SLUMS EFFECT ON URBAN SUSTAINABILITY: SUGGESTED PLANNING MECHANISMS FOR DEVELOPMENT

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Abstract: Slums are considered one of the largest problems that threaten our urban environment, and their negative impact is exacerbated by the passage of time without a radical solution. This research investigated measures that are successful in achieving sustainable urban development within slums or surrounding urban areas. Reducing the negative aspects accompanying the traditional remedies for this phenomenon, which Iraq is currently suffering from, has become a widespread trend in most Iraqi cities. As a result, there emerged belts surrounding urban areas, causing severe repercussions, some of which can be addressed. However, most problems are challenging to address because they affect the urban structure. In Iraqi cities, slums are a feature of the city's transformation phase, distorting their essence. This phenomenon directly and indirectly affects sustainable urban development by conflicting with one of the most important pillars of sustainable development: not to pass on problems to future generations. Over the past decade, our cities have been formed with slums being a large part of their structure. This poses significant challenges for future generations, which will be difficult to solve unless we proactively address them with effective solutions to mitigate their impact. After reviewing various remedies for this problem, it was found that the proposed treatments were unsuitable for the Iraqi situation. The research proposes the idea of exchange (land versus time). When comparing this strategy with the rest of the treatments, it has been found to be the best solution for slums in Iraq, meeting the requirements of sustainable urban development.

Keywords: slums, urban sustainability, Iraqi cities, suggested mechanisms to address slums

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Introduction

Random housing is a complex phenomenon because of its association with many variables, and treating it through one dimension, regardless of its importance and vitality, is wrong. The concept of slums varies from one place to another, depending on the conditions of each society, living standards, values and prevailing social systems. Built from tin or cardboard and other unstable materials, slums are home to many urban residents in developing countries United Nations

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Human Settlements Programme (UNHSP, 2009). The term slums is one of the names given to the process of illegal housing construction, which appeared as an inevitable result of rapid urban growth in the cities of most of the developing world (Dovey et al. 2020), including Iraq. Despite multiple names, they all share one factor: construction and development operations without a license and on land owned by the state or by others, often built outside the scope of government services for non-state recognition (Hussain, Wei 2021). The United Nations Centre for Human Settlements has defined a family in informal settlements as a group of individuals living in an unplanned urban area who lack permanent housing or sufficient living space, access to clean, healthy water, a sanitation facility and secure land tenure (Aliu et al. 2021; Jasim et al. 2024). Many housing units in these neighbourhoods are built with stable materials and good facades, and some areas are well-planned. However, the characteristic that it combines with less organised neighbourhoods and with fewer building materials is that they are all unlicensed and are not included in the city's urban planning. These areas arise in the absence of the general planning of cities and a departure from the laws regulating urbanisation. There are problems in the provision of public facilities and basic services.

Sustainable urban development is a process of finding balance between environmental, economic and social requirements, the balance which is applied at local (city) level (Mohsin et al. 2020; Lianto et al. 2021). With the rapid expansion of cities due to the population increase, there is a need to raise awareness about reducing the environmental costs of urbanisation. This has raised concerns about environmental damage, depletion of non-renewable resources and high pollution levels in urban areas. As cities have become places of environmental degradation in urban areas and overuse of resources, there is a very tangible and inherent danger in urban growth and the expansion of urban lifestyles. This leads to an increase in the use of resources and the environmental load in a way that nature cannot recycle. The solution lies in eco-city sustainability (Höjer et al. 2011), which is well-planned and free of slums (Ragheb, El-Ashmawy 2021). The authors believe that sustainable urban development must include the responsibility of the current generation for negative planning decisions or negligence by those accountable for the presence of cancerous urban patterns difficult to address in the future. The most prominent of these problems is slums, whose problems and consequences will be borne by future generations (Sanya, Mwebaze 2020).

In the past two decades, urban sustainability has been discussed increasingly often (Alipour, Galal Ahmed 2021) since most of the world's population currently lives in cities. According to United Nations reports, this percentage is growing, which indicates that the Arab region, including Iraq, faces significant challenges due to the spread of random housing. This phenomenon has permeated most of the Iraqi cities to form belts surrounding urban areas, causing severe repercussions, some of which can be addressed, but most of the problems are challenging because of their impact on the urban structure of cities. This is further complicated by the lack of housing supply adapted to population growth (Dovey et al. 2021).

The urban environment is the most significant cause of pollution, polluting emissions and global warming, so the issue of urban sustainability has drawn the attention of researchers and institutions, especially the United Nations. Furthermore, random housing is one of the phenomena that harm urban sustainability, as it is not subject to its requirements and urban planning standards, thus leading to an increase in environmental, economic and social problems not only for slum areas but the entire urban area.

The best way to deal with random housing is by addressing the causes of its emergence and preventing its occurrence. After the spread of slums around cities, all the methods used to treat them become useless, and all the methods used to solve this problem carry negative aspects that affect the sustainability of urban areas. The research investigated the measures that achieve sustainable urban development within these slums or surrounding urban areas. Reducing the negative aspects accompanying the traditional treatments of this phenomenon, which Iraq is currently suffering from, has become a widespread trend in most Iraqi cities. As a result, there emerged belts surrounding urban areas, causing very serious repercussions, some of which can be addressed. However, most of the problems

are difficult to deal with because they affect the urban structure (structure) of cities (Farhan et al. 2016).

The random housing phenomenon led to a decline in the quality of urban life in Iraqi cities, and the problem has increased and has been exacerbated since 2003. This study is trying to find treatments that guarantee sustainable urban development of the city. On the other hand, it takes into account social, economic and environmental aspects of people who live in slums. The study uses modern and unconventional methodologies in line with planning requirements and is compatible with Iraqi uniqueness in addressing slums and integrating the surrounding urban areas.

The work outline will be introduced in two parts: the first utilises a comparative, descriptive and analytical method based on the goal achievement matrix and gives weights for each proposed policy to address slums. Furthermore, the second part evaluates the idea of the time-for-land policy using a questionnaire for specialists, whether from academics or in the relevant ministries and local governments. Figure 1 presents the study flowchart.

