Research Paper: The Role of the Rentier Economy on the Land Use Changes of Peripheral Rural Settlements (Case Study: Peripheral Rural Areas in District 19 of Tehran Metropolis)

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ABSTRACT

Purpose: Today, failure to pay attention to the housing needs of low-income groups in the official and planned cities causes the creation of slums and informal settlements, especially in the outskirts of metropolises, which causes a rentier economy, especially in land and housing. In this regard, this study aimed to investigate the role of the rentier economy on the land use changes of peripheral rural areas (case study: peripheral rural areas located in district 19 of the Tehran metropolis).

Methods: This analytical-descriptive study is quantitatively applicable regarding objectives and methodology. Data were analyzed using SPSS (through single sample T-test and factor analysis) and ArcGIS software through RS techniques to Land use classification using artificial neural network method. The statistical population of this study included elites, specialists, managers, and university professors in District 19 of the Tehran metropolis, which was selected by the Non-probability snowball sampling method [N=150].

Results: Based on the T-test, there was an Unsuitable condition of land use changes in the peripheral rural area of District 19 of Tehran city. The results of the factor analysis test showed that the rentier economy in District 19 of Tehran city caused the land use changes of settlements in the peripheral rural areas. The land use classification by neural network method showed that the area of agricultural lands decreased from 8386 hectares in 2000 to 5562 hectares in 2022, which indicated the loss of farming lands and growth of physical spaces of urban.

Conclusion: There was a rentier economy of the land transactions and unique distinction in the rural settlements in the peripheral villages, located in area 19 of Tehran city, so the agricultural lands were changed to residential land use.

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1. Introduction

Rapid urbanization is the main reason for urban challenges, such as lack of energy, environmental pollution, traffic, and land loss. The challenges are obstacles to urban development (Yigitcanlar et al., 2020: 12). These problems cause people's lack of access to basic facilities (Safaepour et al., 2022: 42). One of the considerable primary consequences of urbanization is the urban encroachment in the rural areas of the suburbs especially in the fertile agricultural lands. Immigrant peripheral areas as a place to attract the urban poor population, and the tendency to integrate with the urban spaces intensify the land use change of suburban villages (Yosefi et al., 2022: 48). Urban growth and the addition of rural areas to urban can be used as government rent and have a considerable role in urban expansion and the creation of informal settlements. Rent-seeking is when a person, institution, or group becomes the owner of information, opportunities, and privileges that others do not benefit from; by seizing these opportunities, they gain financial capital and privileged political, cultural, and social positions. There is a kind of committing corruption in this concept of rent, and the conscious use of special privileges that others do not enjoy under equal conditions is often the result of monopoly (Fazlinjad & Ahmadian, 2010: 131). Urban decisions and policies that cause rental prices in the city, especially in urban, are the main problems causing many economic inequalities and subsequent issues. The space of the rentier economy has been expanded through the influential factors in urban management society, including incompatible land use change with economic supply and demand, illegal and rentier possessions, increasing the urban space, and annexing the land and surrounding areas to the city boundary, targeted government projects, exclusive privileges, informal hierarchies, unreliable information acquisition system, ambiguity in determining privacy and public and complex rules. Etc (Kazemian et al., 2021: 210).

Meanwhile, Iran, as a developing country, has been experiencing a similar urbanization process. The trend of urbanization in Iran has been raised in the last half-century, based on the general population and housing censuses. The urban population of Iran exceeded two-thirds of the country's total population in 2011. It is expected that the trend of urbanization in Iran will continue its upward trend and reach about 85% in 2051 (Fathi, 2015: 8). One of the areas experiencing unplanned urban growth has been Tehran and its peripheral areas, especially the 19th district. District 19 and its surrounding areas have faced spontaneous physical expansion as a significant problem. This unexpected urban growth has been made the problems such as the loss of agricultural lands and open spaces, the joining of peripheral rural areas to the city, the unplanned and horizontal expansion of the town, the lack of proper infrastructure, and subsequent consequences, such as legal issues and land acquisition, employment problems, cultural and religious diversity, management problems, and the imposition of economic pressures. So, it is necessary to investigate the role of the rentier economy on the land use change of informal settlements in this area. In this regard, this study aimed to examine the role of the rentier economy on the land use changes of peripheral rural areas in District 19 of the Tehran metropolis.

