level of family income, and this constitutes a motivation to leave education or there is a social reason and the tendency to secure a living. While we see a high percentage of those with university degrees and consecutive diplomas in the study area, the reason for this is the establishment of the Al-Kitab University in recent years, which led to an increase in the number of university graduates in the city of Altun Kupri.

Figure 12: Relative distribution of the educational level of heads of households in the random housing of Altun Kupri for the year 2023.



Source: Researcher based on Table (16).

3.2.5 Analysis of basic services and secondary services in random areas in the city of Altun Kupri

Human beings, whether in regular or informal areas, need to provide basic and secondary services that support the psychological and health aspects (Alaa, 2015). The basic services are (water - electricity - sewage network - municipal services) and secondary services are (schools - hospitals - Andrea and green squares - providing transportation and means of transportation), these services need spaces commensurate with the residential sites and the size of the population of the area, and one of the characteristics of informal housing is the lack of basic and secondary services, but some of them get services by bypassing the services of the serviced areas adjacent to the slum areas. Table (3) in Appendix analyzes and explains the provision of services in informal housing areas in the city of Altun Kupri.

3.2.5.1 Water Services

The city of Altun Kupri is rich in surface and groundwater and the majority of housing units are characterized by being served by the drinking water network informally and planned, some residential neighborhoods get water by bypassing the water network neighboring areas such as (the Azadi neighborhood - Kurdistan neighborhood). The

percentage of water services in the slum areas in the study area reached (33.77%) partially available, if the highest percentage was recorded in (the Qalaa neighborhood), and the percentage of (66.23%) was fully available if the highest percentage was recorded in (the Rizgari neighborhood) that benefited from the neighboring area, despite the provision of this service, but it is not enough to meet the needs of random housing areas.

3.2.5.2 Electricity Services

The informal housing units in the city of Altun Kupri, are characterized by the presence of electricity networks and registered within the electricity circuits, but some of them are exceeded on the main network in the study area. Table (3) in Appendix reached (35.43%) partially exhaled, while recorded fully available rate (64.57%), and the field survey showed that some dwellings get electricity services by bypassing and this is done by erecting poles and more than one dwelling participates in laying electricity wires and is done randomly, photo (6,7,8).

Photo 6: Overtaking the main electricity network in the neighborhood of Azadi/Altun Kupri City 2023.

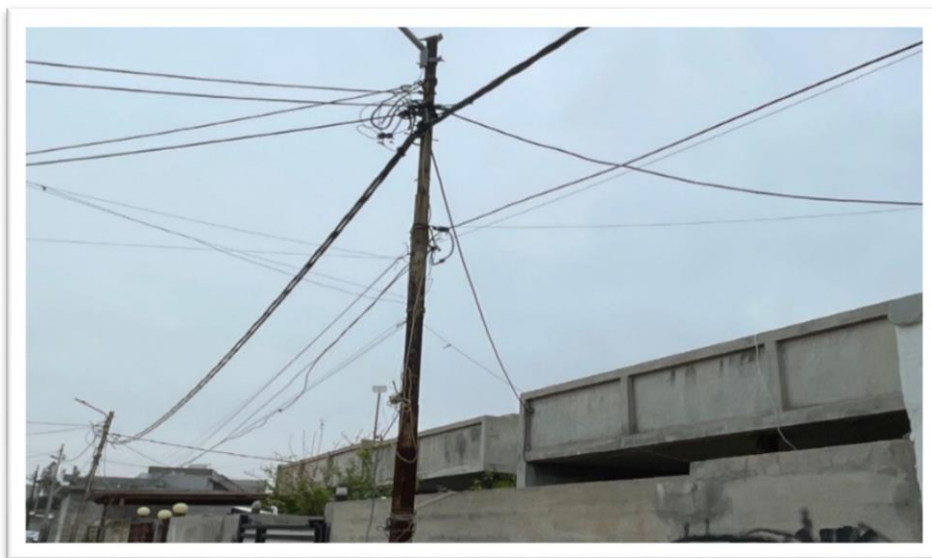


Photo taken on 24/3/2024.

Photo 7: The use of columns to overtake the Kurdistan neighborhood / Altun Kupri 2023.



Photo taken on 24/3/2024.

Photo 8: Overtaking on electricity poles in Kurdistan neighborhood / Altun Kupri 2023.



Photo taken on 24/3/2024.

3.2.5.3 Sewerage Network Services

Informal housing areas usually do not correspond to the planned urban formation. However, they often cater to the needs of the population living in those areas. Slums in the city of Altun Kupri suffer from a lack of sewage drainage, which results in pollution and mixing of water in an area, in the winter season, floods occur in some areas such as the neighborhood Rizgari. From the table below, it is clear that (45.70%) is partially available, which includes all areas close to the city center, while (54.30%) is fully available. Through the field survey, it was found that some neighborhoods suffer from a lack of this service, as there are no regular water streams and no buried water streams, photo (9,10).

Photo 9: Lack of service sewage network in the neighborhood Azadi - Azadi-Altun Kupri.



Photo taken on 18/4/2024.

Photo 10: Random sanitation planning in random housing areas in the city of Razgari/Altun Kupri 2023.



The photo was taken on 18/4/2024.

3.2.5.4 Services for shopping purposes

These services are of great importance because they contribute to meeting the basic needs of the population of the region, by facilitating the provision of shopping operations. Through the field survey, it is clear that (33.89%) is partially available, while (66.89%) is fully available, because some of the residents of the study area have shops.

3.2.5.5 Educational services

Informal housing areas usually suffer from a lack of educational services, but according to the field survey and a table in the annexes, we find that (19.87%) are partially available and (80.13%) are fully available, due to the proximity of the areas to the neighboring areas and benefit from the services of that areas.

3.2.5.6 Health Services

It is considered one of the most important services in human life and has a vital role in maintaining the health and well-being of the individual, and the areas of the phenomenon of random housing in general is characterized by deteriorating health conditions, and this is due to the distance of health centers from it. Through the field survey, we note that the percentage of (43.71%) is partially provided and the percentage (of 56.29%) is fully available according to the opinion of the residents of the random

housing areas, but there is a health center in the center of the city of Altun Kupri, due to the presence of adjacent residential buildings and the lack of green spaces and the spread of waste and lack of disposal leads to the spread of diseases.