Sustainable urban development and informal housing

The concept of sustainable development in general is an environmental concept turned into a comprehensive development concept that takes into account three main interconnected and overlapping axes within the framework of an interaction characterised by precision and rationalisation of resources (Kharazishvili et al. 2020). Slums have a significant impact on these dimensions, namely the environmental, economic and social dimensions, and this influence will be monitored with regard to those aspects (Issa 2021).

Slums and the social aspect of the urban environment

Many international studies and statistics have proven that slum areas are the most vulnerable to crime, contraband, high illiteracy rates and divorce (UNHSP, 2009; Malik et al. 2020). It lacks social services that are not linked to an internal system determined by its residents, as commonly observed in rapidly growing areas driven by emergency reasons. Many problems punctuate the social ties in these gatherings, as they are a major obstacle to development and a focus of

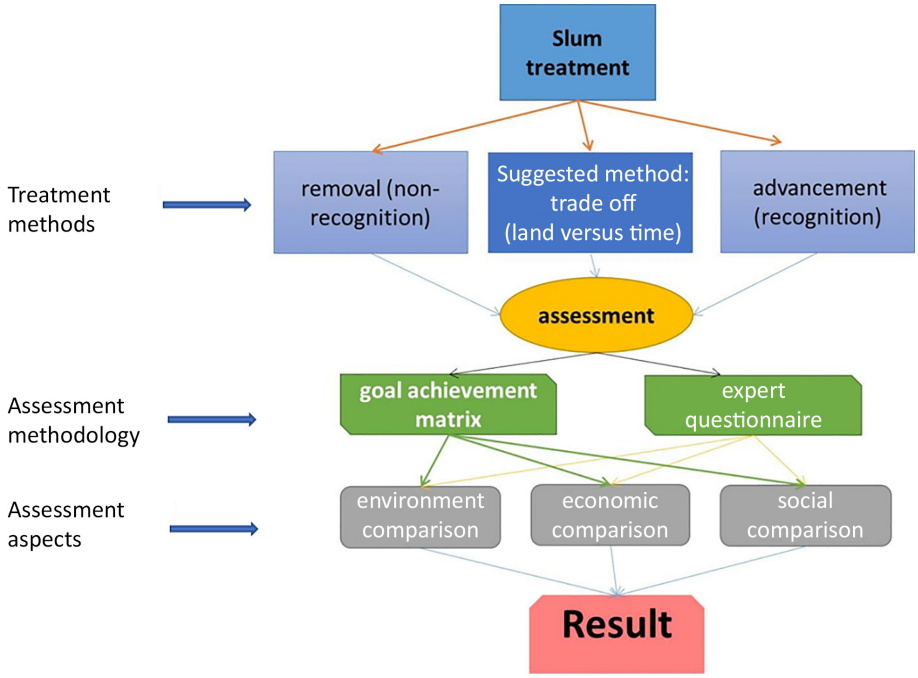

Fig. 1. The study flowchart.
Source: own elaboration.

social, health and security problems (Singh et al. 2019; Pongutta et al. 2021). The buildings are dense, contiguous and random, and the street networks have very narrow capacities and zigzag shapes. In addition, the weakness of the internal street network makes it difficult for ambulances, emergency and firefighting vehicles to arrive (Khademi et al. 2015). Lack of residential communities, randomised to open areas and public squares, turns out to be places where dirt and grime accumulate. Moreover, the residential slums are often devoid of green areas for recreation, public gardens, and areas for leisure and rest for all categories of the population (Toke 1912; Ali 2006). The encroachment on state property by transgressions leads to impeding the implementation of many vital projects important to the city's residents (Bouwmeester, Hartmann 2021).

Slums and the economic side of the urban environment

Slums pose a significant challenge to the economies of countries because of their unplanned nature and because slums are incompatible with planning, which is usually built on the principle of relationships between economic activities (Marx et al. 2013). For instance, we rarely find harmony between slums and workplaces as a result of a large proportion of residents in these gatherings. This lack of alignment stems from prioritising shelter for slum-dwellers wherever available rather than considering proximity to the workplace. Ultimately, this imbalance negatively affects the public economy. It drains a lot of human and material energy, as it distorts the urban structure by requiring an increase in the spaces needed for traffic and a greater need for a road network for transport within the city. This indicates that the unbalanced spatial structure of the city increases the operational cost of all city facilities (Bertaud 2002). Furthermore, it requires an efficient transmission system, high rates of losses in water and electricity networks as a result of irregular connections and unjust bypassing of these networks illegally.

Often, the expansion of informal neighbourhoods upon fertile agricultural lands leads to construction on these lands and water basins, which become polluted because of this random housing expansion. This may affect agricultural or industrial zones, groundwater areas, or mineral ores, limiting their exploitation and utilisation (Declaration 1992).

Slums and the environmental aspect of the urban environment

The environmental damages of random housing can be divided into two parts. The first relates to the damage to the squatter areas themselves, and the second is the damage to the city's environment. The first type is the absence of sewage systems to transport liquid and solid human waste to places far from residential communities, and this results in treatments harmful to the environment, such as dumping solid waste in sites close to residential buildings or using cesspits that contribute to polluting groundwater (Lofrano, Brown 2010; Al-Bahrani et al. 2022). Other environmental problems result from poor proper planning in these areas, especially concerning air and noise pollution and the overlap of industrial activities and workshops with dwellings. The balance between the percentage of built-up land and open space within the residential neighbourhood (Atash 2007) and its direct effect in finding clean air and a healthy environment free of germs and epidemics leads to non-compliance with the legal setbacks that crowd the buildings, which negatively affects the comfort. This is reflected in the psychological state of the individuals and, thus, on their production and reduces the level of their daily activities. Another dimension to the crowding of buildings and the lack of sufficient setbacks for residential buildings is the lack of privacy for the residential unit.

As for its impact on the city, most of the areas of the trespassers are in agricultural areas, green areas or the banks of rivers that contribute to the purification of the city's air. However, the banks of the rivers are places of entertainment where pollutants are thrown directly into the river, which contributes to water pollution in the city's rivers.