2. Literature Review

The city is a complex and multidimensional phenomenon. Organizing the cities and land use is a physical category and essentially deals with the political economy of space. Historical analysis of factors and urban changes due to economic and political factors showed that increasing urbanism and urbanization have caused the emergence of different social classes and the complexity of urban management since the capitalist era until now, which modern capitalism is ruling (Imani Shamlou & Rafiyan, 2016: 292). So, the physical changes in urban fue to the environmental attractiveness cause the space classification (Moshfeghi et al., 2020: 2). Population growth, more demand, and the need for land resources increase the land value; while this is not the only reason for the increase of the land value, it is assumed that even with population stability, the land value will increase. Because the demand for land increases with the development of society and the advancement of technology. Technology advances increase land use and efficiency, thus providing investors with more options for consumption. Urban development also leads to more attractiveness and a tendency for investment or intervention, increasing the land value. Therefore, labor productivity, production, and capital circulation also increase land value (Obeng-Odoom, 2015: 347). Land use change of urban is an economic-spatial process. Land use change and tendencies of society to intervene in space planning reflect the structure of the city's space economy. There are different categories affected by the space economy, such as which part of the city is paid attention to based on what factors, how capital is produced in the city, what users are considered, and how different classes of society are allocated in different parts of a city. Etc (Moshfeghi et al., 2020: 2). The researchers

have examined the economic and land use changes in urban from various aspects. For example, Rastad Boroujeni et al. (2022) investigated the critical attitude toward the influence of rentier capitalism on urban spaces (case study: Megamalls in Tehran). They found that since the 80s, spaces of Tehran in the form of megamalls as an alternative to public spaces such as parks have evolved towards monitoring and control. Urban spaces have become rentier, competitive, consumer, and unproductive, pushing the majority of urban residents to the outskirts of cities, so it has become a place only accessible to the wealthy and capitalist class to achieve more profit. Jafari pabandi et al. (2022) provided the structural-functional analysis of Zanjan morphology affected by petroleum-based economy rent. Their findings showed that the petroleum-based economy in Zanjan city and its effects on land use changes and social-economy inequality have caused the formation of unstable urban morphology. Kazemian et al. (2021) studied the constructive dynamics of large urban-scale projects with the approach of the political economy of space (case study: Mashhad metropolis). Based on the philosophy of creating mega construction projects in Mashhad within the framework of five identified factors, the results showed the role of policymaking dynamics at the transnational level, institutional-organizational forces as drivers of policymaking dynamics at the transnational level, institutional-organizational forces at the national-regional level and economic and political forces at the local national-regional level and economic and political forces at the local level. In research, Sarvar et al. (2021) investigated the political economy and integrated management of territorial integrity in the Tehran metropolis. They found that economic, physical, institutional, political economy and policymaking explain 86.48% of the capital outskirts. Khandan et al. (2019) analyzed the factors affecting the increase of urban land rent in the first district of the Tehran metropolis. They found the effective factors on the rent increase and instability in the management and urban planning of Region 1; the factors included the building density component in the management area, land and housing price component in the economy area, and rapid population growth in the social area. Gil et al. (2023) investigated the rentierism of platform-based rental markets and housing financing in Spain. The results show that the Corona epidemic has strengthened rentierism in the rental markets. This process strengthens the exchange value of housing and the future expectations of the owners of profit. It increases the opportunities and financial instruments for housing, so it cause housing instability and impoverishment of tenants. Huang et al. (2020) investigated the influence of spatial structure on the economic efficiency of the Beijing metropolis in China. Huang et al. (2020) Concluded that urban population, information level, human capital, industrial structure, and technology level have a considerable effect on economic efficiency while a negative effect on factors such as the government role, open economy, and land transactions. Delgado Ramos (2019), in research entitled "real estate industry as an urban growth machine: a review of the political economy and political ecology of urban space production in Mexico City," indicated that in case of inefficiency, Urban land policies as a planning action can provide the platform for rentier economy and intensify its influence. Dong et al. (2018), in a study entitled "housing price, housing rent, and rent-price ratio: evidence from 30 Cities in China," indicated that the rent-land and housing price ratio is a key indicator to identify the state of the real estate housing market. They found an internally significant relationship between housing price and housing rent. Manganelli & Murgante (2017) studied the "urban land rent dynamics in Italy" and found a significant relationship between the land price with various factors, such as building density and distance from commercial centers. Yun et al. (2017) analyzed the land spatial structure and urban economic development in Shandong province in China. They concluded that land rent is determinative for the land development structure and building. However, it's not an effective factor for land use determination. Based on the research background, there is no comprehensive analysis of the role of the rentier economy (economic, environmental, social, and managerial) on changes in informal peripheral settlements. Moreover, studying the rentier economy in Tehran city, especially in District 19, may help recognize the problems in this area and provide proper solutions.