3.2.5.7 Green squares

It is of great importance in residential neighborhoods, which leads to a reduction in carbon dioxide, and random housing areas usually lack these services due to irregular planning by the residents of the area, as (100%) random housing areas in the city of Altun Kupri lack green space services as a result of irregular planning and the large number of neighboring housing, which negatively affects the quality of the environment and the health of the residents of these areas.

3.2.5.8 Availability of transportation and delivery services.

Through the field study and analysis of the questionnaire, we note the percentage of (100%) not providing transportation and delivery service, due to the presence of some housing units irregular and overlapping with each other and not considering the importance of streets within residential neighborhoods, and this is affected by pedestrian movement, and as a result leads to the difficulty of vehicle movement in them, and government agencies responsible for transportation and communications did not care about providing buses between random residential neighborhoods in the city.

Chapter Four

4.1 The effects of the phenomenon of random housing on the city of Altun Kupri

The phenomenon of informal housing is among the prominent phenomena that accompanied the expansion of cities and their spread within the boundaries of the urban fabric of the city as an attraction for many immigrants, which led to the emergence of many effects and problems it poses a danger at the community level (Maryam,2014) Cities are characterized as organic entities that can change and expand, as they witness a continuous increase in population growth. The city usually expands in two phases: the first phase is regular and planned expansion by the competent authorities, while the second phase is random expansion where it is planned by the residents of the area. In the following, we will explain the most important effects of informal housing in the city of Altun Kupri.

4.1.1 The effects of urban planning and development.

Planning is characterized by the organization and development of urban as well as the distribution of services regularly and systematically, in contrast to the slums which is inconsistent with the planning methodology. Slum areas arise without prior planning, and are not formed according to the urban fabric and the distribution of the population, as well as the reality of the phenomenon of informal housing where it arises according to spontaneous social thinking, customs, and traditions (Jalila, 2009). Therefore, we find that most informal housing adapts to the neighboring environment in terms of shape and construction style. As a result, it caused the emergence of many problems or consequences associated with the planning process and through which it was decided to remove or reorganize them within planning, considering that these areas were created without planning as well as causing the distortion of the urban fabric of the city (Hasan, 2013).

Concerning the city of Altun Kupri, the phenomenon of informal housing began to spread from the beginning of its growth. The spread of the phenomenon of informal housing has caused the emergence of many planning and development problems due to weak control and laws, and the lack of long-term planning. In 1918, the city of Altun Kupri consisted of three informal residential neighborhoods because at this period there

was no planning in Iraq in general (Kamran, 2019). We find that the city of Altun Kupri, since its inception, has not had any planning or foundation design until after 1997, a plan was prepared for the study area by the municipality of Altun Kupri and the Ministry of Planning and Follow-up, Kirkuk Governorate (Mohammed, personal interview7, 2024).

After the events of 2003 and until the present time, the city of Altun Kupri suffers from neglect, the basic planning has not been updated, and a programmed planning policy has not been developed to find solutions to the problems resulting from the increase in population size, the deterioration of the housing crisis problem, and the failure to consider the future needs of the city of Altun Kupri. As a result of the failure to update the basic planning of the city of Altun Kupri, the weakness of laws and control, the increase in the continuous demand for housing, and the lack of fear of the population from the ruling government in the study area, contributed to many problems and negative effects on the city, Through the study of the city, we notice in the study area the expansion of third parties plans for random housing, which led to many negative effects, including the lack of social services and public services, as well as a lack of educational services, and the lack of green spaces, and this led to pressure on the planned urban areas and the services of those areas, One of the effects resulting from the lack of planning in the city of Altun Kupri, is the imparting of the urban fabric distorted to the city as a result of spontaneity in the process of propaganda and land division, the buildings are unequal in terms of area and structure, as well as the spread of the remains of the block and construction materials in the neighborhoods and the irregularity of the streets because they were not built to stop the planning standards and as the photo (11,12).

Photo 11: The spread of building materials remains in the neighborhood of Qalaa.



Photo taken on 17/3/2024.

Photo 12: We are selling construction materials on a public street in the neighborhood of Qalaa.



Photo taken on 17/3/2024.

We notice that there is a random layout of the streets as they expand a lot and facilitate the movement of cars in them (Photos13). Some streets narrow even for the movement of more than one person (photo14) and this is a result of a large number of adjacent buildings and dense randomly. There are also ramp streets on which buildings were built randomly (photo15), Where they are dominated by residential buildings without regard to the presence of regulatory streets and traffic networks to facilitate the movement of narrow streets that make it difficult for ambulances, cars to move electricity circuits and cars designated for transporting waste, and this leads to their exposure to environmental hazards.

Through the field survey, we noticed that the obstruction of the implementation of urban plans and their modernization about the division of land uses, most of the land of the municipality of the city of Altun Kupri was exploited for housing, and this led to a deficit in many infrastructure and community services in the study area and the reason for the lack of interest of the competent authorities in the government for recreational and tourism services led to the emergence of cafes and small shops, Such as a tourist café on the main road between Kirkuk-Erbil (Photos 15) without any health standards and tourist standards but the residents of the area study and is very popular with them.

Photo 13: The widening of the streets in the neighborhood of Qarabeg.



Photo taken on 17/3/2024.

Photo 14: The internal alleys are narrow and winding in the Kurdistan neighborhood.



Photo taken on 24/3/2024.

Photo 15: Random coffee shop on the main road between Kirkuk – Erbil.



Photo taken on 17/3/2024.

4.1.2 Environmental impacts

It is considered one of the most important resources that an individual relies on to ensure the continuity of his life. However, the prevailing phenomenon in most Iraqi cities is the imbalance in the components of the urban environment, as a result of multiple human activities such as waste disposal in the wrong places (Abdul Razzaq, 2014).