Informal housing in Iraq

Kut city (the centre of Wasit governorate) will be considered a model for an Iraqi city, Figure

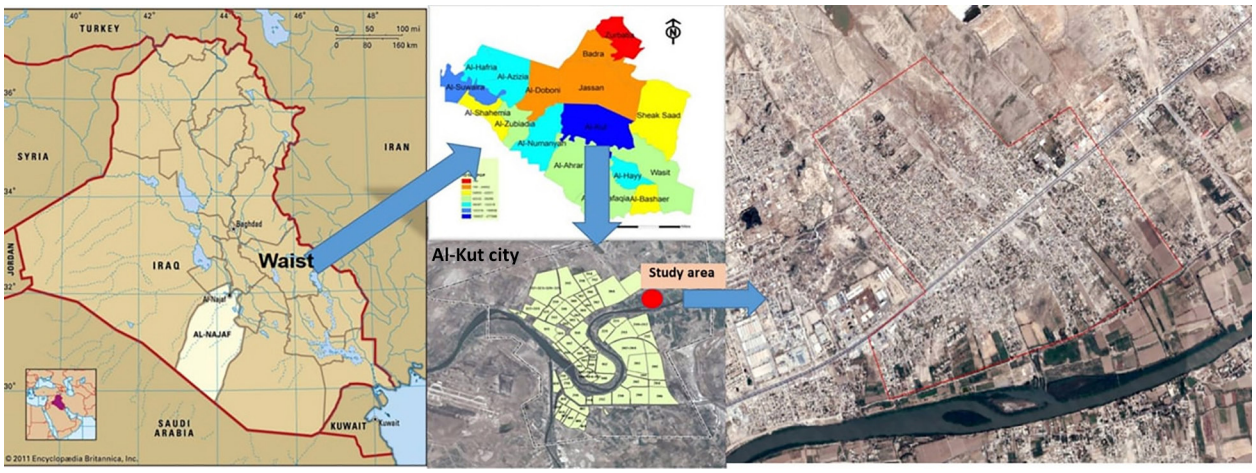

Fig. 2. The study area location map.
Source: own compilation.

2. We note that slums surround it, especially on the surrounding agricultural lands from almost all sides and the open spaces (space) inside the city. The excesses of informal housing have increased steadily since 2003 from nearly 5,000 random housing units throughout the city in 2010, approximately 16 times within seven years. It included various areas in the city because of weak government oversight and the failure to activate their laws.

The owners of agricultural land in the undeveloped areas located within the Kut city planning zone were exploited, as their lands were divided and sold in different pieces without planning or organisation. Ultimately, the urban fabric of these areas lost its identity, characterised by a mix of housing units with various styles and shapes and lacking homogeneity. Buildings vary between modern architectural styles and the rustic mud or block constructions, further contributing to the lack of urban identity. Moreover, these areas lack planning controls, with irregularly dimensioned streets that lack hierarchy and function. Figure 3 compares part of the study area and a formal area in Kut city.

By studying this phenomenon in Kut city, it was found that a considerable percentage of the housing units are built with high-quality construction materials and have expensive finishes and that its residents can be considered from

Fig. 3. Comparison between part of the study area and a formal area in Kut city.
Source: own compilation.

Table 1. Percentage of respondents by the type of housing unit.

Apartment type	Observed frequencies and their percentages	Slum area				Total
		Damoc and Zahra	Al-karama	Aljihad	Eiza	
House	Repetition	310	176	52	12	550
	Ratio of residential unit type	56%	32%	10%	2%	100%
	Ratio of random area	89%	72%	61%	57%	79%
	Percentage of total	44%	25%	7%	2%	79%
Mud House	Repetition	35	66	26	4	131
	Ratio of residential unit type	27%	50%	20%	3%	100%
	Ratio of random area	10%	27%	31%	19%	19%
	Percentage of total	5%	9%	4%	1%	19%
Metal Shanties	Repetition	3	4	7	5	19
	Ratio of residential unit type	16%	21%	37%	26%	100%
	Ratio of random area	1%	2%	8%	24%	3%
	Percentage of total	0%	1%	1%	1%	3%
Total	Repetition	348	246	85	21	700
	Ratio of residential unit type	50%	35%	12%	3%	100%
	Ratio of random area	100%	100%	100%	100%	100%
	Percentage of total	50%	35%	12%	3%	100%
Coefficient of compatibility and its significance		CC = 0.336 P = 0.000 HS				

Source: own compilation.

the middle class financially and culturally, as shown in Table 1 and the pictures in Appendix 1. Therefore, it seems that one of the main reasons for the spread of this phenomenon is the absence of an integrated planning system and the failure to keep pace with various planning stages and basic plans for the needs of expansion in cities, as well as shortcomings in laws and organisational planning mechanisms.

The proposed policy for solving slums problem: Land versus time

The problems that led to the emergence of slums varied in different countries (Fig. 4), so it was challenging to define typical policies or programmes to solve them. However, the treatments can be divided into two main parts:

The first policy: Advancement (recognition)

It includes the rehabilitation of slums and providing them with the necessary infrastructure, social services and urban upgrading. It also involves re-planning these areas to revitalise the region and society, on the one hand, and developing a strategy that links these gatherings with a comprehensive plan, on the other hand (Umar, Ugwu 2019). It also includes the replacement policy. The state sets a well-thought-out work plan and contracts with one of the companies executing such projects, i.e. electing a specific slum area where work is carried out in stages, i.e. removing random and replacing it with organised housing. It is one of the main methods in urban planning policies developed to solve the problem of

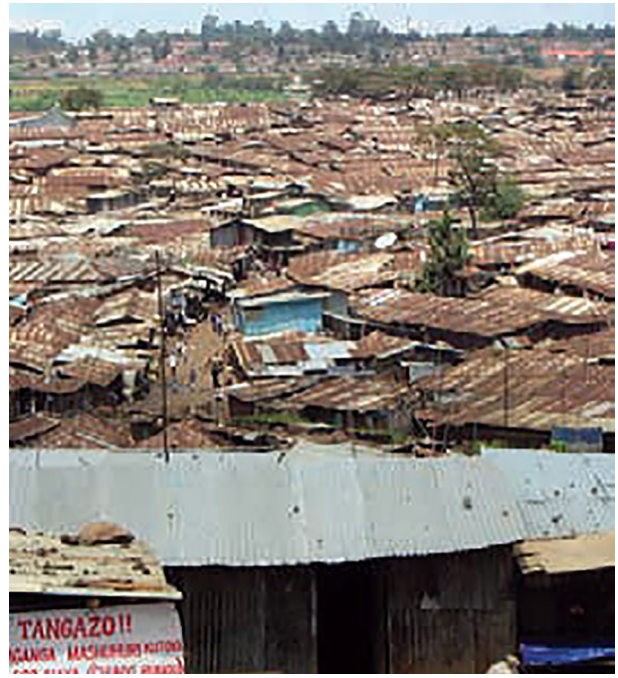

Fig. 4. Slums in poor countries.
Source: United Nations Human Settlements Programme, 2009: 62.