3. Methodology

The current research is an applicable, quantitative, and survey study regarding aims, nature, and methodology. Data were collected using the documentary-field method. The statistical population of this study included elites, specialists, managers, and university professors in District 19 of the Tehran metropolis, which was selected by the Non-probability snowball sampling method [N=150]. The research tool was the questionnaire (Table 1). The validity of the questionnaire was assessed using the opinion of experts and city managers and applying the necessary corrections. The alpha Cronbach method was used to evaluate the questionnaire's reliability, and the Alpha coefficient value was in an acceptable range

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(0.81). The indexes were determined using refereeing the different data resources.

Data were analyzed using SPSS (through single sample T-test and Factor Analysis) and ArcGIS software through RS techniques to Land use classification using the artificial neural network method.

Landsat 7 and 8 satellite images of Tehran's 19th district were used from 2000 to 2022. The list of data used in this study is shown in Table 2.
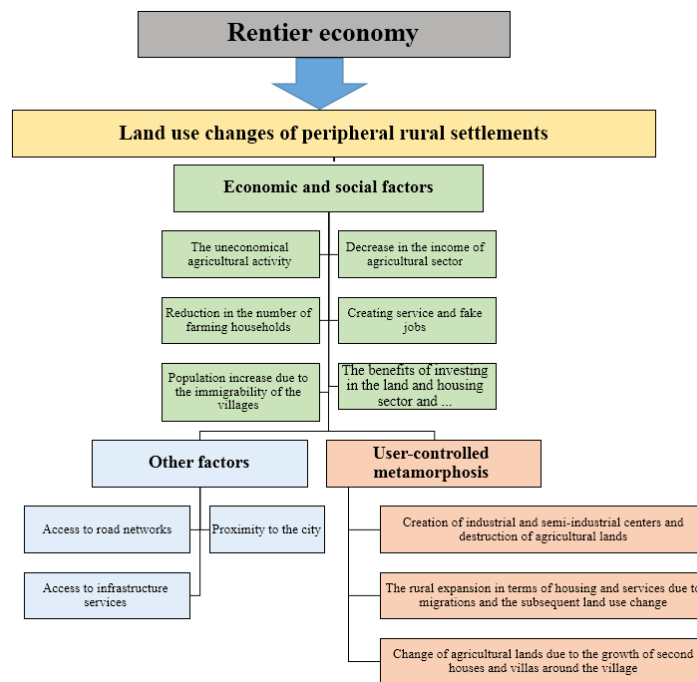

Figure 1. Conceptual model of research. Reference: Research findings, 2023

Table 1. Indexes and sub-indexes of the questionnaire

Indexes of land use changes	Sub-indexes	Reference
User-controlled metamorphosis	Creation of industrial and semi-industrial centers and destruction of agricultural lands	
	The rural expansion in terms of housing and services due to migrations and the subsequent land use change	
	Change of agricultural lands due to the growth of second houses and villas around the village	
Economic and social factors	Decrease in the income of the agricultural sector	Faal jalali & Ghasemi (2021), Asghari Zamani et al. (2016), Shamaee et al. (2016), Darban Astana et al. (2016), Sojasi qeidari & Sadrossadat (2015), Ahmadpour & Alavi (2014), Suwanwerakamtom & Chanthaluecha (2012), Junkie (2008)
	The uneconomical agricultural activity	
	The benefits of investing in the land and housing sector Increasing the land and building value compared to agriculture	
	Creating service and fake jobs	
	Reduction in the number of farming households	
	Population increase due to the immigrability of the villages	
Other factors	Proximity to the city	
	Access to road networks	
	Access to infrastructure services	