The presence of the phenomenon of informal housing in multiple areas in the city of Altun Kupri has led to the existence of environmental problems that did not exist in this way in the past, the most prominent of which is the accumulation of waste in general. Waste is considered a transportable resource so its owner usually wants to dispose of it by collecting and transporting it in nylon bags, and this process and treatment is an urgent necessity that falls on the shoulders of the state. It is found through a field study that most of the areas of the phenomenon of random housing have this service because it is located within the boundaries of the municipality Altun Kupri, but this does vary from one area to another, as some areas are cleaned daily and others are cleaned every week, which led to the presence of piles of waste, and in some neighborhoods they are thrown in the streets or at the end of the boundaries of the residential area, which makes the environment of these neighborhoods unhealthy and a source of spread of diseases (Pictures 16).

Photo 16: Dumping waste at the end of the residential area of the neighborhood Rizgari.



Photo taken on 17/3/2024.

Another effect of this phenomenon is the grazing of animals within residential neighborhoods, which is prohibited according to municipal laws in the city of Altun Kupri, however, during the field survey we noticed that some people secretly graze their animals in the streets. The reason is that most of the population in that area previously lived in the countryside, and another reason is that this is mostly agricultural areas (Photos 17).

Another effect of the phenomenon is the pressure on the sewers in the neighboring areas and the lack of planning to serve them, which leads to floods in the winter the reason is due to not cleaning the sewage openings early before the rains or the residents of the areas throw their waste in the streets, such as what happens in the neighborhood Rizgari (Photo 18).

As for the apparent effects on road and transportation networks, through the field survey, we noticed the occurrence of these effects on the main road within a city and on its outskirts, where abuses occur through the construction of housing or shops or their exploitation to sell construction materials on the outskirts of the public road or sell vegetables from cars on a road (Photos 19, 20).

Photo 17: Grazing animals within residential neighborhoods in the Azadi neighborhood.



Photo taken on 24/3/2024.

Photo 18: Rainwater Collection in the Neighborhood Rizgari (Winter Semester).



Photo taken on 19/3/2024.

Photo 19: A group of shops selling construction materials, gasoline, and a car repair shop on the main road of the neighborhood of Qalaa.



Photo taken on 17/3/2024.

Photo 20: Selling vegetables on a road in the neighborhood of Rizgari.



Photo taken on 24/3/2024.

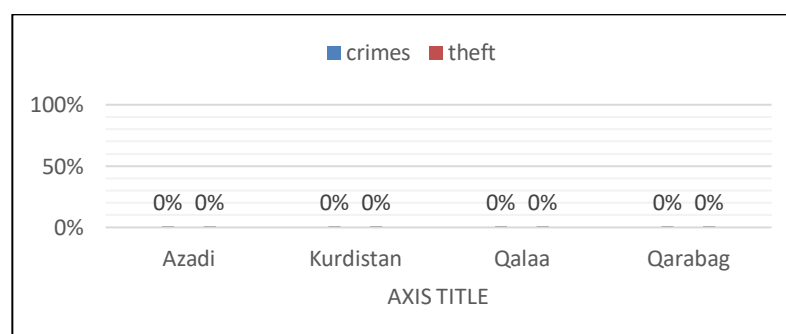
4.1.3 The social and security effects.

The areas are characterized by the phenomenon of random housing as housing areas that do not enjoy a coherent social system among their residents and is due to the population mixture from which these areas are made because most of them are not

residents of the city and this is reflected in the behavior of individuals with each other and this leads to the spread of crime and high disputes as a result of the low social, economic and cultural level of its residents (Kamran, 2019).

Through the field survey in the study area and the analysis of the results of the questionnaire, it was proved that the residents of the random housing areas are of the origin of the city of Altun Kupri, as their percentage reached (50%), and this indicates the existence of social cohesion between the residents of those areas due to a social relationship between them. In addition, the economic and cultural level of the population contributed to making social relations in the study areas stable. The percentage of total holders of university degrees reached (58.94%) and the percentage of residents whose average monthly income ranges to more than (500.000) IQD to (93.71%), and this is one of the most important indicators of the role of a social, economic, and cultural factor in organizing life in informal settlements. This contributed to the stability of the city in terms of security compared to the characteristics of other informal housing areas. A study showed that despite the existence of one police station in the city of Altun Kupri, there is no crime or theft in the study area because they are relatives and acquaintances of each other.

Figure 13: Relative Distribution of Crime and Theft Rates in the random Neighborhoods of Altun Kupri City.



Source: Field Study based on Altun Kupri Police Directorate, Investigation Department, 2023, Unpublished Data.

4.1.4 Agricultural effects

After the events of (2003), urban growth, weak regulatory bodies, and housing deficit in all cities, including the city of Altun Kupri, led to the spread of the phenomenon

of random housing at the expense of agricultural land surrounding the city, as agricultural land owners exploit the citizens' need for residential land, and the high prices of land in the city center bulldoze their land, which led to the waste of hundreds of dunams of agricultural land and the agricultural products they contain were marketed to the city's markets. The total area of agricultural land that was bulldozed within the city limits of Altun Kupri according to the latest plan amounted to (250) dunams (Department of Agriculture, Altun Kupri District, Statistics and Monitoring Division,2023). We find that urban sprawl affected the city's climate due to the environmental impact of the fact that agricultural lands and orchards are sources of natural ventilation that resist dust storms, as well as the city's loss of economic income resulting from agricultural production that used to come from its suburbs.

4.2 Addressing the phenomenon of random housing in the city of Altun Kupri

Addressing the phenomenon of informal housing and limiting its spread requires a lot of time, effort, and hard work, as what years have created is not addressed in months or years. Finding solutions and remedies that satisfy its residents, because they are Iraqi citizens and have the right to adequate housing and a decent life. The idea of treating informal settlements goes back to classical sociologists, as it is based on the survival of informal residential areas, but on the condition that the necessary services are available, or demolished and removed, and then the housing is built again, taking into account the social and economic effects of the population in solving their transition to new residential environments (Karim, 2010).

After 2003, the urban landscape in Altun Kupri, despite its apparent antiquity, became more pronounced, especially after the political upheavals in the study area between the Iraqi government and Kurdish parties, leading to further exacerbation of the situation and making it more complex and difficult to address (Mohammed, Personal Interview8, 2024). This issue has been exploited in elections by candidates promising to address the ownership of the study area.