trespassers' areas by developing mechanisms to ensure the possession of land ownership for trespassers. An endeavour to repair slum areas after their growth is a complex process from the technical and planning perspective and it involves high costs compared to the areas developed according to sound planning rules and standards (Graham, Healey 1999).

The second policy: Removal (non-recognition)

The use of the bulldozer policy is the demolition and removal of all structures. Some see it must provide slum-dwellers with temporary housing units and arrange their housing status by the state. Alternatively, it is possible to compensate with cash allowances or leave the trespassers without compensation. The proponents of this view argue that the development and rehabilitation programmes were not a deterrent to the growth and expansion of these areas.

The type of treatment is linked to many factors related to the regions and countries in which these phenomena are to be treated. These factors depend on the size and pattern of this phenomenon spread, the type of housing in these areas and the residents' cultural and economic level. Therefore, the appropriate types of processors change from one place to another.

Each of the two policies addressing random housing bears the pros and cons. The recognition method leads to significant problems because these areas were not established within the master plan, which ensures their interaction within the city's urban environment. Most of these areas were built on agricultural lands or in areas designed within the master plan, but the city needs no other activities, and thus cause problems for the surrounding city. On the other hand, there are problems within these areas because the construction does not comply with planning standards. The recognition will encourage more abuses on state and private lands and be considered equivalent to dealers of abuse.

The policy of removal will leave a substantial segment homeless since housing units in slums are considered an enormous asset in Iraq. The great shortage of housing stock and the current situation in Iraq cannot provide an alternative. Therefore, the research presents a new idea for dealing with random housing that combines merits of the previous two methods and avoids their drawbacks, exchanging the land encroached upon by the residents for time, which is giving a period for the residents to stay in these areas. This time allows the state agencies to address this problem. Pending implementation, the second part of the proposal is to address the natural causes of informal housing to develop final solutions.

Trade-off in city planning

Exchange, in general, is giving up one thing in exchange for another, or the state of choosing between two options or balancing requirements that cannot be met all at the same time or, alternatively, to achieve a balance between factors that cannot be reached all simultaneously. It is also known as the method of abandoning one of the desired demands in exchange for obtaining the other desired results in order to maximise the total return under certain conditions (Fabbricatt et al. 2020).

In urban planning, there are many applications for exchange. Economic factors have an impact on how the urban environment is formed. Many factors affect the choice of a model for transport decisions. The idea of transport affects decision-making by balancing (cost–benefit) as an economic trade-off. There is another example of the exchange between the price of the housing unit and its location in the city (near the city centre or a remote area), as the proximity to the city centre provides the opportunity to access many services more quickly, but the unit price is higher. The set of economic trade-offs helps determine the location and area of the housing unit (Frank 2004). To achieve a balance between two advantages, the more important one is preferred if it is challenging to combine them, by offering a compromise, which is the objective trade-off of exchanging one important thing, instead of another less important thing, especially to bring about a settlement.

This option (exchange) provides an alternative opportunity for both parties. The idea of alternative opportunity is complementary to the exchange, and both are economic ideas based on sacrificing or giving up the production of a commodity in exchange for the production of a more important commodity. This cost is measured by the amount that society must sacrifice from one commodity in exchange for obtaining another

commodity. It can be said that its theoretical value is equal to the expected value of the alternatives abandoned as a result of a particular choice, and it is used in evaluating the performance of investment tools and making investment decisions in economics (Al-Mamoori et al. 2020). This means that if the acquired value of the new good is more useful than the old one, we make the decision, but if the value gained from the new good is less than that of the old one, we do not make the decision. The opportunity cost in economics is a theoretical value equal to the expected value of the alternatives abandoned as a result of choosing a particular alternative. It is used in evaluating the performance of investment tools and making investment decisions.

Trade-off (land versus time) for the treatment of random housing

When adopting the idea of exchange to deal with random housing, there are two parties: the residents of the slums and the community in general (the residents of nearby cities in particular). It is in the community's interest to be devoid of slums that negatively affect it in all respects. In comparison, the residents of slums have an interest in recognising their areas, legalising their status and providing them with various services.

Therefore, there are two parties, each with different demands from the other party. Furthermore, the implementation of the demand of either party means that the other party will not get anything. According to the principle of exchange, these are the appropriate conditions to find a compromise solution that satisfies both parties. A society that does not want slums to remain will get that, not at present but in the future, meaning that it has given time to solve this problem in the future. On the other hand, slum-dwellers want to address the legal situation and avoid the threat of eviction and removal of services. These demands will be met, but for a specific time until alternatives are provided to them, i.e. they will receive the conditional recognition of time. Thus, the exchange can succeed with each party obtaining a portion of what it wants. However, what is the impact of this exchange on sustainable urban development?

Between the proposed policy (land versus time) and traditional policies

This study aims to evaluate the impact of the exchange (land for time) on sustainable urban development by comparing the traditional treatments (recognition and removal) with the proposed policy and comparing with leaving the slum conditions as they are without any treatment.

Social comparison

The slum areas constitute an obstacle to the city's growth and expansion. Many law violations in these areas hinder the possibility of legalising them. Therefore, their acquisition of legal status requires many exceptions. Many obstacles prevent upgrading slums, including laws and planning standards and the unclear ownership of land in some countries (or co-ownership). Sometimes it requires financial capabilities to count the lands that are infringed upon. Another important factor is technical difficulties related to different sizes and shapes of the plots of land located in the slums. Organising these plots requires effort, money, modern mapping techniques, and aerial and satellites photographs.