Reference: Research findings, 2023

Table 2. Used satellite images

Image time	Sensor	Name of the satellite	Year
9.50	ETM+	Landsat 7	2000
9.50	ETM+	Landsat 7	2010
9.45	OLI-TIRS	Landsat 7	2022

Reference: Research findings, 2023

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Tehran is a densely populated city, the capital of Iran, and the center of Tehran province. Tehran city currently has 22 municipal districts, and the studied area is located in the 19th district, in the south of Tehran. District 19 of Tehran Municipality is one of the peripheral and southern areas of Tehran City. This district is adjacent to regions 16, 17, and 18 from the north. The total area of District 19 is 96.76 square kilometers, and its central and protection zone area are 20.76 and 76 square kilometers, respectively. This administrative- services section of District 19 has 2 areas: 1) the legal area of the municipality and 2) the area outside the legal area, which is the southern border of Tehran city and is enclosed by the southwest belt of Tehran territory (Fooladi et al., 2021).

4. Findings

Before investigating the effect of the rentier economy on the land use changes of peripheral rural settlements located in District 19 of Tehran, the situation analysis of the rentier economy on the land use changes of peripheral rural settlements was investigated using sample T-test analysis (Table 3).

According to Table 3, the results showed the inappropriate status of land use changes in peripheral rural settlements in District 19 of the Tehran metropolis. Since the indexes are negative and their average is higher than 3, the situation is not favorable. The unfavorable level of land use changes in peripheral rural settlements of district 19 of Tehran metropolis was confirmed according to the obtained mean values for studied indexes, including the rural expansion in terms of housing and services due to migrations and the subsequent land use change by the mean of 3.98; decreased income by agricultural sector by the mean of 3.90; population increase due to the immigrability of the villages by the mean of 3.86; creation of industrial and semi-industrial centers and loos of agricultural lands by the mean of 3.77; proximity to the city by the mean of 3.72; the uneconomy agrarian activity by the mean of 3.67; benefits of investing in the land and housing sector and increasing the land and building value compared to agriculture by the man of 3.61; change of agricultural lands due to the growth of second houses and villas around the village by the mean of 3.57; reduction in the number of farming households by the mean of 3.55; creating service and fake jobs by the mean of 3.34; access to infrastructure services by the mean of 3.12; and access to road networks by the mean of 3.04.

A factor analysis test was used to analyze the effectiveness of the rentier economy on the land use changes of peripheral rural settlements in District 19 of the Tehran metropolis (Table 4). Bartlett's test and KMO index were used to determine the appropriateness of the data. The result of KMO and Bartlett's test at the confidence level of 99% indicated the correlation and suitability of the variables to perform confirmatory factor analysis.
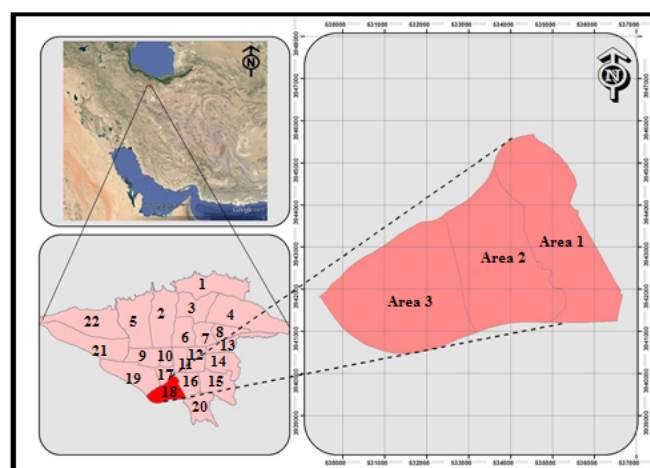

Figure 2. Study area location. Reference: Authors, 2023

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Table 3. Assessment of the impact of the rentier economy on the land use changes of rural settlements in the 19th district