Regarding the phenomenon of informal housing in Altun Kupri city, the most important methods of addressing this phenomenon will be presented, tailored to the city's current situation, based on several conditions set forth by a study to determine the areas to be addressed, as follows:

4.2.1 Opinions of residents of the study area regarding the treatment of random housing

Differences in opinions among the residents of the area regarding the treatment of the phenomenon of informal housing are evident due to the weakness of the government and the division between the administrations of the Kurdistan Region and the Iraqi government (Ahmed, personal interview⁹, 2024). This has led some residents of the area to build more housing and engage in buying and selling transactions in the area's lands. Through field study and analysis of the survey questionnaire, it was found that the percentage of residents who desire ownership amounted to 95.70% of the total area because the residents have a background indicating that this is not the first time informal housing has been legalized in their city. Additionally, the reason for this increase is attributed to the fact that the owners of these lands demand proof of their rights as citizens, which the local government and municipal directorate should fulfill by granting ownership and providing services. Meanwhile, the percentage of residents opting for removal and compensation reached 4.30% of the total population, attributed to the fact that these residents encroached on lands not designated for residential use, such as the Azadi neighborhood, designated for recreational and tourist services, originally owned by the Ministry of Finance, or the Kurdistan neighborhood, constructed on cemetery lands. They exploited this situation, believing that the government would grant them these lands because they are currently unused for the projects designated in the city's master plan, or they could be compensated after removal, as shown in (Table 17).

Table 17: The percentage of opinions of residents of the study area regarding the treatment of random housing.

N	Neighborhoods	Titling	Removal and compensation
1	Azadi	56	6
2	Kurdistan	51	2
3	Qalaa	61	1
4	Qarabag	60	2
5	Razgari	61	2
Total		289	13
% 100		%95.70	%4.30

Source: Field study, results of the questionnaire, according to question (1) part four.

Through field study and gathering the opinions of the residents in the area regarding solutions to address the phenomenon of informal housing, it became evident that the majority of the population preferred ownership. This falls under the title of "maintenance policy", whereby maintenance entails comprehensive development of the urban environment from all aspects, including addressing existing building blocks, enhancing the efficiency of clustered housing, and developing infrastructure and community services (George, 2013).

The ownership of properties by developers must adhere to certain conditions: the lands should be within the city's master plan, construction must be of durable materials, the land use should align with the city's basic design purposes, and additionally, these lands should be part of collective settlements rather than individual ones to facilitate service provision (Hassan, 2013). In the event of land ownership implementation, it does not encompass all informal housing in the city of Altun Kupri, but rather a portion of it, such as the Rizgari neighborhood, and also lands belonging to the Ministry of Agriculture, under specific conditions aimed at addressing the phenomenon of informal housing in Altun Kupri. This statement also applies to neighborhoods like Qalaa and Qarabag.

The government's decision to legalize and maintain informal settlements is considered an appropriate solution to address this escalating issue, as long as it does not

contradict the city's master plan of Altun Kupri. The structure, buildings, roads, and some services in these areas are in harmony with the organized sections of Altun Kupri. This decision was made during the 1990s in Altun Kupri when informal settlement areas were incorporated into the master plan through its update. The municipal authority at that time undertook the development and improvement of those areas to align with the city's master plan, thereby providing services for them. It is also preferable for residents of informal settlements to own land rather than reside on agricultural land, as they possess legal contracts for such ownership. This ownership should involve financial transactions imposed by the government as land rights, thus resulting in benefits for the municipality and contributing to its budgetary resources.

4.2.2 Ways to address the phenomenon of random housing in the city of Altun Kupri.

The emergence of informal housing has led to numerous urban, economic, social, and cultural problems in various cities worldwide (Kamran, 2019). Consequently, researchers and scholars have focused on developing the necessary methods to address this phenomenon. The process of addressing it typically involves several factors, some related to the nature of the political and economic system and the type of housing policies adopted in countries, while others relate to the scale and location of informal housing, population size, the issues faced by these areas, and the legal status of land ownership (Istibraq, 2008). Each of these factors works to determine a suitable approach for addressing and tackling the phenomenon, making it difficult to identify a typical method for addressing this issue. There are several methods adopted by developing countries to address this phenomenon, including in Iraq (Lina, 2008).

As for the phenomenon of random housing in the city of Altun Kupri, the most important methods of treatment of the phenomenon will be reviewed in proportion to the reality of the situation of the city of Altun Kupri, which can be clarified as follows:

4.2.2.1 The Full Removal Method

The full removal method is used in informal settlements established on government land not designated for housing and in informal residential areas suffering from deterioration in urban infrastructure, where dwellings are made of unstable materials. This method is employed to reorganize land use in cities (UN Program, 2002).

It is characterized by high costs, as the construction of new housing requires the provision of new services. It also has negative impacts on the lives of inhabitants of informal settlements and should only be used in rare cases (Jamal, 2016).

The field study of informal housing areas in Altun Kupri city revealed that two areas require the application of this removal method, despite the study confirming that the housing in these areas is in good to fair condition. This is due to their compliance with the conditions specified for removing informal areas in Altun Kupri city, which are located on government lands of strategic importance not designated for housing. It can be said that they apply to informal residential neighborhoods within the boundaries of Kurdistan neighborhood, which were built on cemetery lands and do not have original property deeds, and the informal housing area within Azadi neighborhood, plot number (26/4), which is classified as agricultural and designated for tourism services according to the master plan, and its ownership belongs to the Ministry of Finance (Cabinet Resolution (320 of 8/11/2023)).

4.2.2.2 Partial removal method

Partial removal aims to deal with slums more moderately to avoid the conditions that may be caused by the complete removal of social and economic aspects (Haidar, 2010), and when applying this method, it is necessary to take into account the criteria to identify the buildings that require their removal, and to find temporary alternative housing to remove the old dwelling and that the number of residents allows them to be moved to the new housing (Jamal, 2016) From here we note that the method of the policy of complete removal or survival with the reality of the situation are two methods adopted most applied to address the problem of informal housing in the city of Altun Kupri, and until the present time the competent authorities have not taken any action to address the problem and the basic design has not been challenged after the last update in (1997).