The upgrading raises many questions, such as how the collapsed buildings in these slums will be treated and how the government will deal with the social and humanitarian situation in those areas. The recognition of these areas will also be rewarding to traffickers and violators as they will continue to build randomly and will be prone to raise prices of this construction, increasing and exacerbating the spread of cancerous mass in all urban areas. The complete elimination of slums has significant social effects, most importantly the displacement of a large segment of the population, leaving them homeless with no adequate alternative provision. The adverse social effects will also persist if the slums remain the same.

The application of the principle of land for time will involve recognising these areas after their identification, allowing the provision of necessary services, and will benefit short- and medium-term residents of slums. However, in the long run, the city will benefit from implementing its original plan, which is based on planning

studies and laws. Moreover, this gives a great opportunity for legislative and executive state agencies to determine their conditions and address the housing shortage. Finally, this measure will deter future transgressors because the idea of recognition and ownership is no longer raised.

Economic aspect

The recognition of random housing greatly harms real estate investment. It causes the state to lose many real estates, tourism and investment projects, whether internal or external and its contribution to the depreciation of real estate values in areas close to slums. Those with higher incomes are mostly covered by upgrading programmes and the scheme (site and services). In return, the intended primary category of those programmes is excluded from them. The upgrading policies impose huge financial burdens. These programmes did not guarantee their sustainability and success, in addition to the negative factors that accompanied them, such as local policies and administrative corruption. Moreover, the removal strategy is accompanied by major problems, as the state is forced to evict people from their homes at once or in successive stages and settle them temporarily in housing units far from the site slums. It means organisational and economic obstacles.

The recognition of the reality or eliminating it contains many economic disadvantages when applied and did not deter the growth and expansion of new slums in many cities worldwide owing to failures in implementation for the reasons mentioned earlier. As for leaving the slums without intervention (the current situation), their negative economic impact on the city will remain direct through its impact on the effectiveness of the 'city's structure, lose its efficiency in economic competition and alienate the necessary investments for the 'city's development.

The application of the principle of land for time seems better than previous policies and will make the most of the urban balance provided by housing units in these areas. It will also avoid the state's high economic costs by providing shelter for slums, providing them with infrastructure and improving the investment climate at home and abroad. As for the excellent investment environment in Iraq, long-term economic losses are avoided because of the defect in the urban structure. The poor urban structure imposes high economic costs on the city.

Environmental aspect

The random housing has led to the depletion of fertile agricultural lands, which are considered as a limited resource. This practice often encroaches upon sites near rivers, depriving cities of entertainment and leisure areas. Moreover, it is one of the largest pollution hotspots, as it includes polluting activities and sites for collecting, sorting and recycling garbage. Thus, the environment becomes conducive to the spread of diseases and various epidemics in the region. Additionally, the absence of street networks leads to inadequate drainage and sanitation systems, exacerbating health risks. Furthermore, the lack of planned residential communities and open areas and public squares in slums contribute to neglect, resulting in the accumulation of dirt and debris, further deteriorating environmental conditions. Without intervention, negative impacts will remain, but also if it is recognised or submitted and provided with some services. It will not change except in a small way that benefits the residents of slums more than the city's resident, but the depletion of agricultural land and specific sites in the city will continue. As for the removal policy, it can significantly reduce the negative environmental impacts of the slums.

The application of the principle of land for time will achieve the benefits resulting from the policy of removing slums (bulldozer policy) in the long run and reduce the negative environmental impacts resulting from the upgrading policy in the short and medium term due to the services provided to slums that reduce pollution, and this is better than maintaining the *status quo* because the aforementioned environmental problems will remain the same.

Evaluation results

The previous part of the research dealt with the detailed comparison of the options for dealing with the phenomenon of slums in the light of sustainable urban development. To further compare the proposed ways of dealing with slums, two assessment techniques will be applied. The

first uses the method of achieving the goal matrix to compare the options. The second uses the questionnaire for academics and officials of local governments and heads of medicine specialising in dealing with slums.

Goal achievement matrix

The goal achievement matrix method compared four options (maintaining the *status quo*, removal policy, upgrading policy and land versus time policy). Slum areas provide housing credit; for this reason, a large weight has been given, but by removing slums, this balance will be wasted 'urban capital', so very little weight has been given, and the balance will remain in the case of upgrading or exchange, so high weights were given, and so on for the rest. The details of the matrix are shown in Table 2, and it appears that the exchange option is the best one as it obtained the most points. On the other hand, leaving the slums as they are (the current situation) and not dealing with them got the lowest points, so ignoring this problem leads to serious problems for urban areas, in general.

Questionnaire for specialists

In the second part of evaluating the idea of the land-for-time policy, a questionnaire was prepared for academics working within this jurisdiction, local government officials and heads of departments within the ministries concerned with slums, as shown in Appendix 1. The research dealt in detail with the relationship between the policy of land versus time and the factors of sustainable urban development, as questions were distributed within these axes for the respondents to choose within a gradation of nine steps for each question, starting from the great positive impact and ending with the strong negative impact. A total of 55 questionnaires were distributed and 50 copies were returned. The following results show the opinion of these experts and my agencies:

Social aspect

The social aspect of the questionnaire was divided into five questions, as shown in Appendix 2 and Figure 5. The analysis of the questionnaire shows that there is a significant positive impact of the proposed policy, with a combined impact rate (very high, high, medium and minimum) of 88% in terms of enhancing the security of the city and the slum community. This percentage decreased to 72% concerning the provision of shelter to the residents, and the percentage increased to 92% because of its impact (60% responded that there was a very high impact) on not rewarding trespassers and deterring abuse. This is a very important factor to reduce this phenomenon that

Table 2. Slums solutions compared with the use of the goal achievement matrix.