Sub-indexes	Average	T	Meaningful	The difference of the confidence interval is 0.95	
				Top	Down
Creation of industrial and semi-industrial centers and destruction of agricultural lands	3.77	24.334	0.000	3.86	3.32
The rural expansion in terms of housing and services due to migrations and the subsequent land use change	3.98	24/745	0.000	4.08	3.78
Change of agricultural lands due to the growth of second houses and villas around the village	3.57	24.337	0.000	3.66	3.41
Decrease in the income of the agricultural sector	3.90	24.432	0.000	4.02	3.68
The uneconomical agricultural activity	3.67	24.445	0.000	3.89	3.51
The benefits of investing in the land and housing sector Increasing the land and building value compared to agriculture	3.61	24.339	0.000	3.74	3.44
Creating service and fake jobs	3.34	24.213	0.000	3.45	3.21
Reduction in the number of farming households	3.55	24.353	0.000	3.69	3.43
Population increase due to the immigrability of the villages	3.86	24.511	0.000	3.98	3.51
Proximity to the city	3.72	24.360	0.000	3.85	3.54
Access to road networks	3.04	23.650	0.000	3.21	2.88
Access to infrastructure services	3.12	23.870	0.000	3.32	3.00

Reference: Research findings, 2023

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Table 4. Bartlett's test at the significance level

Correlation	Bartlett value	KMO value	The set to be analyzed
0.000	5426.360	0.806	The impact of the rentier economy on land use changes in rural settlements in District 19 of the Tehran metropolis

Reference: Research findings, 2023

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Based on the findings, the rentier economy in District 19 of Tehran caused land use changes in peripheral rural settlements. The results of the factor analysis for the indexes have been shown in Table 5 according to their influences on the rentier economy. The low affectability was observed in the indexes of the rural expansion in terms of housing and services due to migrations and the subsequent land use change (0.872), the benefits of investing in the land and housing sector and increasing the land and building value compared to agriculture (0.866), access to infrastructure services (0.621), and accesses to communication networks (0.558). So, the rentier economy is effective on the land use changes in the peripheral settlements of District 19 of Tehran city.

The land use changes of rural peripheral settlements of District 19 were investigated using the artificial neural networks (ANNs) method through land use classification.

In this study, the support vector machine method was used for land use classification and investigation of land use changes in peripheral rural settlements of District 19. Figure 3 shows the pattern of the support vector machine for 2000. The classification area and its modification by the Kappa coefficient have been displayed in Table 6.

According to the support vector machine method, the highest land use area was observed in the agricultural area, residential area, and gardens in the peripheral settlements in 2000. In 2000, the size of the residential regions, gardens, and agricultural areas was 1359, 71, and 8386 hectares, respectively. Also, the barren lands and road network area were 988 and 85 hectares, respectively. This year, the kappa coefficient or the accuracy of the artificial intelligence classification method was 0.87. Figure 4 shows the support vector machine model of 2010. Table 7 also shows the area and kappa coefficient of the classification and its changes during the study period. Table 7 also shows the area and Kappa coefficient of the category and its changes during the study period.

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Table 5. The effectiveness of the rentier economy on land use changes in peripheral rural settlements in the 19th district of Tehran

Sub-indexes	Factor Analysis
Creation of industrial and semi-industrial centers and destruction of agricultural lands	0.806
The rural expansion in terms of housing and services due to migrations and the subsequent land use change	0.872
Change of agricultural lands due to the growth of second houses and villas around the village	0.751
Decrease in the income of the agricultural sector	0.785
The uneconomical agricultural activity	0.732
The benefits of investing in the land and housing sector Increasing the land and building value compared to agriculture	0.866
Creating service and fake jobs	0.690
Reduction in the number of farming households	0.754
Population increase due to the immigrability of the villages	0.824
Proximity to the city	0.667
Access to road networks	0.621
Access to infrastructure services	0.588