Through the analysis of Table (17) if a percentage of 100% of the total population of informal settlements expects that the government will make a decision obligating the municipality of Altun Kupri to implement a stay-as-is approach, especially since the local government has previously issued similar decisions to implement a policy of maintaining the status quo without any financial compensation. This is manifested in both

neighborhoods (Kurdistan and Buyuk Altun Kupri), or they will be compensated for a financial amount or land allocation as happened previously after the events of 2003.

We conclude from the above that the application of the policy of deportation of both types is useless, but rather has negative effects and damage to the population, for this experiment to succeed, there must be an alternative, for example, providing housing for the residents of the population to be removed, and it must not be far from their current housing, as well as the government bears the bulk of the costs of new housing and the owners of the house pay the rest of the costs.

4.2.2.3 Development method

Development policy for informal settlements is defined as the comprehensive intervention in the area to address urban, economic, environmental, and social conditions without resorting to demolition, although it remains essential for revitalizing areas (Jamal, 2016). Development policies vary from one area to another depending on the characteristics of the region. Houses built on state-owned land require a different approach compared to those built on agricultural land or within the urban core of the city. Among the key measures in the development process is the establishment of programs to provide appropriate loans and facilities to improve housing standards (Istibraq, 2008). Development is not solely the responsibility of the government; it can also involve training, education, and capacity building for residents in construction through courses, leading to the construction of houses at lower costs by qualified personnel who can work in other areas. This results in recognized residential areas providing all essential services and basic needs to preserve human dignity in informal settlements (United Nations Program, 2002). Consequently, the land is utilized according to a new plan, allowing vital institutions to expand, such as clinics, schools, and others, leading to urban revitalization to reduce poverty and unemployment, attract environmentally friendly industries, and eliminate pollution (Mohammed, 2009). This method is more cost-effective than the previous method and leads to quick and noticeable results.

This approach encompasses informal settlements (Rizkari neighborhood, Qala neighborhood, Qara Bak neighborhood), with the majority of the residences in these areas built on varied land ownership. Through field studies, it has been revealed that the residents of these areas strive to consolidate self-directed human efforts for community

development and environmental preservation. The research indicates that the success and sustainability of this approach necessitate maintaining social relationships among the residents of these neighborhoods and refraining from their displacement during development and improvement processes. The research underscores the necessity of implementing development laws by providing essential services such as water, electricity, sewage networks, and others. Consequently, development programs and the phenomenon of informal housing and service provision are considered official recognition of the legal status of the concerned area's inhabitants, leading to increased land and property prices due to heightened demand from low-income earners. This, in turn, fosters the emergence and growth of new informal residential areas, hopeful of receiving equal treatment and development (Mustafa, 2014).

4.2.2.4 Immunization method to reduce the spread of the phenomenon of random housing in the city of Altun Kupri:

The method of immunization is aimed at preventing the growth and spread of informal settlements. This is not done by addressing or eliminating the phenomenon through demolition or neglect, but by fortifying and restricting it, preventing its extension or absorption of new spaces, while providing the necessary services to stop the spread of informal settlements and unlicensed construction (Salah, 2007). This approach can be implemented in the town of Altun Kupri to address random expansion by effectively activating oversight by municipal and agricultural authorities. It involves identifying areas of informal settlement by utilizing vacant public lands surrounding these settlements. These lands can be utilized for other projects that contribute to organizing the area through contracts with agricultural landowners and governmental bodies while adhering to city boundaries and the foundational design. Compensation is provided to affected landowners to preserve the lands and prevent their conversion into residential plots. This measure will contribute to establishing green barriers that protect against pollution and reduce informal settlements.

Conclusions

Through the study of the spatial analysis of the phenomenon of informal housing in the city of Altun Kupri, a set of conclusions were reached that can contribute to the service of the development of the city of Altun Kupri.

1. In fact, the origin of the problem of random housing dates back to the beginnings of the city of Altun Kupri's inception and appeared in the early thirties of the last century, and then increased significantly after the events of (2003).
2. Since (1997) the foundation design of the city of Altun Kupri has not been updated and the city has developed and expanded randomly.
3. The phenomenon of random housing in the city of Altun Kupri is no longer a shelter for poor families or people with limited income but has become housing areas for high-income people and the exploitation of land for commercial speculation for some owners of capital and real estate.
4. The study area witnessed a continuous increase from 2003 in the number of random housing units, and despite the issuance of laws and applications, in 2023 it reached (3783) housing units and a population of (23900) people, and it is continuing to expand.
5. The high residential rent and the high prices of land and housing in the city center are factors that contributed to the growth and expansion of informal housing in the study area.
6. The study proved that the phenomenon of random housing in the study area can be addressed through the use of several methods by the state and the responsible authorities, such as the method of survival on the status quo or the method of complete and partial removal or the policy of development and improvement and others.
7. The study showed that there is a shortage in the number of housing units compared to the number of inhabitants corresponding to the availability of agricultural land at reasonable prices or empty government land for construction led to the spread of the phenomenon of random housing in the city of Altun Koupri.
8. It became clear during the study that the social and economic patterns of the residents of the informal housing areas in the city of Altun Kupri do not differ from what is found in the residential areas and neighborhoods in the city center,

because most of the residents of the slum area trace their previous residence to the city itself.

9. Through a study, it was found that the residents of the informal housing area took advantage of this matter and encroached on agricultural and other property lands, believing that the government would grant them these lands because they are not used in any service projects and as he did in the past by owning random housing in the study area.
10. The absence of any statistics and accurate information on the number of random housing in the municipality department and the absence of any census of the population of the study area.
11. It turned out that the growth and spread of informal housing are due to the weakness of government policies and the division between the two administrations of the Kurdistan Regional Government and the Government of Iraq, which prompted some residents of the region to build more informal housing and conduct buying and selling transactions in the lands of the region.

Recommendations

The city of Altun Kupri is located in a strategic area in terms of tourism and agriculture and connects the city of Kirkuk and the city of Erbil, as it has a tourist site due to the passage of the small Zab River in a city that can be developed as an area to attract tourists and visitors, so attention must be paid to the government and the responsible authorities to find optimal solutions to the problem of the phenomenon of slums in general in the city of Altun Kupri. A study found the following.