Main objectives	Weight	Secondary goals	Weight	Current situation	Removal policy	Upgrading policy	Trade-off policy
Social aspect	33	Security of slums and city	7	1	5	4	5
		Providing shelter for people	7	5	1	5	5
		Failure to reward transgressors and deter transgression	6	3	6	0	5
		Providing services and improving social status	6	1	1	5	5
		Social justice	7	3	3	4	6
Environmental aspect	34	Impact on natural environment	10	2	8	6	8
		Impact on city's environment	8	2	6	4	6
		Improved slum environment	7	1	1	6	6
		Depletion of agricultural land in city	9	2	7	4	8
Economic aspect	33	Impact on city's economic efficiency	9	2	7	3	7
		Maintaining value of real estate in city	4	2	3	2	3
		Preserving urban capital	6	4	2	5	4
		Effect on transport movement in city	8	2	7	3	5
		Processing policies expenses	6	1	4	0	2
	100	Total	100	31	61	51	75

Source: own study.

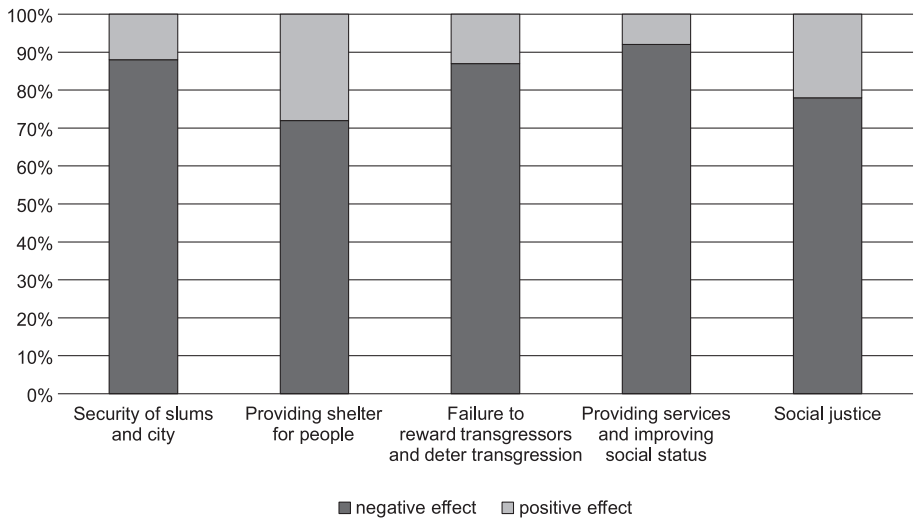

Fig. 5. Results of the impact of land-for-time policy on the social side.
Source: own study.

traders benefit from. The answer to the legalisation of providing services and improving the social situation at the expense of the city and the population was also high (92%). When considering social justice, 78% viewed the policy as having a collective impact (very high, high, medium and minimum) in providing social justice. The result of the proposed policy's impact on the social side is very positive, according to the experts' opinions expressed through the questionnaire.

Environmental aspect

Four questions were prepared within the environmental aspect of the questionnaire, as shown in Appendix 2 and Figure 6. The analysis of the questionnaire shows that there is a significant positive impact of the proposed policy, and the combined impact rate (very high, high, medium and minimum) is 80% on the natural environment. This percentage rose to 86% for its positive impact on the built environment in the city. The percentage was 78% for its positive impact (60% answered that there is a very high impact) on improving the environment of slums. The answer to the depletion of agricultural lands and distinctive sites in the city was also high at 84%. As a result, there is a significant and clear impact of the proposed policy on the environmental side, according to the opinion of the experts indicated in the questionnaire.

Economic aspect

The economic aspect of the questionnaire was divided into five questions, as shown in Appendix 2 and Figure 7. The analysis of the questionnaire shows that there is a significant positive impact of the proposed policy on the economic efficiency of the city and the combined

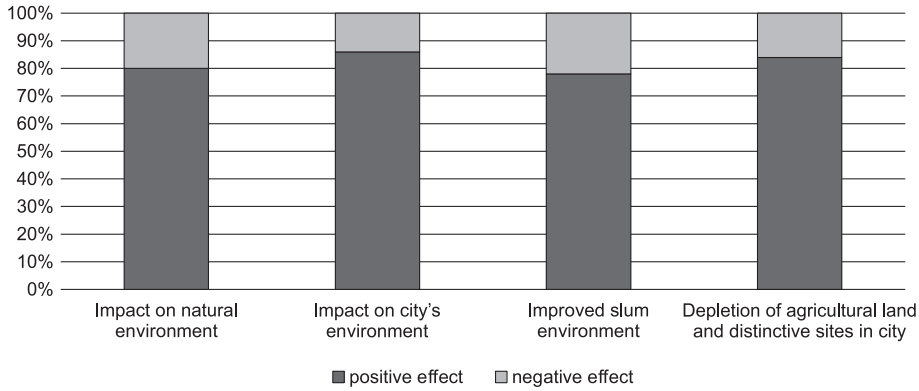

Fig. 6. Results of the impact of the land-for-time policy on the environmental side.
Source: own study.

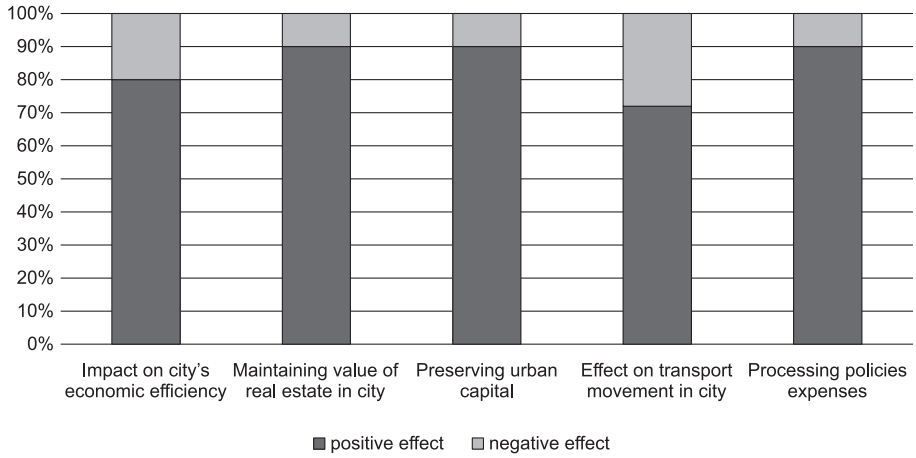

Fig. 7. The results of the impact of the land-for-time policy on the economic side. Source: own study.