Reference: Research findings, 2023
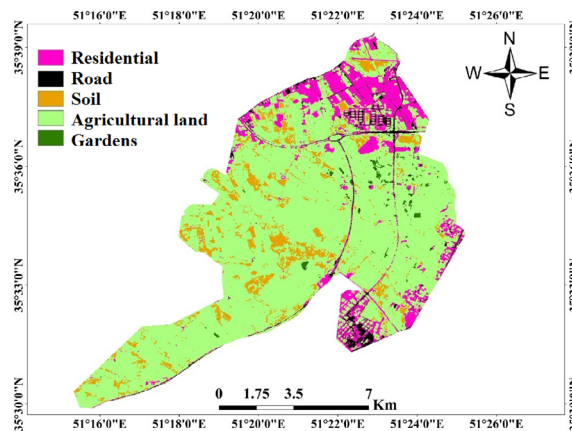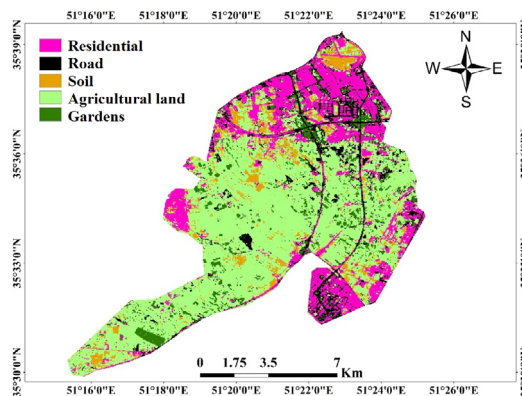
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Figure 3. Land use changes in 2000. Reference: Research findings, 2023

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Table 6. The amount of land use and Kappa coefficient in 2000

Kappa coefficient	Road (Hectares)	Soil (Hectares)	Agricultural lands (Hectares)	Gardens (Hectares)	Residential areas (Hectares)	Year
0.87	75	1088	8386	71	1359	2000

Reference: Research findings, 2023

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Figure 4. Land use changes in 2010. Reference: Research findings, 2023

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Table 7. The amount of land use and Kappa coefficient in 2010

Kappa coefficient	Road (Hectares)	Soil (Hectares)	Agricultural lands (Hectares)	Gardens (Hectares)	Residential areas (Hectares)	Year
0.85	97	810	7462	324	2061	2010

Reference: Research findings, 2023

The high land use area was observed in the agricultural lands, residential areas, and road networks, respectively, in 2010. The area of the residential region increased to 2061 in 2010, showing a 702 hectares increase compared to 2000. An increase and decrease were observed in gardens and agricultural areas by 254 and 864 hectares in 2010. So, the size of farm land and gardens were 7462 and 325 hectares, respectively, in 2010. Moreover, the area of barren lands and road networks was 810 and 97 hectares, respectively 2010. The kappa coefficient, or the accuracy of the artificial intelligence classification method, was 0.85 in 2010. Figure 5 shows the support vector machine model of 2022. Table 8 also shows the area and kappa coefficient of the classification and its changes during 2022.

The high land use area was observed in the agricultural lands, residential areas, and road networks, respectively, in 2020. The area of the residential region increased to 3195 in 2022, showing an 1863 hectares increase compared to 2000. An increase and decrease were observed in gardens and agricultural areas by 482 and 276 hectares in 2022. So, the size of farmland and gardens were 5562 and 553 hectares, respectively, in 20222. The area of barren lands was 715 hectares in 2022.

Moreover, the area of road networks was 110 hectares in 2022. The kappa coefficient, or the accuracy of the artificial intelligence classification method, was 0.88 in 2022. Due to its many functions, the metropolis of Tehran has solid relations and links with the surrounding areas, especially the peripheral rural area, so this relationship has a booster effect on the village's economy, social, cul-