1. Reconsider the modernization of the basic design of the city of Altun Kupri, in line with the reality of the city's situation.
2. Activating the supervisory role of government departments and reforming the reality of the service departments in the city of Altun Kupri.
3. Promoting the countryside in the city of Altun Kupri, through development programs to reduce the spread of the phenomenon of internal migration to the center of the city of Altun Kupri.
4. Taking into account the humanitarian aspect of the residents of random housing neighborhoods, as some of them are forced to live in these areas because of the lack of housing.
5. Follow-up government procedures for the ownership and development of slum areas, most of which, especially before (1997), were owned without any development operations, especially neighborhoods (Kurdistan and Buick Kupri).
6. Establishing residential complexes commensurate with the needs of the current and future residents of the city of Altun Kupri, at reasonable prices and equipped with basic public services distributed to the residents of the areas that need to be removed.

References

- Abdul Razzaq Muhammad Al-Muhammadi, Planning problems resulting from the expansion of the city of Saqlawiya, *Tikrit Journal of Human Sciences*, Volume 21, Issue 2, 2014.
- Ahmed Ali Ismail, *Studies in the Geography of Cities*, First Edition, Dar Al-Thaqafa, Publishing and Distribution, Cairo, 1988, p. 321.
- Alaa Hashem Dakhil, *Urban Encroachment and its Impact on the Emergence of Slums*, College of Arts, University of Baghdad, 2015, p. 6.
- Al-Abadi, A. M., Pourghasemi, H. R., Shahid, S., & Ghalib, H. B. (2017). Spatial mapping of groundwater potential using entropy-weighted linear aggregate novel approach and GIS. *Arabian Journal for Science and Engineering*, 42, 1185-1199.
- Al-Hafith, O., Satish, B. K., & de Wilde, P. (2019). Assessing housing approaches for Iraq: Learning from the world experience. *Habitat International*, 89, 102001.
- AL-JANABI, E. M. S. A. (2022). *DESIGN, AND COMPARATIVE ANALYSIS OF THE HYBRID RENEWABLE ENERGY SYSTEM: A CASE STUDY OF IRAQI REGIONS* (Doctoral dissertation).
- Al-Jawari, S. M. (2020, April). Study for the Informal Settlement Supposed to Be Distributed by the Iraq Government for Poor People in Baghdad City-Republic of Iraq. In *IOP Conference Series: Earth and Environmental Science* (Vol. 459, No. 6, p. 062107). IOP publishing.
- Bernard Granottier, *Slums, Problems and Solutions, Introduction and Approximation of Muhammad Ali Bahgat Al-Fadli*, 2nd Edition, University Knowledge House, Alexandria, Egypt, 2000, p. 21-22
- Dekel, T. (2020). The institutional perspective on informal housing. *Habitat International*, 106, 102287.
- Department of Agriculture, Altun Kupri District, Statistics and Monitoring Division, 2023.
- Dhumad, K. F. (2023). *An Assessment of Informal Housing Policies in Iraq*.
- Durst, N. J., & Wegmann, J. (2017). Informal housing in the United States. *International Journal of Urban and Regional Research*, 41(2), 282-297.

- Faris Abbas Al-Saadi, Regional Variation of the Fertility Scale and its Relationship to Women's Education in Iraq, International Union of Iraqi Women, Secretariat of Studies and Research, Reproductive Symposium, Baghdad, 1983.
- George Touma, Factors affecting the emergence of slum areas and the policy of upgrading, Damascus Journal for Research and Scientific Studies - Engineering Sciences Series, Volume 25, Issue 3, 2013.
- Grashoff, U., & Yang, F. (2020). Towards critique and differentiation: Comparative research on informal housing. Comparative approaches to informal housing around the globe, 1-21.
- Haider Attia Abd Nasser Al-Qarawi, Spatial Analysis of the Reality of the Phenomenon of Random Housing in the City of Kufa, Master Thesis (Unpublished), Faculty of Arts, University of Kufa, 2014.
- Haidar Razzaq Mohammed Al-Musawi, identifying proposals to solve the problem of informal housing, Higher Diploma Project, Institute of Urban and Regional Planning, University of Baghdad, 2010.
- Hanoon, A. S. A. A., & Dhumad, D. K. F. (2021). Rethinking the residential urban environment in Iraq-literature review. In E3S Web of Conferences (Vol. 262, p. 04001). EDP Sciences.
- Hassan Mohammed Hassan Zangana, Residential Slums: A Study in the Geography of Cities, Dar Al-Farahidi for Publishing and Distribution, Baghdad, 2013.
- Hassan, T. S. (2016). Spatial variation of quality of the gap in population compositions in Walton Bridge. Journal of Al-Farahidi's Arts, 8(26).
- Hashem Yassin Mohammed Amin Al-Haddad, Atlas of the natural resources of Erbil Governorate and the management of land for agricultural purposes, a cartographic study, Master Thesis, Faculty of Literature, Salahaddin University, Erbil, 2000, Part 2.
- Hyal Ghanim, S., & Yuonis, A. H. (2020). Regulatory Frameworks for possessioning Informal Housing: Iraqi Law as a Model. Alrafidain of Law, 22(72), 88-135.
- Istabraq Ibrahim Al-Shawk, Towards Upgrading the Existing Housing Balance in Iraq, Ministry of Housing and Construction, 2008.
- Jalila Al-Qadi, Random Urbanization, Translation of Al-Batrawi Scholarship, Saba Al-Awwal, Egyptian House of Books, Cairo, 2009.