Table 3. Land-for-time policy effect on urban sustainability factors in the form (positive, neutral, negative).

Aspect	Influence	% positive	% neutral	% negative
Environmental	Impact on natural environment	72	26	2
	Impact on city's environment	74	24	2
	Improved slum environment	70	22	8
	Depletion of agricultural land and distinctive sites in city	78	16	6
Economic	Impact on city's economic efficiency	66	28	6
	Maintaining value of real estate in city	86	10	4
	Preserving urban capital	80	18	2
	Effect on transport movement in city	50	44	6
	Processing policies expenses	84	12	4
Social	Security of slums and city	60	38	2
	Providing shelter for people	50	44	6
	Failure to reward transgressors and deter transgression	88	10	2
	Legitimising services and improving social status	86	12	2
	Social justice	68	22	10

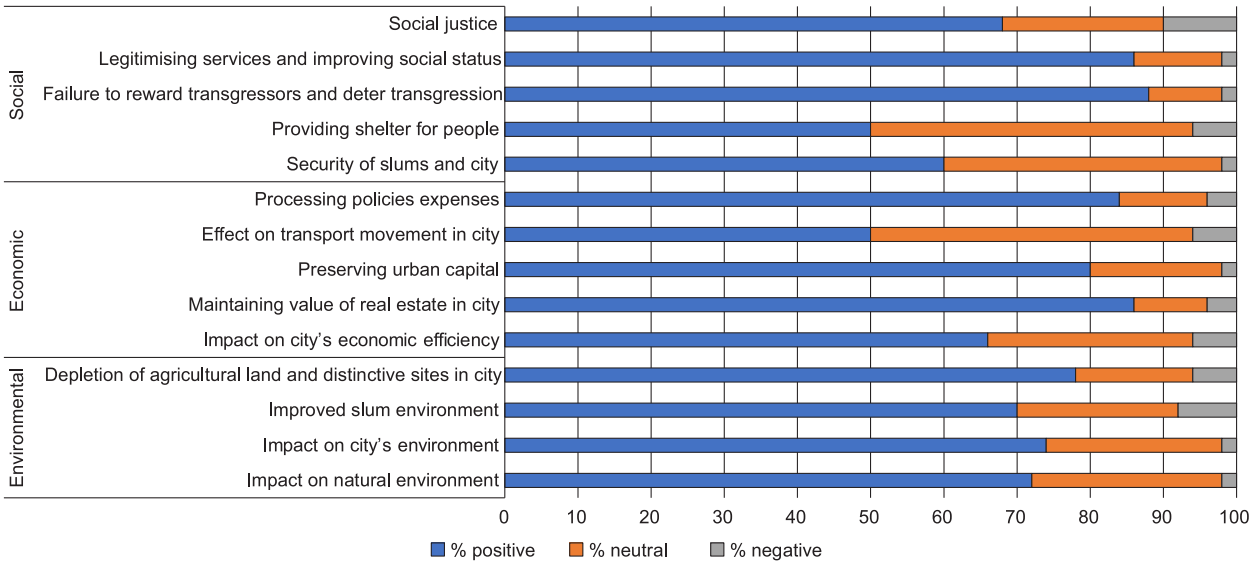

Fig. 8. Results of the impact of land-for-time policy on urban sustainability factors.

impact rate (very high, high, medium and minimum) is 80%. This percentage remained high at 90% in terms of the proposed policy's impact on preserving the value of the real estate in the city, while there was a high level of agreement regarding the policy's role in preserving the urban capital. The impact rate of 90% was to preserve housing units in slums and include them within the housing balance. The percentage decreased to 72% because of its impact on the transport movement in the city; the answer to reducing treatment costs for slums was also high and amounted to 90%.

When merging the questionnaire answers as shown in Appendix 2, the following were obtained: very high impact, high impact and medium impact were grouped under the positive impact; minimum, no impact and minimum negative were grouped under no impact (neutral answer); and minimum negative impact, medium negative and high negative were grouped under the negative impact of the proposed policy. This shows that the results of the proposed policy remain positive. Table 3 and Figure 8 show that all positive results exceeded 50% and the negative results remained insignificant.

Discussion

Previous studies have shown that solving the problem of slums requires well-coordinated efforts to integrate multisectoral interventions (Elrayies 2016). On examining the three strategies for treating slums, it was found that the proposed strategy (land versus time) is the best option for dealing with slums using the two methods (goal achievement matrix and expert questionnaire). However, its implementation requires concerted efforts with the necessary legislation and political will. The possibility of an application exists, but not easily, with 16% indicating that it could not be implemented. The proposed strategy requires a survey of the reality of slums throughout Iraq. To stop any new transgression and not to include it within these treatments requires modern satellite images with high resolution to prove the reality of the violations to make concerted effort to eliminate them, as well as ground surveys to make a comprehensive inventory of all residents of these areas. These technical requirements are possible in the opinion of experts, with 76% of answers stating that there are no technical obstacles.

Most of the encroached areas are agricultural land owned by the state (the Ministry of Finance in it), which is from one-half to three-quarters, and this provides a legal basis for the state's claim of its right within these lands to implement the land-for-time strategy. The rest of the administrative and legal details remain relatively less important. In this context, 70% of the experts have answered that there are no administrative and legal obstacles to implementing the proposed policy (land versus time).

The success of any policy to address slums is linked to the realism of this policy and its applicability under specific circumstances that include the conditions of the country, which means the economic situation, the growth rate of the national product, the population as well as the conditions of the region. However, it is more closely related to the nature of the abuse and the urban area around which this abuse arises. During the study of the situation in Iraq at the current stage, which is characterised by significant economic growth and population growth, with the absence of an appropriate legislative framework and poor state control, the trade-off option is considered appropriate for Iraq. The material resources are sufficient to solve the housing problem according to the planning standards. However, the weakness of the planning and oversight aspect currently does not allow the citizens to be bound by the standards. Therefore, the trade-off policy can be a starting point for following proper planning methods once the requirements have been met.