tural, and physical dimensions. Capital accumulation in urban areas causes rural migrations due to the economic relations between the city and the countryside and making career opportunities. Meanwhile, the peripheral rural settlements (Salehabad, Resalat, Tohid, Qaleh Now, Haj Moosa, Jahanabad, Jafarabad, Bagheroof, Bagh-e-Rezvan, Kashanak, Marjanabad, Palain, Morteza Gerd, Golriz, Jahanabad, Rahimabad, Moradabad) changed and experienced the physical conditions due to the changes of economical-social activity; so that the settlements have become inclined towards urban functions and their actions have also changed from agriculture to industry and services. The rural population was less in the past. Still, unfortunately, the population increased due to the buying and selling of land and increasing the issuance of permits, so this is the main reason for the change of agricultural land to residential areas. In general, it can be concluded that the rentier economy has caused aggravation in the land use changes of the peripheral rural settlements of District 19. The main reason for land use change is the expansion of the villages in terms of housing and services due to migration and land use change. The considerable consequences of land use change in peripheral rural settlements in District 19 are environmental, economic, and social consequences. The harmful environmental effects caused by these changes are such as water and air pollution, loss of agricultural land and village landscape, and excessive water consumption in villa gardens. The economic effects of lack of self-sufficiency and dependence of rural areas on the urban, negative impact on the agricultural economy, and lack of exploitation of agricultural land are other destructive effects of land use change.
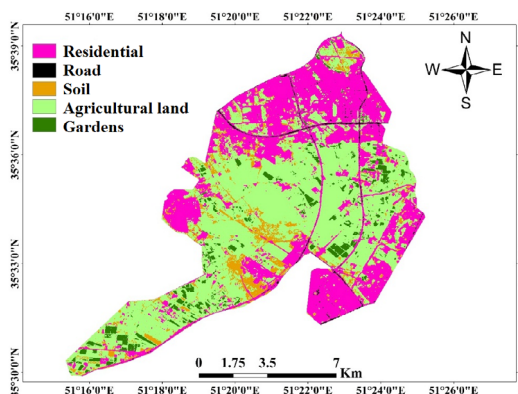

Figure 5. Land use changes in 2022. Reference: Research findings, 2023

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Table 8. The amount of land use and Kappa coefficient in 2022

Kappa coefficient	Road (Hectares)	Soil (Hectares)	Agricultural lands (Hectares)	Gardens (Hectares)	Residential areas (Hectares)	Year
0.88	110	715	5562	553	3195	2022

Reference: Research findings, 2023

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5. Discussion

This study aimed to investigate the role of the rentier economy on the land use changes of peripheral rural areas located in District 19 of the Tehran metropolis. The research results showed that the rentier economy has caused an increase in unnecessary construction and destruction of gardens and agricultural lands in the villages of District 19 of Tehran. Peripheral rural settlements of Tehran have been experiencing land rent, wholesaling spatial distinctions. So that the presence of inefficient managers with unrelated specializations has caused authoritarianism and consumerism in the studied villages, so rural spaces are an option to realize the goals of a rentier and more speculative economy. The effect of the rentier economy is tangible in the reduction of gardens and agricultural lands in peripheral rural settlements in District 119 of Tehran. Examining the peripheral rural spaces of District 19, the position of rural areas in the complex relations of the rentier and speculative economy is evident. There are some reasons for creating the rentier economy including In this regard, in addition to the factors: the functioning of the economic system, centralized governance, the lack of a local model of development in Iran, speculation in the land and property market, imbalance and wrong policies, disordered spaces, weakening of social values.

Moreover, the considerable drivers are the dependence of organizations' budgets on non-sustainable sources and construction permit fees, weak rules and regulations, lack of effective law and inefficiency of related executives, weakness of the judicial system, and lack of managerial and executive determination to deal with capital violations. In the meantime, the economic structure change is the first important step to dealing with the challenges. Considering appropriate policies at the national level, production sectors should be strengthened relative to land and housing activities and attract more capital. Also, supporting institutions and private organizations is a practical step for managing public demands and monitoring the activities of these organizations and their interventions. Following this study, Jafari Pabandi et al. (2022) showed that the petroleum economy in the centralized management of the country and its impact in

Zanjan city had caused the use changes, socio-economic inequality, and spatial imbalance and, consequently, formation of an unstable urban morphology. Dong et al. (2018) showed that the land and housing price rent ratio is a crucial index to identify the Real estate market situation. They found an internal relationship between housing rent and price.

Considering the findings, the following suggestions are provided:

- Increasing monitoring of the functioning of the private sector in the 19th district of Tehran and the quasi-government industry and preventing the unproductive growth of capital;

- Forming a specialists and experts team in the field of land use changes in the villages of District 19 of Tehran and compiling maps (land use changes) in 5-year periods;

- It is also suggested that the transparency of proving information will attract people's participation and rule the market economy, and ultimately prevent unhealthy economic competition.

- land use change of semi-industrial centers (such as brick kilns) from the outskirts of District 19 to increase the quality of the suburban landscapes.

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