- Jamal Baqir Mutlaq, identifying proposals for solving the problem of informal housing: an analytical study of the city of Baghdad from (2003-20098), *Journal of Development Scheme*, No. 33, 2016.
- Jeromey Fellmann, and others, *Human Geography (Lands capes of Human activities)* Mcgraw, Hill Higher Education, 2007.
- Kahachi, H. A. H., & Brown, A. (2020). Low-Income Housing Provision: Between Governmental Interventions and Informal Settlements-Greater Cairo Region Between 1980s and 2010s. *The Iraqi Journal of Architecture and Planning*, 19(2), 39-50.
- Kamran Taher Saeed, A Geographical Analysis of the Problem of Informal Housing in the City of Koya, *Koya University Journal of Humanities and Social Sciences*, Volume 2, Edition 2, 2019.
- Karim Kazem Hammadi Al-Shammari, An Analytical Study of the Problems of the Urban Environment (Selected Areas of Hilla City), Master Thesis (Unpublished), Institute of Urban and Regional Planning, University of Baghdad, 2010.
- Khaled Husni Al-AShaab, *The City and Urbanization in the Civilization of Iraq*, Baghdad, 1984, p 8.
- Khalil Ibrahim Al-Aasem, Violations of Land Ownership in Iraqi Legislation, Master Thesis (unpublished), Higher Institute of Urban and Regional Planning, University of Baghdad, 1986.
- Lina Abdul Amir, Informal Housing (Study Area um Al-Ward in Al-Jadriyah), Diploma Thesis, Institute of Urban and Regional Planning, University of Baghdad, 2008.
- Maryam Jabbar Rashm, Slums and Social Security - A Social Field Study, *Journal of the College of Education for Girls*, Volume 25, Issue 2, 2014.
- Mohammed Jassim Mohammed Shaaban Al-Ani, Applied Studies for Some Aspects of Urban and Regional Planning, 1st Edition, Dar Safa for Publishing and Distribution, Amman, 2009.
- Muhammad Abdul Latif Asfour, Saeed Ibrahim Al-Badawi, Field Studies in Urban Geography with an Applied Study on Majmaah, Diriyah and Daham in the Kingdom of Saudi Arabia, *Anglo-Egyptian Library*, Cairo, 1976, p. 135).
- Mustafa Buhais Kiayash, Spatial Variation of the Spread of Informal Settlement Phenomenon in Al-Fallujah District Using Geographic Information Systems,

- Unpublished Master's Thesis, College of Education (Ibn Rushd), University of Baghdad, 2014.
- Mustafa Mohamed Morsi, Indiscriminate Overpopulation and Terrorism, First Edition, Riyadh, 2010.
- Mutasim Sallyi, The Lower Zab and the Ancient History of the City of Altun Kupri), Sardam Al-Arabi Magazine, Studies and Research, Issue (22), 2008.
- Neamat Mohamed Nazmi, Sahar Suleiman Abdullah, Maha Sami Kamel, Development and Development of Slums as a Model for Compatible Housing in Egypt, The Case of Manshaet Nasser Area in Cairo, Report Submitted to the Ninth Al-Azhar International Engineering Conference, 2007.
- personal interview (7,8), on 21-4-2024 Engineer Luqman Osman Mohammed, Altun Kupri Municipality Directorate, Planning and Follow-up Division, GIS Unit. GIS Unit.
- personal interview 2, Abdullah Muhammad Salam Al Salhi, dated 18/2/2024.
- personal interview 3, Aso Ghazi, the Director of the Urban Planning Division in Kirkuk Governorate, on 2/4/2024).
- Personal Interview 9, on 24-3-2024, Qasm Ahmed, Altun Kobri Municipality Directorate, Planning and Follow-up Division, GIS Unit.
- Personal interview 1, Aso Ghazi, the Director of the Urban Planning Division in Kirkuk Governorate, 28-3-2024 on Thursday, 9:45 minutes in the morning.
- Personal interview 6, on 24-3-2024, Engineer Luqman Osman Mohammed, Altun Kobri Municipality Directorate, Planning and Follow-up Division, GIS Unit.
- Personal interview 4, on 17-3-2024, Engineer Luqman Osman Mohammed, Altun Kupri Municipality Directorate, Planning and Follow-up Division, GIS Unit.
- Personal interview 5, Mohamed Daoudi, Director of Altun Kupri Municipality, on 16-4-2024 Altun Kupri Municipality Directorate.
- Saadi Mohammed Saleh Al-Saadi et al., Housing Geography, University of Baghdad, 1990.
- Sabri Fares Al-Hiti, Khalil Ismail Muhammad, Geography of Settlement and Rural, House of Wisdom Press, Baghdad, 1986.
- Sabri Fares Elahiti, Saleh Falih Hassan, Geography of Cities, Second Edition, National Library, Baghdad, 1986.

- Sadeq, S. N., & Alhamdany, T. H. (2021). Geometric Study of the Lesser Zab River Channel Between Altun-Kupri City and Dibbs Dam, Kirkuk, Northern Iraq. *The Iraqi Geological Journal*.
- Salah Dawood Suleiman, "The Phenomenon of Encroachments in Cities," *Al-Istad Journal*, Issue 62, College of Education (Ibn Rushd), University of Baghdad, 2007.
- Saleh, D. K. (2010). Stream gage descriptions and streamflow statistics for sites in the Tigris River and Euphrates River basins, Iraq (Vol. 540). Reston, VA.
- Shrestha, P., Gurran, N., & Maalsen, S. (2021). Informal housing practices. *International Journal of Housing Policy*, 21(2), 157-168.
- Siddiqui, N., Guiu, R., & Ameen Shwan, A. (2019). Among brothers and strangers: Identities in displacement in Iraq. *International Migration*, 57(2), 80-95.
- Siddiqui, N., Guiu, R., & Ameen, A. (2017). Reframing Social Fragility in Areas of Protracted Displacement and Emerging Return in Iraq: A Guide for Programming.
- Smit, S. (2019). Connecting the urban informal settlement to the city: a system dynamics approach (Doctoral dissertation, Stellenbosch: Stellenbosch University).
- Susan Forez Martin, *Handbook on the Application of the Guiding Principles on Internal Displacement*, translated by Abu Daqqa, Debruckings Institute, Internal Displacement Project, 2005, p. 5.
- Tahseen Jassim Shanan Al-Azerjawi, *Residential Patterns in Nasiriyah City*, College of Education, University of Mosul, Master Thesis (unpublished), 2004.
- Tcharles Eermz, *The City and Housing Problems*, translated by a committee of university professors, Dar New Horizons, Beirut, 1964.
- UN habits- <https://www.isdb.org/sites/default/files/media/documents/2020> (Last access:13\1\2024)
- United Nations Human Settlements Program, *Urban Development Strategies, and Shelter Strategy for the Poor*, Nineteenth Session, 2002.
- V. Zaitseva, (2017) Adaptation of the residential environment of micro-districts of mass typical building to modern socio-economic processes, 127.
- Wegmann, J., & Mawhorter, S. (2017). Measuring informal housing production in California cities. *Journal of the American Planning Association*, 83(2), 119-130.