Conclusions

There is a prominent call for efficient urban planning and the curbing of unplanned development in Iraq, especially the spread of slums. The trend of population growth in the country and the national product is followed by a high rate of urbanisation. The absence of coordinated and well-planned growth, as seen in the formation of many unplanned and slum suburbs surrounding Iraqi cities, has turned into a cancerous growth phenomenon without any planning or coordination.

Different from other countries where the spread of slums is related to poverty and low income, the case of Iraq is special. This is usually a case of fast-paced wealth generation and the rise of neglect for urban planning, plotting of houses for citizens and the establishment of integrated complexes.

It is impossible to neglect the destructive consequences that unplanned housing has on sustainable urban development. It has made it hard for Iraq to enjoy the opportunities of the international market, the devolution of power and the injection of profound finances into the country.

With regard to the state of affairs in Iraq, the formal and legal structures, coupled with the traditional systems, cannot tackle the problem of slums competently. Nevertheless, a land-for-time policy tailored to the general situation could be a starting point for appropriate regulations to solve the issue in Iraq. This policy, based on the current conditions, has proved to be superior to the rest. Municipal or local administration control must be entrenched in building legislation to resolve the problem of construction permits being issued for buildings that are in violation of regulations and those that fail to fulfil construction permit requirements. On top of that, we have to take responsibility for creating a respected body that helps to solve this issue.

The findings presented in this article emphasise the importance of addressing the unplanned urban expansion and slums issue in Iraq. By highlighting the limitations of existing approaches and proposing the adoption of a land-for-time policy, this study contributes to sustainable urban development. It confirms the importance of balancing economic growth with thoughtful urban planning, housing provision and the establishment of effective regulatory measures.

Moving forward, it is essential to recognise the applicability and potential impact of the proposed solutions in Iraq. Further research and exploration should focus on the implementation of the land-for-time policy, the strengthening of municipal oversight and the establishment of a dedicated body to combat random housing. These efforts will pave the way for more comprehensive and effective measures to address the challenges posed by unplanned urban growth and the proliferation of slums, ultimately fostering sustainable and inclusive urban development in Iraq.

Conflicts of interest

The authors declare no conflict of interest.

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Appendix 1. Pictures of slum areas in Kut city

A commercial bypass on the axes of the regional movement

A commercial and service bypass on the axes of the regional movement

A commercial bypass with a pool of dirty water on the axes of the regional movement

A commercial and industrial bypass on the axes of the regional movement

Animals grazing waste

Industrial services and a mosque in the bypass area

Appendix 2. The questionnaire

My teachers, colleagues, municipal decision-makers and researchers,

This questionnaire aims to reach the best treatment for random housing within the research entitled 'Suggested planning treatments for random housing to achieve urban sustainability'. Please fill out the form by ticking the correct answer box, and these data will be used for purely academic purposes. We hope for your cooperation to obtain the best results; your response and objectivity in answering this questionnaire will help make this scientific research accurate and obtain the best results and ways to make the city of Kut better in partnership with you.

First: A summary of the research idea

The best way to deal with random housing is by addressing the causes of its emergence and trying to prevent its occurrence. After the spread of slums around cities, all the methods used to treat them has become useless, all the methods used to solve this problem carry with them negative aspects that affect sustainability of urban areas. The research tried to investigate the treatments successful in achieving sustainable urban development, whether within these slums or in the surrounding urban areas. Reducing the negative aspects related to the traditional treatments of this phenomenon, which Iraq is currently suffering from, has become a widespread trend in most Iraqi cities. As a result, there emerged belts surrounding urban areas, causing very serious repercussions, some of which can be addressed, but most of the problems are difficult to treat because they affect the urban structure (structure) of cities.

After reviewing all types of solutions for this problem, it was found that the proposed treatments are divided into two types, the first is the recognition and acceptance of the situation with all its shortcomings and problems, and the second is the lack of recognition and removal of slums, causing the displacement of hundreds of thousands of people with limited income, so both are not suitable for the Iraqi situation. The research puts forward the idea of exchange (land for time), meaning the conditional recognition of time (defining a long-term period of their stay), that is, giving the slum-dwellers a period of time to stay in these areas, and this time allows state agencies to address this problem. Pending implementation, the second part of the proposal is to address the real causes of random housing to develop final solutions.

Second: The impact of the idea of exchange (land for time) on sustainable urban development.

The social aspect.

		Very high	High	Medium	Minimum	No effect	Minimum negative impact	Medium negative impact	High negative impact	Very high negative impact
1	Security of slums and city	7	11	12	14	3	2	1		
2	Providing shelter for people	2	4	19	11	8	3	2	1	
3	Failure to reward transgressors and deter transgression	30	10	4	2	2	1	1		
4	Legitimising services and improving social status	25	11	7	3	2	1	1		
5	Social justice	13	11	10	5	4	2	2	1	2

The environmental aspect.

		Very high	High	Medium	Minimum	No effect	Minimum negative	Medium negative	High negative	Very high negative
1	Impact on natural environment	13	11	12	4	7	2	1		
2	Impact on city's environment	15	16	6	6	4	1	1	1	
3	Improved slum environment	12	16	7	4	5	2	2	1	1
4	Depletion of agricultural land and distinctive sites in city	14	16	9	3	4	1	2	1	

The economic aspect.

		Very high	High	Me-dium	Mini-mum	No effect	Minimum negative	Medium negative	High Negative	Very high negative
1	Impact on city's economic effi-ciency	11	14	8	7	5	2	2	1	
2	Maintaining value of real estate in city	29	11	3	2	2	1	1	1	
3	Preserving urban capital	13	20	7	6	1	2	1		
4	Effect on transport movement in city	2	4	19	11	8	3	2	1	
5	Processing policies expenses	21	12	7	4	3	1	1	1	

Third: Applying the idea of trade-off in random housing

Is the idea of exchange (land for time) practical and applicable?

It can be applied easily	23	It can be applied with difficulty	19	It cannot be applied	8

Do you think there are technical obstacles that prevent the implementation of the idea of exchange (land for time)?

There are no technical obstacles	38	There are technical obstacles	13

Do you think there are administrative obstacles that prevent the implementation of the idea of exchange (land for time)?

There are no administrative obstacles	35	There are administrative obstacles	15th