Zikra Abdul Naeem Ibrahim, Slums from the Perspective of Residents of Neighboring Urban Areas (An Anthropological Study in the Sumer Neighborhood of Baghdad, Journal of the College of Arts, Issue 100 (June 30, 2012)



Annex

Institute of Higher Education and Scientific Research Tokat University / Faculty of Arts / Department of Geography Questionnaire Form

My brother citizen/ my sister citizen

This form was prepared for scientific research by the researcher (Bahra Muhammad Sharif Rashid) a student at the master's level and this form contains questions related to the study tagged (spatial analysis of the phenomenon of random housing in the city of Altun Kupri) which is part of the requirements for obtaining a master's degree in geography, and is not with procedural research or any other goals. Therefore, we hope that your answer about it will be objective and accurate. Sincerely and respect.....
Researcher.

Notice // Answer with a sign (X)

The answer does not require mentioning the name.

Part one: Personal Information

1. Name of the residential
2. Date of construction of the house: 2003 and before 2004 - 2010 2011 - 2020
 2021 -2023
3. Housing condition Good medium Bad
4. Number of rooms in the dwelling: one Two Rooms three rooms
5. Land Ownership and Type of Use
 Public domain Private property Mixed property
6. Housing area: 25-50 75-100 125-150 >200
7. Construction Materials: Stone Block Clay Material
8. Homeownership: Ownership Rent
9. Rent Amount: Ownership 100-150 151-200 201 and more
10. Gender of Head of Household: Male Female
11. Profession:

12. Education level

Elementary High school Diploma University

13. Number of family members

Less than 4 4-5 6 -7 8-9 >10

14. Income level

Less than 250IQD 260-500IQD 510-750IQD >760 IQD

15. Previous place of residence: Altun Kupri City Kirkuk City Suburbs City

Other Governorates .

Part two: Reasons and Motives for the emergence of Inform Housing

1. What are the factors for the emergence of informal housing?

Reason	Strongly Agree	Agree Normally	Disagree	strongly disagree
Security situation				
Weak investments				
Increased internal migration				
natural disasters				
Decrease in the number of housing units.				
Lack of services				
High land and housing prices				
Weak government investment and support in housing				
Increasing the rental value of homes				
Weakness of the government apparatus in oversight and follow-up				
Social factors				

Part Three: Examined The Availability of Services in Informal Housing.

1. Do you have the following essential services available?

Services	partially available	fully available	unavailable
water			
electricity			
Sewerage network			
Services for shopping purposes			

2. Do you provide the following secondary services?

Services	partially available	fully available	unavailable
Educational Services			
Health Services			
Green Spaces			
Availability of transportation and delivery services			

Part four: People's opinions about the solutions to the problem of informal housing.

1. What do you expect the government to do for you: Titling Removal and compensation ?
2. Are you willing to cooperate with government agencies if slums have been treated? Yes No
3. If a dwelling or part of it conflicts with the organization of the region, are you ready to give it or part of it in exchange for being compensated with another dwelling or a sum of money: Yes No .

Table (1) Relative Number of Materials Used in the Construction of Informal Housing in Altun Kupri City.

	Neighborhoods	Block	Stone	clay material
1	Azadi	62	0	0
2	Kurdistan	53	0	0
3	Qalaa	62	0	0
4	Qarabag	62	0	0
5	Razgari	63	0	0
Total		302	0	0
%		%100	%0	%0

Source: Field Study, Questionnaire Results Question (15).

Table (2) Analysis of basic services and secondary services in informal areas in the city of Altun Kupri:

N	Neighborhoods	partially available	fully available	unavailable
Water Services				
1	Azadi	13	49	0
2	Kurdistan	13	40	0
3	Qalaa	36	25	0
4	Qarabag	28	34	0
5	Razgari	11	52	0
Total		101	200	0
%		%33.44	%66.23	%0
Electricity Services				
1	Azadi	12	50	0
2	Kurdistan	13	40	0
3	Qalaa	37	25	0
4	Qarabag	28	34	0
5	Razgari	17	46	0

Total		107	195	0
%		%35.43	%64.57	%0
Sewerage network Services				
1	Azadi	21	41	0
2	Kurdistan	14	39	0
3	Qalaa	37	25	0
4	Qarabag	28	34	0
5	Razgari	38	25	0
Total		138	164	0
%		%45.70	%54.30	%0
Services for shopping purposes				
1	Azadi	11	51	0
2	Kurdistan	12	41	0
3	Qalaa	38	24	0
4	Qarabag	28	34	0
5	Razgari	11	52	0
Total		100	202	0
%		%33.11	%66.89	%0
Educational Services				
1	Azadi	13	49	0
2	Kurdistan	6	47	0
3	Qalaa	15	47	0
4	Qarabag	9	53	0
5	Razgari	17	46	0
Total		60	242	0
%		%19.87	%80.13	%0
Health Services				
1	Azadi	35	27	0
2	Kurdistan	23	30	0
3	Qalaa	38	24	0
4	Qarabag	9	53	0
5	Razgari	27	36	0

Total		132	170	0
%		%43.71	%56.29	%0
Green squares				
1	Azadi	0	0	62
2	Kurdistan	0	0	53
3	Qalaa	0	0	62
4	Qarabag	0	0	62
5	Razgari	0	0	63
Total		0	0	302
%		%0	%0	%100
Availability of transportation and delivery services				
1	Azadi	0	0	62
2	Kurdistan	0	0	53
3	Qalaa	0	0	62
4	Qarabag	0	0	62
5	Razgari	0	0	63
Total		0	0	302
%		%0	%0	%100

Source: (1) Field study, the result of the questionnaire according to the question of part three (1)
(2) Field study, the result of the questionnaire according to the question of part three (3)

BACKGROUND

Name and Surname	BAHRA Mohamed Sharif Rashid
Personal Information	Nationality T.C.: Place and Date of birth:
Contact Information	E-posta:
Education Information	Bachelor: Salahaddin University (2004-2005) College of Art Department of Geography. Master: Tokat-Gaziosmanpasha University (2022-2024)

